



**VII.
INTERNATIONAL
APPLIED SOCIAL
SCIENCES
CONGRESS
(C-IASOS – 2023)**

**Full Paper
Proceedings
Book**



**L-Università
ta' Malta**



SVEUČILIŠTE U RIJEKI UNIVERSITY OF RIJEKA
FAKULTET ZA MENADŽMENT U TURIZMU I UGOSTITELJSTVU
FACULTY OF TOURISM AND HOSPITALITY MANAGEMENT
OPATUJA, HRVATSKA CROATIA



**VII. INTERNATIONAL APPLIED SOCIAL SCIENCES
CONGRESS (C-IASOS 2023)
FULL PAPER PROCEEDINGS BOOK**

13th-15th November 2023

“Applicable Knowledge for a Sustainable Future”

Editor in Chief

Dr.Ercan ÖZEN

Editors

**Dr. Simon GRIMA
Dr. Adalet HAZAR**

**Dr. Larisa MISTREAN
Dr. Esat SAÇKES**

<https://iasoscongress.org/en/>

All copyrights of this publication belong to the Editors. No parts of this publication may not be used, copied, reproduced, redistributed, or published without being appropriately referenced. The Authors are responsible for accuracy of all statements and data contained and the accuracy of all references information, and for obtaining and submitting permission from the author and publisher of any previously published material included in this publication. The Publisher and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this publication.

ECONOMICS AND FINANCIAL RESEARCH ASSOCIATION

Address: Ankara, Türkiye
<https://efad.org.tr/en/>

ISBN: 978-625-94328-1-6

29.12.2023

International Applied Social Sciences Congress. (CiasoS Congress) All Rights Reserved.

**VII. INTERNATIONAL
APPLIED SOCIAL SCIENCES CONGRESS (C-IASOS 2023)
FULL PAPER PROCEEDINGS BOOK**

ISBN: 978-625-94328-1-6

29.12.2023

Copyright © 2023

CONGRESS ID

Name of Congress

International Applied Social Sciences Congress- CiasoS Congress

Type of Participation

Keynote and Invited

Date and Place 13-15 November 2023, Malta

Page Number	: 787
Size	: A4
Language	: English
Scientific field	: Social Sciences
Publication date	: 29.12.2023

Congress Chairpersons

Dr. Simon GRIMA

Dr. Ercan ÖZEN

Dr. Luan VARDARI

Dr. Larisa MISTREAN

Executive Committee

Prof. Dr. Simon GRIMA	University of Malta
Prof. Dr. Alexandru STRATAN	Academy of Economic Studies of Moldova
Prof. Dr. Beate SWIECKA	Szczecin University, Poland
Prof. Dr. Grațiela Georgiana NOJA	West University of Timisoara, Romania
Prof. Dr. Mirela CRISTEA	Universitatea din Craiova, Romania
Prof. Dr. Kiran SOOD	Chitkara University, India
Prof. Dr. Sanjay TANEJA	Graphic Era University, India
Assoc.Prof.Dr. Sabina HODŽIĆ	University of Rijeka, Croatia
Assoc.Prof. Dr. Victoria COCIUG	Academy of Economic Studies of Moldova
Assoc.Prof.Dr. Larisa MISTREAN	Academy of Economic Studies of Moldova
Dr.Liliana STAVER	Academy of Economic Studies of Moldova
Dr. Maia DIAKONIDZE	Akaki Tsereteli State University, Georgia
Vedran MILOJICA	University of Rijeka, Croatia
Assoc.Prof.Dr. Ercan ÖZEN	Uşak University, Türkiye
Assist.Prof.Dr. Esat SAÇKES	Balıkesir University, Türkiye

Advisory Committee

Prof. Dr. Frank BEZZINA	University of Malta
Prof. Dr. Laszlo VASA	Metropolitan University – Hungary
Prof. Dr. Catalina SITNIKOV	University of Craiova, Romania
Prof.Dr. C. Coşkun KÜÇÜKÖZMEN	İzmir Ekonomi University, Türkiye
Prof. Dr. Patrizia ZAGNOLI	University of Florence - Italy
Prof. Dr. Sokol PACUKAJ	Aleksandër Moisiu University of Durrës, Albania

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Prof.Dr. Sima NART	Sakarya University, Turkiye
Prof.Dr. Süleyman YÜKÇÜ	Dokuz Eylül University, Turkiye.
Prof.Dr. Tuğrul KANDEMİR	Afyon Kocatepe University, Turkiye
Prof.Dr. Veysel KULA	Afyon Kocatepe University, Turkiye

Scientific Committee

Prof. Dr. Beata SWIECKA	Szczecin University, Poland
Prof. Dr. Felix Puime GUILLEN	University of A Coruña, Spain
Prof. Dr. Christian RICHTER	Coventry University in Egypt at the Knowledge Hub
Prof. Dr. Daniela BAGLIERI	University of Messina, Italy
Prof. Dr. Darko TIPURIĆ	University of Zagreb, Croatia
Prof. Dr. Ibish MAZREKU	University "Haxhi Zeka" - Peja, Kosovo
Prof. Dr. Inna ROMANOVA	University of Latvia, Latvia
Prof. Dr. Iryna KREIDYCH	National Technical University of Ukraine
Prof. Dr. Ivan HANAFI	University of Negeri Jakarta - Indonesia
Prof. Dr. Leonardo Aureliano DA SILVA	Escola Superior de Propaganda e Marketing – ESPM,Brazil
Prof. Dr. Lorne SWITZER	Concordia University, Canada
Prof. Dr. Macario G. GAYETA	University of the East, Philippines
Prof. Dr. Mariya SHYGUN	Kyiv National Economic University, Ukraine
Prof. Dr. Mirela CRISTEA	Universitatea din Craiova, Romania
Prof. Dr. Nada RATKOVIĆ	Faculty of Economics, Business and Tourism Split, Croatia
Prof. Dr. Nicoleta SIRGHI	Universitatea de Vest din Timișoara, Romania
Prof. Dr. Olena V. CHERNIAVSKA	National Aviation University Ukraine
Prof. Dr. Olga KOL	St.Petersburg State University of Economics
Prof. Dr. Olga KOVALEVSKAYA	St.Petersburg State University of Economics
Prof. Dr. Ovidiu STOICA	Alexandru Ioan Cuza University of Iasi, Romania
Prof. Dr. Peter HWANG	University of Tartu, Estonia
Prof. Dr. Petru ȘTEFEA	West University of Timisoara, Romania
Prof. Dr. Pierpaolo MARANO	Catholic University of the Sacred Heart, Institute of Law, Department of legal studies, Italy
Prof. Dr. Rădulescu MAGDALENA	University of Pitesti, Romania
Prof. Dr. Raluca DRACEA	University of Bucharest, Romania
Prof. Dr. Ravinder RENA	NWU Business School, North-West University, South Africa

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Prof. Dr. Romina ALKIER	University of Rijeka, Croatia
Prof. Dr. Ronnie FIGUEIREDO	Lusófona University, Portugal
Prof. Dr. Shahida SAJJAD	Malir University of Science & Technology-Karachi-Pakistan
Prof. Dr. Simon GRIMA	University of Malta, Malta
Prof. Dr. Simone Domenico SCAGNELLI	University of Torino, Italy
Prof. Dr. Sokol PACUKAJ	Aleksandër Moisiu University of Durrës, Albania
Prof. Dr. Theodore SYRIOPOULOS	University of The Aegean, Greece
Prof. Dr. Violeta CVETKOSKA	Ss. Cyril and Methodius University in Skopje
Prof. Dr. Wolfgang H. SCHULZ	Zeppelin Universität - Germany
Prof. Dr. Yaqoob Al-BUSADI	Sultan Qaboos University, Umman (Oman)
Prof. Dr. Katarzyna SZOPIK-DEPCZYŃSKA	University of Szczecin, Poland
Prof. Dr. Agim MAMUDI	Mother Teresa University, North Macedonia
Ascoc. Prof. Dr. I. Thonse HAWALDAR	Kingdom University, Bahrain
Assist. Prof. Dr. Andrea IMPERIA	Sapienza University of Rome, Italy
Assist. Prof. Dr. Loredana MIRRA	University of Rome "Tor Vergata", Italy
Assist. Prof. Dr. Aamir Aijaz SYED	Shri Ramswaroop Memorial University, India
Assist. Prof. Dr. Bálint HORVÁTH	Kodolányi János University, Hungary
Assist. Prof. Dr. Nadezhda KOSTADINOVA	St. Cyril and St. Methodius" University of Veliko Tarnovo, Bulgaria
Assist. Prof. Dr. Rrezarta GASHI	AAB College, Faculty of Economics- Kosovo
Assist. Prof. Dr. Tehmina KHAN	RMIT University, Australia
Assoc. Prof. Dr. Agim MAMUDI	Mother Teresa University, North Macedonia
Assoc. Prof. Dr. Aleksander BIBERAJ	Polytechnic University of Tirana, Albania
Assoc. Prof. Dr. Beaneta VASILEVA	Technical University of Varna, Bulgaria
Assoc. Prof. Dr. Edyta MARCINKIEWICZ	Lodz University of Technology, Poland
Assoc. Prof. Dr. Erdoğan EKİZ	King Abdulaziz University, Saudi Arabia
Assoc. Prof. Dr. Fitim DEARI	South East European University -North Macedonia
Assoc. Prof. Dr. Hab Graçela Georgiana NOJA	West University of Timisoara,Romania
Assoc. Prof. Dr. Hanna SHVINDINA	Sumy State University; Fulbright Alumna- Purdue University, USA
Assoc. Prof. Dr. Igor TODOROVIC	University of Banja Luka, Bosnia and Herzegovina
Assoc. Prof. Dr. Larisa MISTREAN	Academy of Economic Studies of Moldova
Assoc. Prof. Dr. Inga COTOROS	Academy of Economic Studies of Moldova. Moldova

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Assoc. Prof. Dr. İsmail GÖLGEÇİ	University of Aarhus, Denmark
Assoc. Prof. Dr. Klime POPOSKI	University of Kliment Ohridski, North Macedonia
Assoc. Prof. Dr. Muhammad Khalid SOHAIL	Bahria University, Pakistan
Assoc. Prof. Dr. R. Sabir qızı ABDULLYEVA	Azerbaijan National Academy of Sciences, Azerbaijan
Assoc. Prof. Dr. Sanela ŠADIC	University of Sarajevo, Bosnia and Herzegovina
Assoc. Prof. Dr. Nermin KİŞİ	Zonguldak Bülent Ecevit University, Türkiye
Asst. Prof. Dr. Anera MUSLIU	University "UKSHIN HOTI" Prizren, Kosovo
Asst. Prof. Dr. Festim TAFOLLI	University "UKSHIN HOTI" Prizren, Kosovo
Asst. Prof. Dr. Kushtrim GASHI	University "UKSHIN HOTI" Prizren, Kosovo
Dr. Alireza RAJEBI	Charkhe Niloufari Azarbaijan University, Iran
Dr. Bogdan PATRUT	Alexandru Ioan Cuza" University of Iasi, Romania
Dr. Charalampos KYRIAKIDIS	National Technical University of Athens, Greece
Dr. Edgardo SICA	University of Foggia, Italy
Dr. Eihab FATHIELRAHMAN	United Arab Emirates University, UAE
Dr. Enkeleda LULAJ	University of Haxhi Zeka, Kosovo
Dr. Gul JUSSOPOVA	National school of public policy , Kazakhstan
Dr. Iqra AKRAM	Lahore College for Women University, Pakistan.
Dr. Irene ANASTASIADOU	Logistics, Greece
Dr. Maia DIAKONIDZE	Akaki Tsereteli State University, Georgia
Dr. Marie Therese VILLA	Eudoxia Research Centre -Philippines
Dr. Mehmet Ali KÖSEOĞLU	Metropolitan State University, USA
Dr. Menno BOTH	Saxion University of Applied Sciences , Netherlands
Dr. Muthmainnah	Al Asyariah Mandar University - Indonesia
Dr. Nadia MANSOUR	University of Sousse-Tunisia
Dr. Peterson K. OZILI	Central Bank of Nigeria, Nigeria
Dr. Ragif HUSEYNOV	Managing Director of Khazar Education Centre / Azerbaijan
Dr. Samer Ali AL-SHAMI	Universiti Teknikal, Malaysia
Dr. Sc. Fisnik MORINA	University "Haxhi Zeka" - Peja, Kosovo
Dr. Syed Tahir RIZVI	International Islamic University Islamnad, Pakistan
Dr. Tomoko OIKAWA	Limerick Üniversitesi, Ireland
Dr. Valdrin MISIRI	University "Haxhi Zeka" - Peja-Kosovo
Dr. Lana CINDRIĆ	University of Zagreb, Croatia

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Prof. Dr. Adalet HAZAR	Başkent University, Türkiye
Prof. Dr. Adnan SEVİM	Anadolu University, Türkiye
Prof. Dr. Ebru Güllü KÜÇÜKALTAN	Dokuz Eylül University, Türkiye
Prof. Dr. Birol ERKAN	Iskenderun Technical University, Türkiye
Prof. Dr. Cafer TOPALOĞLU	Muğla Sıtkı Koçman University, Türkiye
Prof. Dr. Cantürk KAYAHAN	Afyon Kocatepe University, Türkiye
Prof. Dr. Çağatan TAŞKIN	Uludağ University, Türkiye
Prof. Dr. Duygu KIZILDAĞ	İzmir Demokrasi University, Türkiye
Prof. Dr. Ekrem TUFAN	Çanakkale Onsekiz Mart University, Türkiye
Prof. Dr. Emrah ÖZKUL	Kocaeli University, Türkiye
Prof. Dr. Erhan DEMİRELİ	Dokuz Eylül University, Türkiye
Prof. Dr. Ferudun KAYA	Abant İzzet Baysal University, Türkiye
Prof. Dr. Funda Rana ADAÇAY	Anadolu University, Türkiye
Prof. Dr. İlhan KÜÇÜKKAPLAN	Pamukkale University, Türkiye
Prof. Dr. Metin COŞKUN	Anadolu University, Türkiye
Prof. Dr. Savaş ARSLAN	Bahçeşehir University, Türkiye
Prof. Dr. Senay YÜRÜR	Yalova University, Türkiye
Prof. Dr. Şenol BABUŞÇU	Başkent University, Türkiye
Prof. Dr. Ufuk SELEN	Uludağ University, Türkiye
Prof. Dr. Onur GÖZBAŞI	Nuh Naci Yazgan University, Türkiye
Prof. Dr. Volkan ALTINTAŞ	Katip Çelebi University, Türkiye
Assoc. Prof. Dr. Mesut ATASEVER	University of Uşak, Türkiye
Assoc. Prof. Dr. Bayram ŞAHİN	Balıkesir University, Türkiye
Assoc. Prof. Dr. Çağatay BAŞARIR	Bandırma Onyedli Eylül University, Türkiye
Assoc. Prof. Dr. Dilşad ÇOKNAZ	Abant İzzet Baysal University, Türkiye
Assoc. Prof. Dr. İlhan ADİLOĞULLARI	Çanakkale Onsekiz Mart University, Türkiye
Assoc. Prof. Dr. Müberra ÇELEBİ	Düzce University, Türkiye
Assoc. Prof. Dr. Selim ŞANLISOY	Dokuz Eylül University, Türkiye
Assoc. Prof. Dr. Serkan ÖZDEMİR	Bursa Technical University, Türkiye
Assoc. Prof. Dr. Sertaç GÜNGÖR	Selçuk University, Türkiye
Assoc. Prof. Dr. Sinan AYTEKİN	Balıkesir University, Türkiye
Assoc. Prof. Dr. Utku KÖSE	Süleyman Demirel University, Türkiye
Assoc. Prof. Dr. Letife ÖZDEMİR	Afyon Kocatepe University, Türkiye

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Assoc. Prof. Dr. Ozan ÖRMECİ	Kent University, Türkiye
Assoc. Prof. Dr. Eser YEŞİLDAĞ	Celal Bayar University, Türkiye
Assoc. Prof. Dr. Gonca DİLER	Afyon Kocatepe University, Türkiye
Assist. Prof. Dr. Esat SAÇKES	Balıkesir University, Türkiye
Assist. Prof. Dr. Gönül İpek ALKAN	Dokuz Eylül University, Türkiye
Assist. Prof. Dr. İbrahim Murat BİCİL	Balıkesir University, Türkiye
Assist. Prof. Dr. Kadir YILDIZ	Celal Bayar University, Türkiye
Assist. Prof. Dr. M. Ertan TABUK	Hitit University, Türkiye
Assist. Prof. Dr. Neşe KAFA	Adıyaman University, Türkiye
Assoc. Prof. Dr. Özer YILMAZ	Bandırma Onyedil Eylül University, Türkiye
Assist. Prof. Dr. Reşat SADIK	Düzce University, Türkiye
Assoc. Prof. Dr. Serap VURUR	Afyon Kocatepe University, Türkiye
Assist. Prof. Dr. Serhat Adem SOP	Mehmet Akif Ersoy University, Türkiye
Assist. Prof. Dr. Yusuf ÖCEL	Düzce University, Türkiye
Assist. Prof. Dr. Erdoğın KOTİL	Abant İzzet Baysal University, Türkiye
Dr. Abdurrahman MOHAMED	Antalya Bilim University, Türkiye
Dr. Bilge VİLLİ	Balıkesir University, Türkiye
Dr. Seda MUMLU KARANFİL	İstanbul Gelişim University, Türkiye
Dr. Aykut AKSU	Trakya University, Türkiye

FOREWORD

In the ever-evolving landscape of finance, where technological advancements continue to unfold at an unprecedented pace, the C-IASOS 2023 Congress emerges as a pivotal nexus for professionals, scholars, graduate students, and thought leaders.

This gathering provides an indispensable platform for these diverse stakeholders to converge, share profound insights, and collectively navigate the intricate terrain of financial risk management in our rapidly evolving digital era.

Standing at the intersection of finance and technology, we find ourselves confronted with an urgency to adapt, innovate, and strategically manage financial risks like never before. The ongoing digital revolution, while unlocking unprecedented opportunities, simultaneously introduces novel dimensions of risk that demand our unwavering attention and understanding.

From the ever-looming specter of cybersecurity threats to the intricate complexities of algorithmic trading, our financial landscape is now intricately woven with the threads of technology, necessitating a comprehensive and forward-thinking approach to risk management. The C-IASOS 2023 Congress, meticulously organized by the esteemed Department of Insurance and Risk Management of the Faculty of Economics, Finance, and Accountancy at the University of Malta, is thoughtfully designed to provide a dynamic forum for in-depth discussions, foster interdisciplinary collaboration, and facilitate the exchange of cutting-edge research and practical insights.

The distinguished speakers and panelists, drawn from diverse sectors and backgrounds, will delve into the latest trends, challenges, and innovative solutions in managing financial risk within the dynamic framework of the digital world.

As the Congress embarks on this intellectual journey, I implore the participants to actively participate, engage wholeheartedly with their peers, and contribute their invaluable expertise to the collective understanding of financial risk management in this digital age.

The C-IASOS Congress is unwavering in its commitment to nurturing an environment that not only encourages dialogue but also sparks innovation, propelling the understanding of the intricate interplay between finance and technology to new heights.

My heartfelt gratitude extends to all participants, sponsors, and supporters who have played a pivotal role in bringing C-IASOS 2023 Congress to fruition. The participants' dedication to advancing knowledge and fostering collaboration is truly commendable, and I am confident that the next two days will be an intellectually enriching and professionally rewarding experience for all involved.

Together, let us embark on this shared journey of exploration and discovery, shaping the future trajectory of financial risk management in this dynamic digital age.

Welcome to the "Managing Financial Risk in a Digital World" Congress, where your collective contributions and interactions will undoubtedly leave an indelible mark on the evolving landscape of finance.

Professor Dr. Eleftherios Thalassinos

Ph.D., in 1983, M.B.A., in 1979, D.H.C., in 2013; 2015; 2018

European Chair Jean Monnet in 1979

Editor-in-Chief, ERSJ www.resj.eu, IJEBA www.ijeba.com, IJFIRM
www.journalfirm.com Chair ICABE conference www.icabe.gr
thalassinos@ersj.eu

SUMMARY FOR CIASOS CONGRESS 2023

CiasoS Congress 2023 was held in Malta as hybrid form during 13-15 November 2023 by CiasoS Science Platform which includes Malta University, Academy of Economic Studies of Moldova (ASEM), University of Rijeka Faculty of Tourism and Hospitality Management, Croatia and University “Ukshin Hoti” Prizren, Faculty of Economics, (Kosovo)

There are participants from 32 different countries at the congress as follows: Austria, Azerbaijan, Bangladesh, Bulgaria, China, Croatia, Georgia, Germany, Greece, India, Indonesia, Iraq, Italy, Kazakhstan, Kyrgyzstan, Kosovo, Latvia, Malaysia, Malta, Moldova, Nigeria, North Macedonia, Pakistan, Philippines, Poland, Portugal, Romania, Slovakia, South Africa, Spain, Turkiye and Ukraine.

18 of 113 papers were presented onsite form at University of Malta Valletta Campus while others were presented virtually. From 32 different countries about 250 authors contributed the CiasoS 2023. As we see detailed program of 2023 event, 37,17% of the all papers were presented by Türkish participants. 12,39% of the papers comes from Romania, 9,73% from India, 7,08% from Moldova, 2,65% from Croatia, 1,77 % from Malta, 1,77 % from Latvia, 1,77 % from Bulgaria, 1,77 % from Georgia and other 23,90% of the papers were from other 23 countries.

The special topic of the CiasoS 2023 was “***Managing Financial Risk in a Digital World***” thus there were four keynote speakers on the preliminary session on the line with the Congress topic. Session started by the speech of Prof. Emanuel Said who is the dean of Faculty of Economics, Management & Accountancy, University of Malta.

First keynote speaker was Mr.Fabio Frontini and he delivered his speech on “Traditional Trading Vs. Crypto Trading – The Elysium Experience”. In turn; Mr. Luca Celati presented on “Risk Management in Crypto”, Prof. Joshua Ellul presented on “The need for Techno-Regulatory Tools for Software Regulation: from Blockchain, to AI and Beyond” , and Mr.Manuele Marini – Opportunities and Challenges Using AI and Machine Learning.

The Congress committee hold in 14 November 2023 Tuesday at Msida campus for technical meeting. Finally the event ended by the social trip on Wednesday, 15 November 2023.

CIASOS AWARDS

Award Name:VII. C-iasoS Congress Science Award

Paper Title : Energy Transition and Sustainability

Author/s : Dr. Peter Stallinga

Award Name:CiasoS Congress Thematic Award - Managing
Financial Risk in a Digital World

Paper Title :Navigating Financial Risk: Strategies for Sustainable
Wealth Management

Author/s :Dr.Marie Therese Villa-Caoile

Award Name: Best Presentation Award

Paper Title : The revolutionary of AI and IoT (AIoT) on students'
communication and critical thinking in EFL Classroom

Author/s : Dr. Muthmainnah

CIASOS Congress 2023 Full Program

13.11.2023

PRELIMINARY SESSION

8.30- 8.55 Registration
9.00- 9.15 Prof. Emanuel Said, Dean of FEMA, University of Malta,
9. 15-10.00 Fabio Frontini – Traditional Trading Vs. Crypto Trading – The Elysium Experience
10.00-10.45 Luca Celati - Risk Management in Crypto
10.45 -11.00 Coffee Break
11.00-11.45 Prof. Joshua Ellul - The need for Techno-Regulatory Tools for Software Regulation:
from Blockchain, to AI and Beyond
11.45-12.30 Manuele Marini – Opportunities and Challenges Using AI and Machine Learning.
12.45 -13.20 Panel Discussion
13.20 - 14.00 Lunch

PLENARIES

13.11.2023 - 14:00-15:30

ROOM 1: Session Chair: Inna Romanova - Latvia

009-El Thalassinós - Greece

Central Bank Digital Currency vs Cryptocurrencies

093- Ankit Dhiraj, Sanjeev Kumar, Divya Rani, Kiran Sood - India, India, India, India

Perceived Financial Risk as Moderator of Satisfaction, Destination Image and Revisit Intention

028- Thomas Burkhardt - Germany

Portfolio selection for the risk lover

ROOM 2: Session Chair: Andre Farrugia- Malta

021-Petya Petrova - Bulgaria

Reporting for Sustainability: Practices in Environmental Accountability among Bulgarian companies

029- Marica Mazurek - Slovakia

The Innovative Approach to Public Services Provision in Cities

078-Rumyana Popova, Vladimir Karadzhov- Bulgaria, Bulgaria

Artificial Intelligence-Some Ethical Issues in the Context of State Government

ROOM 3: Session Chair: Sinan Saraçlı- Türkiye

017-Huriye Gonca Diler - Türkiye

Does Digitalization Lead to Green Economic Growth in The Turkish Economy?

054- Sinan Saraçlı, Bilge Villi, Berkalp Tunca – Türkiye, Türkiye, Türkiye

Examination of the Companies in the BIST 30 Index within the Framework of the UN Sustainable Development Goals

023 -Fulya Güngör , Bilge Villi , Esat Saçkes- Türkiye, Türkiye, Türkiye

Determining the Visibility of Sustainability Certificates of Accommodation Facilities with Tourism Operation Certificates in Electronic Environments by Content Analysis; Balıkesir Province Example

13.11.2023 - 16:00-17:30

ROOM 1: Session Chair: Jonathan Spiteri - Malta

088 Inna Romanova, Jan Körnert, Marina Kudinska – Latvia, Germany, Latvia

Greylisting: Punishment or Opportunity?

089- Laila Cekule, Margarita Dunska- Latvia, Latvia

Fostering Entrepreneurial Intention through the Family Business Effect

026- Popa Marina, Plămădeală Olivia- Moldova, Austria

A look at the Financial World in a Metaverse Version

ROOM 2: Session Chair: Christian Bonnici West- Malta

099-Nilcan Mert, Yusuf Murat Kızılkaya, Mustafa Caner Timur – Türkiye, Türkiye, Türkiye

Determinants of Sustainable Environmental Welfare: A Model Proposal for G7 Countries

083-Milian NEGUTOIU- Romania

Quality of Life – Conceptual Approaches and Quantification Methods

030-Peter Stallinga- Portugal

Energy Transition and Sustainability

ROOM 3: Session Chair: Kiran Sood, India

018-N. Serap Vurur, Münevvere Yıldız, Letife Özdemir- Türkiye, Türkiye, Türkiye

The asymmetric impact of foreign direct investments on ecological footprint: Evidence from Türkiye

041 Loredana Mirra - Italy

Cooperative banks, innovative entrepreneurship, and trust: insights from Italy

108- Andrea IMPERIA- Italy

On the endless waste emergency in Rome and its controversial solution

ONLINE SESSIONS

13 November 2023 Monday

09:30 - 10:30 (GMT+1) Malta Time Zone

WEBINAR 1 - Session Chair: Gratiela G. Noja - Romania

016-Mirela Cristea, Gratiela Noja, Raluca Drăcea, Catrinel Tălăban – Romania, Romania, Romania, Romania

New Ventures of Waste Management Innovation for Sustainable Well-being

035- Rareș-Mihai Nițu, Robert-Ștefan Uricaru, Grigore-Ioan Piroșcă- Romania, Romania, Romania, Romania

Green Certificates as a Method to Achieve Carbon Footprint and Greenhouse Effect Reduction Targets

036-Rareș-Mihai Nițu, Radu-Alexandru Budu, Silvia-Elena Iacob - Romania, Romania, Romania

Electric Car Pollution as a Source of Carbon Footprint Reduction

050-Gratiela Georgiana Noja, Marilen-Gabriel Pirtea, Nicoleta Claudia Moldovan, Irina-Maria Grecu, Alexandra Mădălina Țăran – Romania, Romania, Romania, Romania, Romania

Climate change and global environmental risks: new insights from a bibliometric analysis and theoretical systematic review

WEBINAR 2 - Session Chair: Maia Diakonidze - Georgia

031-Daniela Soldić Frleta, Dora Smolčić Jurdana – Croatia, Croatia

Sustainability aspects – domestic tourists' perspective

044-Marino Stanković, Melko Dragojević, Matija Fortuna- Croatia, Croatia, Croatia

The potential in adoption of digital technologies in the hotel industry: Technological, Organizational and Environmental drivers

086-Maia Diakonidze, Nino Topadze – Georgia, Georgia

COVID-19's Impact on Medical Tourism and Public Health Service Enhancements: A Case Study

091-Sergo Tsagareishvili, Maia Diakonidze, Manana Kobakhidze- Georgia, Georgia, Georgia

Prospects of hotel business development: The case study of Georgia

WEBINAR 3 - Session Chair: Nikhil Yadav - India

022-Uma Shankar Yadav, Nikhil Yadav, Mitushi Singh –India, India, India

Study on Indian Monetary System from a Monetarist Viewpoint in the Context of a Pandemic Economic Situation

C-019-Miron Mihaela, Mistrean Larisa – Romania, Moldova

The Usefulness of Authentic Partnerships, Through the Involvement of All Stakeholders, with the Aim of Reducing the Risks Generated by the Pandemic Context in the Educational Environment

038-Arbresh Raveni, Agim Mamuti – North Macedonia, North Macedonia

Forward premium puzzle: Evidence from South East European Countries

051-Alexandra-Mădălina Țăran, Flavia Barna, Miruna-Lucia Năchescu, Marilen-Gabriel Pirtea – Romania, Romania, Romania, Romania

Does good governance and effective health financing improve the health status of EU citizens?

13 November 2023 Monday

10:45 - 11:45 (GMT+1) Malta Time Zone

WEBINAR 1 - Session Chair: Ahmad Al Yakin, India

049-Akansha Mer – India

Predictors and Outcome of Employee Engagement in Startups

053-Criste Cristina, Man Ciel, Crăciun Andreea Florentina – Romania, Romania, Romania

Digitalisation and its Impact on the Economy and Society: An EU Perspective

047-Ahmad Al Yakin, Luis Cardoso, Idi Warsah, Abdul Latief, Muthmainnah, Aco Nasir - Indonesia, Portugal, Indonesia, Indonesia, Indonesia, Indonesia

Practice adapting ChatGPT as teaching materials to promote social interaction in Pancasila and civic education classes

034-Rareș-Mihai Nițu, Alexandra-Maria Vlad, Roberta-Mihaela Stanef-Puica- Romania, Romania, Romania

The Mediterranean Transport Corridor “5 GMED”: Technological Implications in the Rail Transport System

WEBINAR 2 - Session Chair: Muhammad Khalid Sohail - Pakistan

077- Serghei Ohrimenco, Valeriu Cernei – Moldova, Moldova

Cyber Conflict: Indicators and Assessments

007- Togrul KHALILOV – Azerbaijan

Valuable Findings about the Ancient History of Nakhchivan

045-Md. Hasan Ali, Md. Shurhab Ali, Md. Jahidul Islam- Bangladesh, Bangladesh, Bangladesh

E-Democracy for Smart Cities in Bangladesh: A New Chapter and a New Path

097-Rehana Farhat, Temoor Anjum, Muhammad Khalid Sohail – Pakistan, Pakistan, Pakistan

AI adoption in recruitment and selection: exploring different factors of TOE model in Pakistan

WEBINAR 3 - Session Chair: Aamir Aijaz Syed - India

107-Aamir Aijaz Syed – India

Does Digital Financial Inclusion impede Financial Stability: Evaluating the Moderating role of Regulation and Compliance?

055-Irina-Maria Grecu – Romania

Network analysis of the advancement of international migrants in the Romanian labor market: the role of digitization and skills' updating process for the future 'ideal' employee

057-Ran Tao, Lobonț Oana-Ramona, Su Chi Wei, Qin Meng – Romania, Romania, China, China

Does climate policy uncertainty impact the carbon market? Evidence from Wavelet-Based quantile-on-quantile method

072-Diana Avram - Romania

Intelligent agents used in the digitization of pre-employment processes for people with disabilities

13 November 2023 Monday

12:00 - 13:00 (GMT+1) Malta Time Zone

WEBINAR 1 - Session Chair: Beata Swiecka – Poland

110-Beata Swiecka – Poland

Financial Literacy and Household Insolvency

046-Saule Saparbayeva, Bazhan Turebekova –Kazakhstan, Kazakhstan

Transformation of the practice of accounting for lease relations

092-Marie Therese Villa-Caoile –Philippines

Navigating Financial Risk: Strategies for Sustainable Wealth Management

104-Mohammad Qais Rezvani, Nirmala Chaudhary, Utkarsh Mangal, Ragif Huseynov – India, India, Azerbaijan

Balancing Inter-Generational Differences in Family Businesses: Challenges for HR Professionals

WEBINAR 2 – Session Chair: Sezer Boşkuş Kahyaoğlu - South Africa Republic

042 -Ainura Turdalieva, Razia Abdieva, Sezer Boşkuş Kahyaoğlu – Kyrgyzstan, Kyrgyzstan, South Africa Republic

Relationship between Financial Worrying and Borrowing during Covid-19

082-Gabriela Ignat, Ioan Prigoreanu, Nicu Şargu, Lilia Şargu – Romania, Romania, Moldova, Moldova

Estimating the economic value of agricultural land on the financial sustainability of agricultural holdings in the North-East Region of Romania

085-Tanya Chouhan - India

Dealing with the Covid Crisis in a Professional Environment Being Emotionally Intelligent

087- Sneha, Akhil M P- India

Foreign Direct Investment (FDI), Economic Growth and Sustainable Development Goals (SDG): A Study On Associations

WEBINAR 3 - Session Chair: Gratiela G. Noja - Romania

073- Reepu- India

Blockchain technology for the metaverse

105- Geta Mitrea- Romania

Challenges and solutions of the Romanian social work system for the refugee crisis in Ukraine

103-Kumar Shalender, Rajesh Kumar Yadav – India, India

Roadmap to Encouraging Green Economy: An Nondisruptive Perspective for Corporate World

096-Cercel (Zamfirache) Camelia- Romania

Sustainable development in Romania and the European Union

WEBINAR 4 - Session Chair: Sanjay Taneja - India

098-Ioana Gutu, Camelia Nicoleta Medeleanu, Romeo Asiminei – Romania, Romania, Romania

The evolution of employment and ICT in accommodation industry in Romania and surrounding economies

100-Veaceslav Zaporozjan, Corina Zaporozjan – Moldova, Moldova

The Perspectives of Applying the European Union Norms in the Constitutional Jurisprudence of the Republic of Moldova

076-Pawan Kumar, Mukul Bhatnagar, Sanjay Taneja– India, India, India

Investigate the time pattern of bitcoin crypto: an ARMA modeling approach to unraveling volatility

109-Shipra Shukla – India

Does digital access to financial services improves social upliftment for sustainable future: An empirical approach in context to social welfare of Indian economy

13 November 2023 Monday

14:00 - 15:00 (GMT+1) Malta Time Zone

WEBINAR 1 - Session Chair: Muthmainnah - Indonesia

001- Enes Ismeti, Ernest Ismeti - Kosovo, Kosovo

The Use of the Verbs to Learn and to Study Interchangeably in Spoken Discourse and in Academic Texts

003-Luminita Diaconu – Moldova

Legal Liability in the Field of Environmental Protection According to International Conventions and Treaties

014 -Muthmainnah, Besse Darmawati, Ahmad Al Yakin, Abdul Gafur Marzuki, Rapia Arcanita, Eka Apriani – Indonesia, Indonesia, Indonesia, Indonesia, Indonesia, Indonesia

The revolutionary of AI and IoT (AIoT) on students' communication and critical thinking in EFL Classroom

069-Thaeer Mueen Sahib, Osamah Mohammed Alyasiri, Hussain A.Younis, Dua'a Akhtom, Israa M. Hayder, Sani Salisu, Muthmainnah – Malaysia, Iraq, Malaysia, Iraq, Iraq, Nigeria, Indonesia

A comparison between ChatGPT-3.5 and ChatGPT-4.0 as a tool for paraphrasing an English Paragraphs

WEBINAR 2 - Session Chair: Fisnik Morina - Kosovo

015- Mariya Shygun, Grigoryi Muhomor – Ukraine, Ukraine

Directions for receivables disclosure in the structure of integrated reporting

011-Fisnik Morina, Liridona Nikqi, Ujvara Berisha-Kosovo, Kosovo, Kosovo

Analyzing the Impact of Cash Flow Management Strategies on the Financial Performance of Commercial Enterprises in Kosovo: A Comprehensive Study

008- Elvis Mujačević, Loreta Rupčić- Croatia, Croatia

Motives and barriers for customers to switch to another bank

002- Luan Vardari, Isuf Qabrati, Vesel Usaj – Kosovo, Kosovo

Navigating the New Normal: Strategies for Managing Financial Risk in the Digital Era

WEBINAR 3 - Session Chair: Süleyman Yükçü - Türkiye

075- Fatma Coşkun- Türkiye

Teacher Opinions on the Applicability of Measurement and Assessment Based on Artificial Intelligence Systems in Education

070- Elif Özdemir Onaç, Esra Benli Özdemir- Türkiye, Türkiye

Investigation the Science Critical Thinking Skills in terms of Various Variables of Secondary School Students

061-Süleyman Yükçü, Seda Yavuzaslan Söylemez – Türkiye, Türkiye

The Cost of Spoiled Behaviors

067- Mustafa Ertan Tabuk, Selçuk Kendirli- Türkiye, Türkiye

Cost-Benefit Analysis in Sports Organizations

WEBINAR 4 - Session Chair: Keti Ventura - Türkiye

084-Kübra ÖNDER- Türkiye

The Effect of Working Conditions on Procrastination and Social Loose Behaviors

080-Süleyman Çelik, Oya Eru, Ruziye Cop– Türkiye, Türkiye, Türkiye

The Effect of Attitudes towards Advertising Notifications of Mobile Applications on Online Impulse Buying Tendency

079-Rafet Resul Doğan, Gamze Aksoy, Sevda Almaci, Şeyma Demir, Mustafa Ertan Tabuk- Türkiye, Türkiye, Türkiye, Türkiye, Türkiye

The Relationship between Youth Perception of Social Support in Physical Activities and Leisure Time Management Attitude

074- Sabriye Akin, Keti Ventura - Türkiye, Türkiye

Exploring the Factors Affecting the Purchasing Behavior of Consumers in Bioplastic Products: A Sustainability Approach

13 November 2023 Monday

15:15 - 16:15 (GMT+1) Malta Time Zone

WEBINAR 1 - Session Chair: Larisa Mistrean - Moldova

062-Monika, Brij Mohan, Vinit Kumar, Mistrean Larisa- India, India, India, Moldova

Block Chain-Based Identification and Authorization, Hospital Billing Along With Insurance Claim Management

063-Khushwant Singh, Mistrean Larisa, Yudhvir Singh, Dheerdhvaj Barak- India, Moldova, India, India

A Patient Supervising Solution Related to the Internet of Things with an RFID Scanner

064- Lilia Şargu, Nicu Şargu, Ioan Prigoreanu, Gabriela Ignat - Moldova, Moldova, Romania, Romania

Optimization of fiscal incentives on sustainability of buoyancy and tax elasticity in the Republic of Moldova

065-Sonal Trivedi, Vinita Choudhary, Neha Kamboj - India, India, India
AI and Blockchain for smart contract management in Digital world of IoT

WEBINAR 2 - Session Chair: Félix Puime-Guillén - Spain

012-Félix Puime-Guillén, Zita Graça Teixeira Pereira, Patricia Coloret Portela, Rosa María Ricoy Casas, Raquel Fernández González – Spain, Spain, Spain, Spain, Spain

Online marketing of fishery and aquaculture products: a case study

024-Perciun Rodica, Şavga Larisa, Iordachi Victoria - Moldova, Moldova, Moldova

Identifying the potential of consumer cooperatives in the development of circular business models in the Republic of Moldova

056-Alina Ionaşcu – Romania

Theoretical and methodological insights on the relationship between globalization, quality of life and economic development

095-Arvinder Kaur, Harmanpreet Kaur, Aarti Dangwal – India, India, India

Exploring the Effectiveness of Centralized Exchange and Decentralized Exchange for Cryptocurrency Trading in the World of DeFi for Sustainable Finance

WEBINAR 3 - Session Chair: Fulya Güngör - Türkiye

094- Esat Saçkes, Fulya Güngör- Türkiye, Türkiye

A Bibliometric Research on the Conceptualization of Sustainable Tourism with VOSviewer

101 Bünyamin Göl, Çiğdem Tarhan- Türkiye, Türkiye

Challenges of Digitalisation in Agriculture and its Impact on EU Climate Policies

113- Oğuz Han Öztay, Gökçe Öztürk – Türkiye, Türkiye

A Content analysis related to Thesis of Cyberchondria in Turkey in New Media Age

114-İbrahim Halil Efendioğlu- Türkiye

Digital Consumer Behavior: A Systematic Literature Review

WEBINAR 4 - Session Chair: Ozan Çatır - Türkiye

052-Ayşe Şengöz- Türkiye

The Effect of Tour Guide on Tourist's Purchase Intention to Local Food

058-İhsan Kurtbaş, Onur Akçakaya, Mustafa Caner Timur – Türkiye, Türkiye, Türkiye

A Research on 'Craftsmen's Perception of Chain Markets' in the Example of Ardahan Province

060-Betül Arslan, Hülya Yaman – Türkiye, Türkiye

Elements of Gastronomy in Ottoman Miniatures

071-Özlem Özdemir Süzer- Türkiye

An Evaluation of the Restaurant Image of Kayseri, the City of Gastronomy: The Case of Tripadvisor

13 November 2023 Monday

16:30 - 17:45 (GMT+1) Malta Time Zone

WEBINAR 1 - Session Chair: Hasan Hüseyin Yıldırım - Türkiye

112-Adalet Hazar, Mesut Doğan, Şenol Babuşcu, Bade Ekim Kocaman, Asuman Erben Yavuz, Sevdie Alshiqi – Turkiye, Turkiye, Turkiye, Turkiye, Turkiye, Kosovo

Modeling the Impact of Financial Development on Environmental Sustainability: The Role of Green Growth and Environmental Taxes

040-Hasan Hüseyin Yıldırım, Cevriye Yüksel Yıldırım- Turkiye, Turkiye

The Effect of Russia's Invasion of Ukraine on the Stocks of Energy Companies; Evidence from Stock Markets of Energy Importing and Exporting Countries

033-Reyhan Can-Turkiye

Forecasting Turkey and BRICS Country Indices by Machine Learning

116- Anthea Schembri, Simon Grima – Malta, Malta

Internal Controls in Fraud Detection and Prevention

027-Hasan Hüseyin Yıldırım – Turkiye

The Impact of the Geopolitical Risks on the Stock Market; An Application on Selected Countries

WEBINAR 2 - Session Chair: Kenan İlarslan - Turkiye

025-Melih Kabayel, Emine Kabayel- Turkiye, Turkiye

Green Fiscal Policies in Sustainability of Green Economy

115-Ufuk Selen, Ebru Sipahi – Turkiye, Turkiye

The Performance Analyses of the Regional Development Agencies in Turkiye

059- Kenan İlarslan- Turkiye

Modelling Malta and Turkiye stock exchange returns with Markov-Switching Dynamic Regression analysis

102- Muhammet Bahri Kırıkçı- Turkiye

Investigation of the Relationship between Environmental Pollution and Energy Production

081-Özden Şentürk- Turkiye

Strategic Tools and Future Perspective of Financial Risk Management in the Age of Digital Transformation

WEBINAR 3 - Session Chair: Özlem Tuna - Turkiye

005-Ertan EROL, Hatice ER- Turkiye, Turkiye

Recommendations for the Use of Leather Waste in Packaging Industry

006-Kader Erol, Hatice Er- Turkiye, Turkiye

The Effect of Augmented Reality Applications on Consumers' Perception of Brand Value

010-Esra N. Kılıcı- Turkiye

A Study on Factors Affecting the Value of Gold in Turkish Lira

020-Gökçe Çiçek Ceyhun- Turkiye

An Analysis of Energy Security in the Eastern Mediterranean in the Scope of the Blue Homeland Doctrine in terms of Maritime Trade

117- Jan Buhargiar, Simon Grima –Malta, Malta

Client Expectation of Auditors' Characteristics

013- Özlem Tuna, İsa Gül- Turkiye, Turkiye

The Mediating Role of Impression Management in the Effect of Ethical Leadership on Green Organisational Behaviour

WEBINAR 4 - Session Chair: Reyhan Bahar - Turkiye

039 Bilge Villi, Reyhan Bahar- Turkiye, Turkiye

Ethical Choices in Cosmetic Products: Examining Sustainable Cosmetic Brands with Content Analysis

111-Mehmet YAZICI – Turkiye

Earthquake Culture and Components of Earthquake Fighting in Turkey in the Context of 2023 Kahramanmaraş Earthquakes

106-Ipek TEKIN, Tugay GUNEL- Turkiye, Turkiye

Does an Increase in Minimum Wage Really Cause Higher Unemployment? A Fourier Causality Analysis in Selected Developed and Developing Countries

068- Elif Koç- Turkiye

Evolving Logistics Landscape: A Comparative Analysis of Logistics Performance Index (LPI) Reports with a Focus on Digitalization Trends

090- Nermin Kişi- Turkiye

Reimagining Employee Engagement in the Digital Age

037-Ramazan Arslan, Mehmet Akif Peçe- Turkiye, Turkiye

The Effects of the Kahramanmaraş Earthquake on Total Employment in Turkey: RALS-LM Unit Root Analysis with Structural Break

14 November 2023

Technical Committee Meeting - 11:00-12:00 Msida Campus

15 November 2023

Social Event – 10:00-16:00

Table of Contents

Legal Liability in the Field of Environmental Protection According to International Conventions and Treaties	1
<i>Luminita Diaconu</i>	
Motives and barriers for customers to switch to another bank	9
<i>Elvis Mujačević, Loreta Rupčić</i>	
A Study on Factors Affecting the Value of Gold in Turkish Lira	20
<i>Esra N. Kılıcı</i>	
The revolutionary of AI and IoT (AIoT) on students' communication and critical thinking in EFL Classroom	27
<i>Muthmainnah, Besse Darmawati, Ahmad Al Yakin, Abdul Gafur Marzuki, Rapia Arcanita, Eka Apriani</i>	
The asymmetric impact of foreign direct investments on ecological footprint: Evidence from Turkiye	52
<i>N. Serap Vurur, Münevvere Yıldız, Letife Özdemir</i>	
The usefulness of authentic partnerships, through the involvement of all stakeholders, with the aim of reducing the risks generated by the pandemic context in the educational environment	66
<i>Mihaela Miron , Larisa Mistrean</i>	
Reporting for Sustainability: Practices in Environmental Accountability among Bulgarian companies	73
<i>Petya Petrova</i>	
Identifying the potential of consumer cooperatives in the development of circular business models in the Republic of Moldova	85
<i>Iordachi Victoria , Șavga Larisa, Perciun Rodica</i>	
Green Fiscal Policies In Sustainability of Green Economy	111
<i>Melih Kabayel, Emine Kabayel</i>	
A look at the Financial World in a Metaverse Version	122
<i>Popa Marina, Plămădeală Olivia</i>	
The Innovative Approach to Public Services Provision in Cities	138
<i>Marica Mazurek</i>	
Energy Transition and Sustainability	153
<i>Peter Stallinga</i>	
Forecasting Turkiye and BRICS Country Indices with Machine Learning	168
<i>Reyhan CAN</i>	

The mediterranean transport corridor “5 GMED”: technological implications in the rail transport system <i>Rareş-Mihai Niţu, Alexandra-Maria Vlad, Roberta-Mihaela STANEF-Puica</i>	185
Green certificates as a method to achieve carbon footprint and greenhouse effect reduction targets <i>Rareş-Mihai Niţu, Robert-Ştefan Uricaru, Grigore-Ioan Piroşcă</i>	194
Electric car pollution as a source of carbon footprint reduction <i>Rareş-Mihai Niţu , Radu-Alexandru Budu, Silvia-Elena Iacob</i>	208
Permanent or Temporary Effects of Natural Disasters on Total Employment in Turkiye: A RALS-LM and DF_GLS Unit Root Analysis with Structural Breaks <i>Ramazan Arslan, Mehmet Akif Peçe</i>	217
Forward premium puzzle: Evidence from South East European Countries <i>Arbresh Raveni, Agim Mamuti</i>	229
Ethical Choices in Cosmetic Products: Examining Sustainable Cosmetic Brands with Content Analysis <i>Bilge Villi, Reyhan Bahar</i>	249
The Effect of Russia's Invasion of Ukraine on the Stocks of Energy Companies; Evidence from Stock Markets of Energy Importing and Exporting Countries <i>Hasan Huseyin Yildirim, Cevriye Yuksel Yildirim</i>	259
The potential in adoption of digital technologies in the hotel industry: Technological, Organizational and Environmental drivers <i>Marino Stanković, Melko Dragojević, Matija Fortuna</i>	271
E-Democracy for Smart Cities in Bangladesh: A New Chapter and a New Path <i>Md. Hasan Ali, Md. Shurhab Ali, Md. Jahidul Islam</i>	307
Transformation of the practice of accounting for lease relations <i>Saule Saparbayeva, Bazhan Turebekova</i>	317
Practice adapting ChatGPT as teaching materials to promote social interaction in Pancasila and civic education classes <i>Ahmad Al Yakin, Luis Cardoso, Idi Warsah , Abdul Latief , Muthmainnah, Aco Nasir</i>	336
Predictors and Outcome of Employee Engagement <i>Akansha Mer</i>	360
Examination of the Companies in the BIST 30 Index within the Framework of the UN Sustainable Development Goals <i>Sinan Saraçlı, Bilge Villi, Berkalp Tunca</i>	372

Modelling Malta and Turkiye stock exchange returns with Markov-Switching Dynamic Regression analysis <i>Kenan İlarslan</i>	386
Elements of Gastronomy in Ottoman Miniatures <i>Betül Arslan , Hülya Yaman</i>	396
Block chain based identification and authorization, hospital billing along with Insurance Claim Management <i>Monika Gahlyan, Brij Mohan, Vinit Kumar, Larisa Mistrean</i>	407
A patient supervising solution related to the Internet of Things with an RFID scanner <i>Khushwant Singh, Larisa Mistrean, Yudhvir Singh, Dheerdhwaj Barak</i>	420
Optimization of fiscal incentives on sustainability of buoyancy and tax elasticity in the Republic of Moldova <i>Lilia Şargu, Nicu Şargu, Ioan Prigoreanu, Gabriela Ignat</i>	432
Cost-Benefit Analysis in Sports Organisations <i>Mustafa Ertan TABUK, Selçuk KENDİRLİ</i>	450
Evolving Logistics Landscape: A Comparative Analysis of Logistics Performance Index (LPI) Reports with a Focus on Digitalization Trends <i>Elif Koç</i>	461
A comparison between ChatGPT-3.5 and ChatGPT-4.0 as a tool for paraphrasing an English Paragraphs <i>Thaeer Mueen Sahib, Osamah Mohammed Alyasiri, Hussain A.Younis, Dua'a Akhtom, Israa M. Hayder, Sani Salisu, Muthmainnah</i>	471
Investigation the Science Critical Thinking Skills in terms of Various Variables of Secondary School Students <i>Elif ÖZDEMİR ONAÇ, Esra BENLİ ÖZDEMİR</i>	481
An Evaluation of the Restaurant Image of Kayseri, the City of Gastronomy: The Case of TripAdvisor <i>Özlem Özdemir Süzer</i>	490
Intelligent agents used in the digitization of pre-employment processes for people with disabilities <i>Diana Avram</i>	504
Exploring the Factors Affecting the Purchasing Behaviour of Consumers in Bioplastic Products: A Sustainability Approach <i>Sabriye AKIN, Ketı VENTURA</i>	511
Cyber Conflict: Indicators and Assessments	528

<i>Serghei Ohrimenco, Valeriu Cernei</i>	
Artificial Intelligence – Some Ethical Issues in the Context of State Government	
<i>Rumyana Popova, Vladimir Karadzhov</i>	538
The Relationship Between Youth Perception of Social Support in Physical Activities and Leisure Time Management Attitude	
<i>Rafet Resul DOĞAN, Gamze AKSOY, Sevda ALMACI , Şeyma DEMİR, Mustafa Ertan TABUK</i>	557
Strategic Tools and Future Perspective of Financial Risk Management in The Age of Digital Transformation	
<i>Özden Şentürk</i>	569
Estimating the economic value of agricultural land on the financial sustainability of agricultural holdings in the North-East Region of Romania	
<i>Gabriela Ignat, Ioan Prigoreanu, Nicu Şargu, Lilia Şargu</i>	577
Quality of Life – Conceptual Approaches and Quantification Methods	
<i>Milian NEGUȚOIU</i>	590
Dealing with the Covid Crisis in a Professional Environment Being Emotionally Intelligent	
<i>Tanya Chouhan</i>	601
Reimagining Employee Engagement in the Digital Age	
<i>Nermin Kişi</i>	613
A Bibliometric Research on the Conceptualization of Sustainable Tourism with VOSviewer	
<i>Esat Saçkes, Fulya Güngör</i>	623
Sustainable Development in Romania and the European Union	
<i>Cercel (Zamfirache) Camelia</i>	638
The evolution of employment and ICT in accommodation industry in Romania and Surrounding economies	
<i>Ioana Gutu, Camelia Nicoleta Medeleanu, Romeo Asiminei</i>	650
The Perspectives of Applying the European Union Norms in the Constitutional Jurisprudence of the Republic of Moldova	
<i>Veaceslav Zaporojan, Corina Zaporojan</i>	665
Roadmap to Encouraging Green Economy: An Nondisruptive Perspective for Corporate World	
<i>Kumar Shalender, Rajesh Kumar Yadav</i>	675

Balancing Inter-Generational Differences in Family Businesses: Challenges for HR Professionals <i>Mohammad Qais Rezvani, Nirmala Chaudhary, Utkarsh Mangal, Ragif Huseynov</i>	682
Earthquake Culture and Components of Earthquake Fighting in Turkiye in the Context of 2023 Kahramanmaraş Earthquakes <i>Mehmet Yazıcı</i>	695
A Content analysis related to Thesis of Cyberchondria in Turkiye in New Media Age <i>Oğuz Han Öztay, Gökçe Öztürk</i>	706
Digital Consumer Behavior: A Systematic Literature Review <i>İbrahim Halil Efendioğlu</i>	714
The Performance Analyses Of The Regional Development Agencies In Turkiye <i>Ufuk Selen, Ebru Sipahi</i>	739
Valuable Findings About the Ancient History of Nakhchivan <i>Togrul Khalilov</i>	753

Legal Liability in the Field of Environmental Protection According to International Conventions and Treaties

Luminita Diaconu ¹

Abstract

Introduction: The changes that take place in nature, including those resulting from acts of pollution, influence both the natural territorial complexes of a state, as well as neighboring states, and the territories that represent the common heritage. So a violation that leads to an ecological imbalance on the territory of a state can very likely result in an ecological imbalance in the territory of another state, including the neighboring one.

Aim: The purpose of this research was to thoroughly identify and analyze the subject of liability for the injurious consequences arising from activities not prohibited by international law, and determine who is the holder of obligations of prevention in determining "polluter pays" principle."

Method: Finding and analyzing different approaches regarding relevant studies in the field of legal liabilities analyzing international treaties and conventions in environmental international law. Examining the necessity of applying legal responsibility in the field of environmental protection on an international level

Findings: What characterizes environmental law norms is the fact that in most of them overwhelmingly, these are technical norms, legally sanctioned, establishing deadlines and strict ways of achieving precisely defined objectives, prescribing behaviors and attitudes well outlined, able to allow a rational, appropriate valued action of nature.

Originality and value: The universal nature of ecological problems and the common interest of current humanity for the preservation of the environment make the legal regulation the main means of promoting the objectives of a viable socioecological model. One can even talk about the perspectives of notable developments: a new report on the subject by law with the values protected by means of environmental law and criminal law, a compensation as complete as possible for ecological damage, through the mechanisms of criminal liability and the role of international and state law in the current protection and development of environmental law.

Key Words: environment, protection, international crime, international responsibility, nuclear damage, subjects of international law.

Jel Codes: K 1; K 10; K 15

¹ PhD candidate, Lecturer at The Academy of Economic Studies of Moldova, Faculty of International Economic Relations, Foreign Languages Department. Republic of Moldova

1. INTRODUCTION

Examining the necessity of applying legal responsibility in the field of environmental protection on an internal level, we must not forget that the natural environment, constituting a complex framework of elements, does not extend its influence only on the territory of a state. The delimitation of the territory is a political and legal operation regarding the identification of the border and its route. (Popescu,2001) The changes that take place in nature, including those resulting from acts of pollution, influence both the natural territorial complexes of a state, as well as neighboring states, as well as the territories that represent the common heritage. So a violation that leads to an ecological imbalance on the territory of a state can very likely result in an ecological imbalance in the territory of another state, including the neighboring one. Obviously, nature “does not know” the territorial borders of the state and natural processes or phenomena do not specifically belong to a state. From here starts the need to consecrate the principles and rules of international legal responsibility in the field of environmental protection.

Stating a problem

International responsibility can be defined as a mandatory measure, as a consequence of the illegal or legal act, but which has caused damage to the environment and which arises by virtue of the provisions of international legislation, treaties to which the state is a party. International law is specific to the institution of the responsibility of states, which can be engaged in the form of political, moral or material responsibility. In terms of environmental law, this responsibility arises from an international crime causing environmental damage.

Material responsibility differs from other forms of international responsibility of the state, since it implies the obligation to repair the material or moral damage caused to another state. It can exist independently or in correlation with political and moral responsibility or accompanied by the criminal responsibility of persons guilty of international crimes. In the specialized legal doctrine, it is rightly stated that the basis of the international material responsibility of the state has similar features to the civil responsibility in domestic law, which consists of:

- committing an act with intent or negligence
- moral or material damage has been caused by the illegal act
- there must be a causal relationship between the damage caused and the action.

In other words, the material responsibility of the subject of international law is a form of material responsibility presumed in the field of international relations. It is necessary to mention from the very beginning that international material liability in environmental law relations has both a subjective and an objective character. Therefore, we distinguish several forms of international material liability in environmental law relations, namely:

- a) subjective material responsibility for international crimes that caused damage to the common heritage:
- b) subjective material responsibility for international crimes that caused damage to the common heritage:

c) subjective material liability for international crimes that caused damage to the patrimony of another state.:

d) subjective material responsibility for international crimes that caused damage to the patrimony of another state:

e) objective material liability following damages caused to the common heritage:

f) objective material responsibility following damages caused to the heritage of another state

Therefore, material, tortious liability is the obligation of a person to repair the damage caused to another through an illegal extra-contractual form or, as the case may be, the damage for which he is called by law to repair the damages.

So, in other words, the international tort liability arises as a result of the violation of a general legal obligation (the state's obligation not to cause pollution through its activities on the territory of the neighboring state), and the contractual one (resulting from international treaties and conventions) arises only in the present to a treaty between 2 states (several states), the conditions of which provide concrete measures of liability in case of non-compliance with the provisions of these international documents.

Delimiting the responsibility for the international crime and the international delict, it is necessary to refer only to the difference between the delict and the international crime, namely to the fact that both are parts of the "same coin" - delictual responsibility, but the difference lies in the nature of the social danger created by the deed. Therefore, "In the draft articles developed by the International Law Commission, international crime is defined as the fact that is illegal from an international point of view, which results from the violation of an international obligation so essential for safeguarding the fundamental interests of international society, that it is considered as a crime against society as a whole,"(Popescu,1993)

The distinction between damage to the common patrimony and that of the states depends on the determination of the patrimony of each individual state, which constitutes those resources that are within the territory of the state's jurisdiction, and the common patrimony is the territories with international regimes, not subject to the sovereignty of the states (Balan,Serbenco,2001) (international seas, oceans, outer space and celestial bodies, etc.)

The environment is not and cannot be the subject of victim (whether unlawful or lawful acts generating an impact on its injury), but the fundamental value protected internationally. The subject is entitled to compensation advertising is the "holder" environment and in the state (when affected environment under its jurisdiction) or the international community (when affected environment not under the national jurisdiction of a state) that (the victim) acts (the rule) under state management or defense of environmental elements. Internationally, the distinction between liability and responsibility for the wrongful act of harmful consequences results from lawful activities. According to art. 2 of the project on 'responsibility for internationally wrongful states "adopted by the CDI in 2001, there is an internationally wrongful act of a State when conduct consists of an act or omission, a) is attributed to the State under

the international rights and b) constitutes a breach of an international obligation of that State. As regards an illegal act, it was considered in the literature as being provided "subjective" as the intent and knowledge of the relevant State organs and agents. Regarding the second condition - violation of international obligations - conduct must represent a breach of an international obligation assumed by the State concerned - this condition was considered "objective". The existence of one of the circumstances which removes the unlawful nature of an act is, in fact, an obstacle to a request for compensation for breach of an international obligation. The causes that exclude unlawfulness of the act are: consent, self-defense, countermeasures, force majeure, state of distress and state of necessity. The main legal consequences of an internationally wrongful obligations of the state are "guilty" to cease the unlawful conduct and to repair the damage caused by his conduct. The state must fulfill the obligation breached. Even if the state ceases responsibility to repair the damage caused by the unlawful conduct, it is not exempt from the obligation to remedy of a breach, repeating the illegal act and, where appropriate, compensate and rehabilitate part of the legal relationship affected by the breach. The requirement covers repair any damage caused by the wrongful act, whether it is a material or moral one.

A special place in international responsibility is occupied by objective international responsibility for environmental damage. In specialized literature, the objective international material responsibility of states is considered an independent complex of international law relations, the content of which concerns the obligations of states to repair damages caused without fault in connection with the performance of legal activities and the right of the injured state to demand, based on the agreements concluded, the repair of these damages. (Marinescu, 1996) As it appears from the stated definition, objective material responsibility is based on the fact that fault is not taken into consideration, and the parties have agreed on this fact through an international act.

As for the international acts in the matter of objective material liability for environmental damage at an international level, they refer only to nuclear damage. (Niciu, 1999) as well as if a space object causes damage to the surface of the earth or an aircraft. Humanity, having a rich practice of various accidents at nuclear targets, and in some cases, even regarding the use of these resources as weapons of mass destruction in Hiroshima and Nagasaki, and the closest, from Chernobyl, in 1986, immediately after the last mentioned case, measures were adopted to prevent the abusive use of nuclear resources. We consider that one of the most important moments was the conferring of the objective nature of the material liability for nuclear damage. Moreover, in the legal doctrine it is even proposed to consider the field of nuclear uses as a distinct branch of international law. This branch of law regulates the protection of life, human health, and the environment, and by which it is guaranteed that nuclear scientific and technological results are used only for peaceful purposes, for the good of mankind.

All this tells us about at least 2 things: first, that nuclear technologies are a source of particularly increased danger for humanity, and second, that international legislation

should establish particularities in the regulation of these uses, but which would most effectively ensure security and prevention of the impact on the environment.

However, it is necessary, considering the text of the Convention on Civil Liability for Nuclear Damage from 1963 from Vienna, to specify whether or not the content of nuclear damage also includes environmental damage caused by nuclear damage

Thus, the text of point 1 of article 1 establishes that nuclear damage includes damage caused to the person (death or injury) and property damage. Namely, these 2 categories of damage can be objectives of environmental damage, more than that, nuclear damage itself, according to its nature is environmental damage.

The coexistence of the state with other states within the world community always dictates the implementation of the most effective measures that can ensure the execution of common tasks in order to avoid any harmful impact on the environment based on the principles of positive liability, and the establishment of objective liability. This, as I mentioned before, it can be applied for nuclear damage and for damage caused on the surface of the earth and a state's aircraft by objects launched into space. Thus, liability for civil damage and environment caused as a result of causing a nuclear accident resulting from an objective on the territory of the state or from the transportation of nuclear resources, as well as from the damage of nuclear propulsion transport, has an objective character, without taking into account the fault.

As regards the rules for the application of objective material liability, as I mentioned, they are analogous to civil liability in domestic law. At the same time, regarding environmental damage, the rules for the application of material liability measures are to be revised, so as to exclude the possibility to the states to negotiate the size and amount of reparation of damages caused to the environment, and consequently also the possibility of the state not to demand reparation of damages.

The main conditions for the application of such a form of liability are: the presence of the fact causing the damage, the presence of the damage itself and the existence of a causal link between the fact causing the damage and the damage itself. However, in the specialized literature there are various opinions related to the spectrum of these conditions.

Thus, often, in addition to stating these 3 conditions, the problem of guilt is also raised. One of the most important aspects in the application of objective material liability for environmental damage consists in the fact that guilt here is not presumed, on the contrary, it is excluded. as prof Dutu mentioned. (Dutu, 1996) At the same time, in some specialist sources we can also find statements such as that when applying international liability, fault is a mandatory element. Moreover, when the lack of fault is demonstrated, the state cannot be obliged to repair the damage. We cannot agree with the second position, because once the condition of objective liability is established, which is not based on the idea of fault, fault cannot be placed as a condition for the application of this form of liability. Thus, if the objective responsibility would be possible to apply only under the condition of presumption of guilt, this would be nothing but a form of responsibility based on the consideration of guilt, but which is presumed

until proven the contrary. If we are discussing objective liability, fault is not taken into consideration. This is even evident from the content of point 2 of Article IV of the Convention on Liability for Nuclear Damage, which establishes that if the operator proves that the nuclear damage resulted in its entirety or in part due to the serious negligence of the person who suffered it, or if this person acted or omitted to act with the intention of causing damage, the competent court may, if the law permits, exonerate the exploiter in full, or in part of the obligation to repair the damage suffered by this person. Thus, neither the lack of fault, nor even the force majeure represented by natural cataclysms is considered as a condition exonerating liability, a fact that once again proves to us that the objective material liability for nuclear damages does not take into account the fault.

This allows the application of material liability towards the state, from the territory of which the damage occurred or in whose property the installations with nuclear propulsion or carriers of nuclear material are located.

Considering that the phenomena, especially those destructive to the environment, are usually generated by actions, perhaps even admissible, but carried out by several states, they may raise the question of what is the amount of the obligation of each of the responsible parties. One of the solutions for this situation offered them the provisions of point 3 a) of the Vienna Convention, which establishes that in case of nuclear damage it was the result of the actions of several states, they are liable jointly and cumulatively, but to the extent that it is impossible to determine with certainty which is the part of the damage imputable to each. In this sense, objective responsibility on an international level usually excludes solidarity if the damage is the result of the actions of several states.

Exoneration from liability

From the contents of point 2 of article 4 of the Convention on Liability for Nuclear Damage, which establishes that if the operator proves that the nuclear damage resulted, in whole or in part, from the serious negligence of the person who suffered it, or that this person acted or omitted to act with the intention of causing damage, we can reveal the exhaustive conditions that exempt the perpetrator from repairing the nuclear damage caused to another person, among which are listed:

- the nuclear damage resulted in whole or in part from a serious negligence of the person who suffered it
- the person who suffered damage, acted or omitted to act with the intention of causing damage
- the nuclear damage was caused by a nuclear accident, directly resulting from acts of armed conflict, hostilities, civil war or insurrection.

Also, point 5 of article 4 of the above-mentioned Convention establishes that the operator is not responsible for nuclear damage caused to the nuclear installation itself or the goods located on the site of this installation and which are or must be used in relation to it, as well as for damage caused to the means transport on which the nuclear material is located at the time of the nuclear accident.

CONCLUSIONS

The right to a healthy environment does not only have a collective dimension, which implies the member states to cooperate in order to prevent and combat pollution, and to protect the natural environment, at the regional and international level, but also an individual dimension, which involves the right of every individual to prevent pollution.

What characterizes environmental law norms is the fact that in most of them overwhelmingly, these are technical norms, legally sanctioned, establishing deadlines and strict ways of achieving precisely defined objectives, prescribing behaviors and attitudes well outlined, able to allow a rational, appropriate valued action of nature.

With regard to environmental protection, it must be shown that it is carried out, according to the law, by the establishment of certain obligations, the establishment of special conditions and the stipulation of prohibitions regarding the rational use of natural resources, preventing and combating environmental pollution and the harmful effects of natural phenomena. The purpose of environmental protection is preservation of ecological balance, by avoiding pollution, in order to maintain and improve the quality of natural factors, of the natural values of the states, respectively the provision of living conditions optimal for current and future generations. In this context, the "technicality" of environmental law favors the unification and standardization of regulations in the matter, through harmonization of national legislations and the adoption of global international documents. everywhere in the world more and more insistently, the protection of the environment is imposed, this being one of priority contemporary concerns.

The universal nature of ecological problems and the common interest of current humanity and future for the preservation of the environment make the legal regulation the main means of promoting the objectives of a viable socioecological model. One can even talk about the perspectives of notable developments: a new report on the subject by law with the values protected by means of environmental law and criminal law, a compensation as complete as possible for ecological damage, through the mechanisms of criminal liability and the role of international and state law in the current protection and development of environmental law. All this reinforces the opinion that the environment constitutes heritage common of humanity, towards which all states have not only rights, but especially obligations to nature of ensuring normal conditions of existence and development - in terms of quantity and quality of natural resources of biodiversity.

References

- Balan Oleg ,Eduard Serbenco.(2001)Drept international public,Chisinau,p.195-196
Balan Oleg,Eduard Serbenco,(2001)Drept International Public,Chisinau,p.187.
Dutu M.(1995) Dreptul international al mediului,Bucuresti,p.143
Marion C.(1998) Molea.Raspunderea statelor indreptul international,Craiova,p.182

Marinescu Daniela (1992) Dreptul mediului inconjurator,Bucuresti,p.200

Marinescu D (1996).Dreptul mediului inconjurator,Bucuresti,p.344

Niciu M.(1999) Drept international public,Cluj Napoca ,p.380.

Popescu Dumitru Florian Comon (1993) Drept International Public p.234

Motives and barriers for customers to switch to another bank

Elvis Mujačević,¹ Loreta Rupčić²

Abstract

Introduction: Today's modern technology offers various services to consumers, including banking services. Internet banking makes it easier for customers to conduct certain transactions from the comfort of their homes. In this way, interaction between customers and bank staff is reduced. Nevertheless, many customers have certain reasons why they want to change their bank, such as an increase in the cost of banking services (account maintenance fees) or poor service. However, when switching banks, customers may face certain obstacles that make this process difficult, such as the high cost of switching from one bank to another. Nevertheless, banks are constantly working to improve their services in order to retain customers and remain competitive in the market. They achieve this through marketing in banking, i.e. the marketing mix, and especially through a promotional element, because thanks to the internet, the availability of banking services is very easy and customers can find out about the potential bank at any time.

Aim: The aim of the study is to obtain answers to the questions to what extent does price influence the decision to switch banks? What are the motives that motivate a person to change banks? What obstacles does a person encounter when switching banks?

Method: Survey method, description method, comparison method, case method. The empirical investigation was mainly conducted with the help of a survey.

Findings: Poor services, inconvenience in the bank, and bad staff are just some of the reasons why people decide to change banks. The price factor is significant because if another bank has a lower cost on an annual basis, it means a saving for customers, which may encourage them to look for another bank. Many respondents are satisfied with their current bank and have not changed banks often. This is mainly because of the proximity of the branch and ATM, but also because of the quality of the services they receive at their current bank. Respondents who changed banks did so because the other bank had lower costs or because they were forced to change their address, which forced them to change banks when branches were far away.

Originality and value: - The study provides information on how to improve service and retain existing customers, i.e. how to attract new customers. It provides information on which services/products are crucial when choosing a bank.

Keywords: banking, bank marketing, motives, barriers, transition

Jel Codes: G21, G00, 020

¹ Elvis Mujačević, Ph.D, Full Profesor, University of Rijeka, Faculty of tourism and Hospitality Management, Opatija, Croatia

² Loreta Rupčić, M.Sc., University of Rijeka, Faculty of tourism and Hospitality Management, Opatija, Croatia

1. INTRODUCTION

Today's modern technology offers consumers a wide range of services, including banking. Internet banking makes it easier for customers to conduct certain transactions from the comfort of their homes. In this way, interaction between customers and bank staff is reduced. Nevertheless, many customers have certain reasons why they want to change their bank, such as an increase in the cost of banking services (account maintenance fees) or poor service. However, when switching banks, customers may face certain obstacles that make this process difficult, such as the high cost of switching from one bank to another. Nevertheless, banks are constantly working to improve their services in order to retain customers and remain competitive in the market. Customers are confronted with different marketing campaigns every day, but in the banking sector it is not so easy for customers to react to the action, i.e. to switch banks. Many customers have had an account with a bank they are satisfied with for years. But when they then decide to change, they have to weigh up the good and bad sides of switching banks.

The study asks the following questions:

1. To what extent does price influence the decision to switch banks?
2. What are the motives that motivate a person to switch banks?
3. What are the obstacles to switching banks?

2. LITERATURE REVIEW

Banking is an industry that focuses on personalized services and therefore needs to provide services that meet the needs of its customers. To meet these needs, bankers are expected to provide satisfactory services through the provision of form, place, time, and property (Bhattacharyay, 1995:35).

The banking sector requires investment in marketing innovations, which should be synchronized with the development of market culture and improvement of the process of organizational learning (Shpak, Kulyniak, Gvozdz, Malynovska, 2020:231).

In recent years, the Internet has become a very popular flat, supportive distribution space for electronic banking. Internet banking users are offered easier access to their accounts at any time of the day, during the week and even on weekends. For example, Bucur (2015:36) states, "Internet banking or e-banking package is a customer-bank interaction solution that allows customers to create transactions and access their account information through an internet connection." Internet banking includes services such as payments, account balances and balance enquiries with the aim of providing customers with direct access to their financial resources (Hossain, Hossein Khan, Naumov, 2022:6). Online services have gained popularity in recent decades due to their accessibility, availability and wide distribution. Banks have also shifted a large part of their business to the internet in search of competitive advantage, differentiation, and customer loyalty.

Farah (2017:256) identifies seven reasons for user switching in the service industry: price, inconvenience, non-use of service, staff reactions to a service failure, the attractiveness of competition, ethical problems, and spontaneous switching. Subramaniam and Ramachandran (2019:155) argue that customer switching behavior is influenced by price, reputation, service quality, effective advertising, involuntary switching, distance, and cost of switching.

3. RESEARCH METHODOLOGY

The aim of the study was to determine the reasons for switching banks, i.e. the motives of the bank, but also the obstacles that make this process more difficult. The primary data were collected using an online questionnaire created with a GoogleDocs survey. The survey was designed to be shared via a link with respondents through social media, e-mail and other online tools. 136 people were surveyed between 31 May and 18 June 2023. The questionnaire consists of 17 questions. The first group of questions addresses general information about the respondents, while the second group answers questions about motivations and barriers to switching banks. The age range included a group of respondents between 18 years and 61 years and older.

3.1. Research model and hypothesis

The problem of the study was to define the motives that influence the consumer's decision to switch banks at the initial stage and to identify the obstacles that prevent the consumer from achieving his goal. The study aims to identify the benefits and consequences of switching banks by defining the opportunities that individuals realize by taking this step.

In line with the determinants of the problem and the subject of the study, the hypothesis is stated:

H1: A variety of banking services encourages citizens to switch banks that provide services to citizens of all ages.

The aim of the study is to find out what motives (intrinsic and extrinsic) encourage a person to switch banks. It also aims to find out to what extent people decide to change banks and whether they are satisfied with their change after a certain period of using banking services

3.2. Data analysis

3.2.1. Demography

136 people participated in the market research, of which 47 were men (34.6%) and 89 were women (65.4%). The lowest age limit for participation in the survey is 18 years, so 39 people between the ages of 18 and 28 participated in the survey, which is 28.7%. Then 36.8% of the respondents are in the age category of 29 to 39 years. 19.9% of the respondents are in the category of 40 to 50 years and 10.3% are in the category of 51 to 60 years. The respondents in the category of 61 years and older are 39 (28.7%)

Table 1: Gender of respondents

Gender	Frequency	%
Women	89	65,4
People	47	34,6
All	136	100

Table 2: Age of respondents

Age	Frequency	%
18-28	39	28,7
29-39	50	36,8
40-50	27	19,9
51-60	14	10,3
61 and above.	6	4,4
All	136	100

3.2.2. Type of banking client

When it comes to the type of bank customer, respondents were offered three answers. Most respondents were retail customers, 111 (81.6%), followed by business customers with 16 (11.8). Nine respondents answered that they were both private and business customers of the bank.

Table 3: Type of banking client

Type of banking client	Frequency	%
Private client (natural person)	16	81,6
Business client (legal entity)	9	6,6
Both	111	11,8
Altogether	136	100

Modernization and digitalization have led to a simplification of many life processes, so that with the advent of internet banking, visits to a bank branch are becoming increasingly rare. Internet banking makes it much easier to carry out transactions and other actions for which one used to have to go to the bank. This is confirmed by the respondents, as 125 of them use internet banking and only 11 participants do not use internet banking for personal reasons.

Table 4: Use of Internet banking

Use of Internet banking	Frequency	%
Respondents who use it	125	91,9
Respondents who do not use it	11	8,1
Altogether	136	100

3.2.3. Satisfaction with service in the bank

People change banks when they are not satisfied with certain factors in the bank, for example the service. However, the respondents answered the following questions with the aim of answering the question of how satisfied they are with the current bank where they have an account. According to the survey, satisfaction with the current bank is very good, as most respondents are very satisfied with the service. 55 of them are satisfied with the service and 46 are very satisfied. 4 of them are dissatisfied with the service and 13 are dissatisfied.

1-extremely dissatisfied
2-dissatisfied
3-neither satisfied nor dissatisfied
4-satisfied
5-extremely satisfied
136 responses

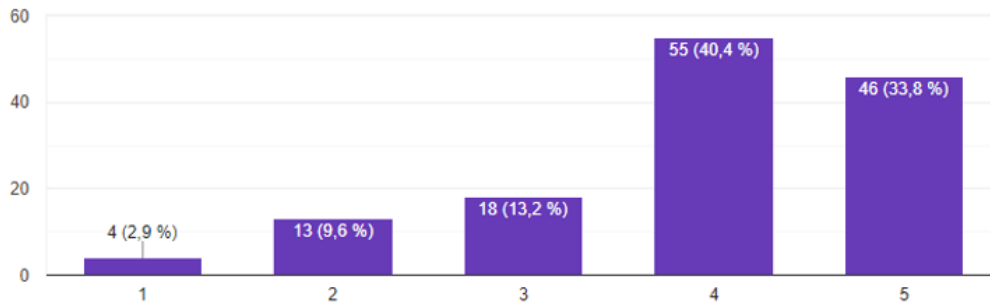


Figure 1. Satisfaction with the service in the bank

3.2.4. Satisfaction with the offer of services in the bank

When it comes to satisfaction with the services offered by the bank, the respondents are also very satisfied. 50 of them are satisfied and 47 are very satisfied. Dissatisfied are 13 respondents and extremely dissatisfied are 4.

1-extremely dissatisfied

2- dissatisfied

3-neither satisfied nor dissatisfied

4-satisfied

5-extremely satisfied

136 responses

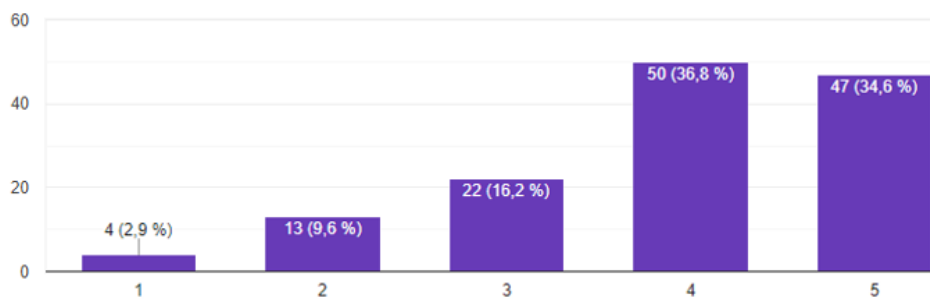


Figure 2. Satisfaction with the offer of services in the bank

3.2.5. Satisfaction with benefits in the bank

The banks offer certain advantages to their long-term customers, and many respondents see this as an additional reason not to change banks. Thus, 43 respondents are very satisfied with the benefits in the bank and 53 are satisfied. There are 14 dissatisfied and 4 unsatisfied.

1-extremely dissatisfied

2- dissatisfied

3-neither satisfied nor dissatisfied

4-satisfied

5-extremely satisfied

136 responses

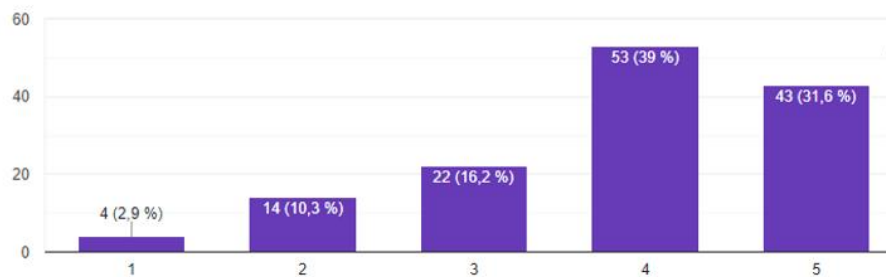


Figure 4. Satisfaction with the benefits in the bank

3.2.6. Change of respondent bank

In the course of their lives, people make various decisions with which they try to improve their life situation. One of them is to change banks. Therefore, respondents answered the question of how many times they have changed banks in the course of their lives. 58 respondents have changed banks once, 54 respondents have never changed banks. Twelve respondents have changed banks twice and the same number more than twice.

Table 5: Change of the respondent's bank

Change of bank in numbers	Frequency	%
Not once	54	39,7
Once	58	42,6
Twice	12	8,8
More than twice	12	8,8
Altogether	136	100

4. CONCLUSION

Over the years, various studies have been conducted on the motives and barriers to customers switching from one bank to another. One such study was conducted by Ghamry and Shamma in 2022. The study involved 255 people who had opened accounts at Kuwaiti Islamic banks. They tried to find out the reasons why people are willing to leave their current bank. The research found that the most important factors influencing customers' behaviour in switching to a Kuwaiti Islamic bank were convenience of service, reliability of service and level of technology. The research was conducted with the aim of identifying customers' motives and barriers in switching to another bank. With a sample of 136 respondents, the study yielded certain results. Accordingly, the hypothesis was also investigated: Different banking services induce citizens to switch banks that provide services to citizens of all ages. The results of the survey showed that a large number of respondents had changed banks at least once in their lives. Respondents who have never switched banks were asked about the reasons for staying with their current bank. For example, a larger number of respondents believe that bank staff are largely responsible for their satisfaction with the bank because they are accessible and inform customers about new services. In addition, respondents believe that location is very important when it comes to opening a bank account. The location of the bank branch is very important because respondents want to access a service from the bank at any time, and they cannot do that if their branch is several kilometres away. The same goes for ATMs, because withdrawing money is sometimes cumbersome if respondents have to go directly to the bank just to withdraw money because they do not have ATM nearby. The motives of respondents who have changed banks at least once in their lives are diverse. High fees are the most common motive because respondents believe that there are banks that have lower costs. The slow correction of a mistake is another motive that 24 respondents consider very important. When a bank customer needs a service from a bank, he expects it to be fast because his further workflow depends on it. This is especially true for business customers who have a business account in addition to a private account, so the bank's service is more demanding. The motives most often mentioned in the survey are related to prices and costs, especially now after joining the Eurozone, after which everyone is more careful with their finances. To determine the tax, certain questions were asked about the bank's services and their satisfaction. The hypothesis, which was: diverse banking services encourage citizens to change banks that offer services to citizens of all ages, proved to be successful. In particular, respondents believe that banking services play an important role in choosing a bank. Although a small number of respondents learn all kinds of information about the bank's services mainly through the internet and the use of internet banking is increasing, this does not change the fact that banks have a strong influence on customers in terms of loyalty, cooperation and empathy in providing certain services. All the above motives for switching banks show that one criterion is not sufficient when choosing a bank, as many factors play an important role, namely location, price, staff, banking services and the like. Despite the various motives customers have for switching banks,

there are also certain obstacles that make the switching process more difficult. The most common obstacle is the cost of switching, as many banks have certain conditions for closing an account, which makes customers reluctant to stay with their current bank. In addition, location also plays a major role, as the inaccessibility of the bank makes it difficult for customers to access the bank's services, so they usually stay with their current bank even if they do not like certain banking conditions. In addition, when switching banks, respondents experienced some inconvenience from staff who want to keep their customers and therefore encourage them to stay. Each of them strives to keep their customers satisfied because this also affects their reputation. If the bank has a bad reputation, this is of course another motive for the customer to change the bank if there are repeated mistakes there that give it a bad reputation. Due to the strong progress of the internet and the possibilities it offers, also in the banking sector, further investigations will probably be carried out in the future. Banks should continue to focus on face-to-face communication as much as possible, as this creates a stronger bond between the bank and the customer and ensures long-term customer loyalty. However, to achieve this, the bank needs to invest in itself in terms of improving services, continuously improving services, investing in staff and ultimately maintaining its reputation.

REFERENCE

- Aghaei, M., Vahedib, E., Safari Kahrehc, M., Piroozd, M. (2014), An examination of the relationship between Services Marketing Mix and Brand Equity Dimensions, *Procedia - Social and Behavioral Sciences*, Vol. 109, pg. 865-869.
- Agarwal, P.K. (2019), Drivers of Bank /Branch Switching Intentional Behaviour in Retail Banking: Evidence from Indian Banking Customers, *Journal of Marketing and Consumer Research*, Vol. 54, 1-12.
- Bhat, T.G. (2015), A study on scope of service marketing, *International Journal of Research and Analytical Reviews (IJRAR)*, Vol. 2 No. 1, pg. 624-631.
- Bhattacharyay, B.N. (1995), Marketing Approach to Promoting Banking Services, *Vikalpa*, Vol. 14 No. 2, pg. 35-36.
- Bucur, L.E. (2015), Characteristics of online banking products and services, *Revista Economica*, Vol. 67(5), pg. 33-46.
- Bytygi, S., Hasani, V.V., Ramaj, V. (2010), Marketing Management in Banks and Other Financial Institutions, *International Journal of Innovation and Regional Development*, pg. 69-74.
- Cetina, J., Mihail, N. (2007), Price Strategies in Banking Marketing, *Economie teoretica si aplicata*, pg. 25-31.

- Ennew, C.T., Waite, N. (2007), *Financial Services Marketing International Guide to Principles and Practice*, Elsevier Ltd., UK.
- Farah, M.F. (2017), Consumers' switching motivations and intention in the case of bank mergers: a cross-cultural study, *International Journal of Bank Marketing*, Vol. 35 No. 2, pg. 254-274.
- Ghamry, S., Shamma, H. (2022), Factors influencing customer switching behavior in Islamic banks: evidence from Kuwait, *Journal of Islamic Marketing*, Vol. 13 No. 3, pg. 688-716.
- Gondat-Larralde, C., Nier, E. (2006), Switching costs in the market for personal current accounts: some evidence for the United Kingdom, Working Paper no. 292, Bank of England.
- Hole, Y., Pawar, S., Bhaskar, M.P. (2018), Service Marketing and Quality Strategies, *Periodicals of Engineering and Natural Sciences*, Vol. 6 No.1, pg. 182-196.
- Hossain, S., Hossein Khan, M.Y., Naumov, N. (2022), Service quality and online banking services: analyzing the international tourists' satisfaction with online banking services in Bangladesh, *international journal of multidisciplinary in business and science*, Vol. 8, No. 13, pg. 5-16.
- Kotler, P., Armstrong, G. (1991), *Principles of Marketing*, Prentice-Hall International Editions, Englewood Cliffs, NJ.
- Kotler, P. (2000), *Marketing management*, Prentice Hall, NJ.
- Lovelock, C.H., Vandermerwe, S., Lewis, B., Fernie, S. (2016), *Services Marketing*, Edinburgh Business School, Edinburgh.
- Maniruzzaman, M. (2020), Impact of Service Marketing Mix in the Banking Sector: A Study of Private Commercial Banks in Dhaka City, Bangladesh, *International Journal of New Technology and Research (IJNTR)*, Vol. 6, No. 10, pg. 65-72.
- Manosur Alharth, M., Jastania, Z.A., Aziz, A.A. (2017), The Total Quality Management in Banking, *International Advanced Research Journal in Science, Engineering and Technology*, Vol. 4 No. 5, pg. 159-163.
- McDonald, M., Frow, P., Payne, A. (2011), *Service Marketing Plans: Full Guide*, Third Edition, Wiley.
- Methlie, L.B., Nysveen, H. (1999), Loyalty of on-line bank customers. *Journal of Information Technology*, Vol. 14 No. 4, str. 375-386.
- Once, G. (2012), Service marketing in banking sector and recent perceptions in marketing thoughts of services, Faculty of Economics and Business Marketing Department, pg. 484-48.

- Onwoga Auka, D., Bosire, J.N., Matern, V. (2013), Perceived service quality and customer loyalty in retail banking in Kenya, *British Journal of Marketing Studies*, Vol.1 No.3, pg. 32-61.
- Patterson, P., Smith, T. (2003), A cross-cultural study of switching barriers and propensity to stay with service providers, *Journal of Retailing* 79, pg. 107–120.
- Shpak, N., Kulyniak, I., Gvozd, M., Malynovska, Y., Sroka, W. (2020), Estimation of the marketing activity of banking structures, *Acta universitatis agriculturae et silviculturae mendelianae brunensis*, Vol. 68 No. 1, pg. 229-242.
- Singh, F., Kaur, D. (2011), Customer Perception of Banking Services – A Comparative Study of Rural and Urban Branches, *Asia Pacific Business Review*, Vol. 7 No. 2, pg. 37-47.
- Subramaniam, R., Ramachandran, J. (2019), Customers' switching behavior in banking industry-empirical evidence from Malaysia, *International Journal of Business, Economics and Law*, Vol. 1, pg. 156-162.
- Tesfom, G., Birch, N. (2011), Do switching barriers in the retail banking industry influence bank customers in different age groups differently? *Journal of Services Marketing* 25/5, pg. 371–380.
- Torres Fragaso, J., Luna Espinoza, I. (2017), Assessment of banking service quality perception using the SERVPERF model, *Contaduría y Administración*, Vol. 62 No. 4, pg.1294-1316.
- Valenzuela, F. (2014), Switching Barrier's Influences on Service Recovery Evaluation in the Retail Banking Industry: Construct Development and Testing, Vol. 22 No. 4, pg. 296-306.

A Study on Factors Affecting the Value of Gold in Turkish Lira

Esra N. Kılıcı¹

Abstract

Introduction: The value of gold in Turkish Lira has provided great returns to its investors in recent years, especially due to the significant depreciation of Turkish Lira against the US dollar.

Aim: In this study, the existence of the relationship between these variables is tested by focusing on the value of ounce gold and the USD/TRY exchange rate that are the two major variables affecting the value of gram gold in Turkish Lira.

Method: In the analysis, we use the traditional ADF unit root test to investigate the stationarity of the series, as well as the Fourier ADF unit root test developed by Enders and Lee (2012), which allows for structural breaks. In the second stage, using the Fourier ADL cointegration test developed by Banerjee et al. (2017), we examine the effect of the USD/TRY exchange rate and value of ounce gold on the value of gram gold in Turkish Lira over the period of 2018:07-2023:07.

Findings: The results of the analysis point to the existence of a long-term relationship between the USD/TRY exchange rate, the value of ounce gold and the value of gram gold in Turkish Lira in the relevant period.

Originality and value: Gold can be considered a safe-haven asset against depreciation in the national currency, uncertainty, and fluctuations in financial markets.

Key Words: gold prices, foreign exchange rate, structural break

JEL Codes: C10, F31, G15

1. INTRODUCTION

In the global economy, gold performs a variety of tasks. Since it has monetary significance, central banks want to include it in their international reserves. In addition to being used in jewellery, it has industrial use. Investors have long used gold as a hedge in portfolio diversification as well as a refuge during periods of very volatile economic and political conditions as well as strong market volatility. A unique commodity that serves both monetary and financial purposes is gold (Qian et al., 2019).

According to Chirwa and Odhiambo (2020), gold has long been a symbol of prosperity and is viewed as a haven when economies are growing or contracting. In the past, societies all over the world minted coins made of gold as a form of commerce. Gold was used as a currency reserve to back up any quantity of printed money from central banks throughout the world during the gold standard era, which ended in the 1930s. Similar to how the gold standard was abandoned in the second part of the 20th century, this precious metal is still traded on the stock market as a haven in times of

¹ Assoc. Prof., Istanbul University-Cerrahpaşa, Department of Health Economics, Türkiye

economic, financial, or political prosperity or suffering. Gold possesses all the characteristics necessary to be a strategic investment asset due to the fact that it is a widely traded financial product. The value of gold traded on the stock exchange reached a two-decade high of \$46.4 billion in March 2020, according to the London Bullion Market Association. As a result, both producers and investors place a high value on research into the price dynamics of the commodity price of gold.

In this context, the impact of changes in global liquidity on commodity prices and asset price indices was examined by Murach (2019). By examining how long-term changes in gold prices can be tied to changes in global money, production, and inflation, their study analyzes the long-term correlations between these variables using a multivariate cointegration technique. The findings imply that excess global liquidity has a major impact on real gold prices and that real gold prices and global inflation move in parallel.

In another study, Elfakhani et al. (2009) investigate the variables that may account for variations in the price of gold throughout time. For the period of 1971–1998, they use the Kaufmann–Winters (1989) model, which they alter by taking into account variables that indicate the supply and demand for gold as well as a stock market proxy. The amount of central banks' sales of their gold reserves, stock market activity, the value of the US dollar, and gold production and fabrication forces are found to be the main drivers of gold price between 1990 and 2001, according to their factor analysis. Their findings suggest that the variables that affected the price of gold in the 1980s are different from those that did so in the 1990s. They advise governments to increase their gold holdings to stabilize their currencies as a partial remedy for the current turmoil in the global financial crisis and credit crunch, and they advise investors to think about including gold in their portfolios as a store of value and a tool for diversification.

In their study, Barsky et al. (2021) focus on three factors that are frequently mentioned as influencing gold prices: inflationary expectations, real interest rates, and pessimism on the macroeconomic environment of the future. Their empirical findings center on three main propositions: that gold is a hedge against inflation, that gold is sensitive to anticipated long-term real interest rates, and that gold is seen to be protective against adverse economic times.

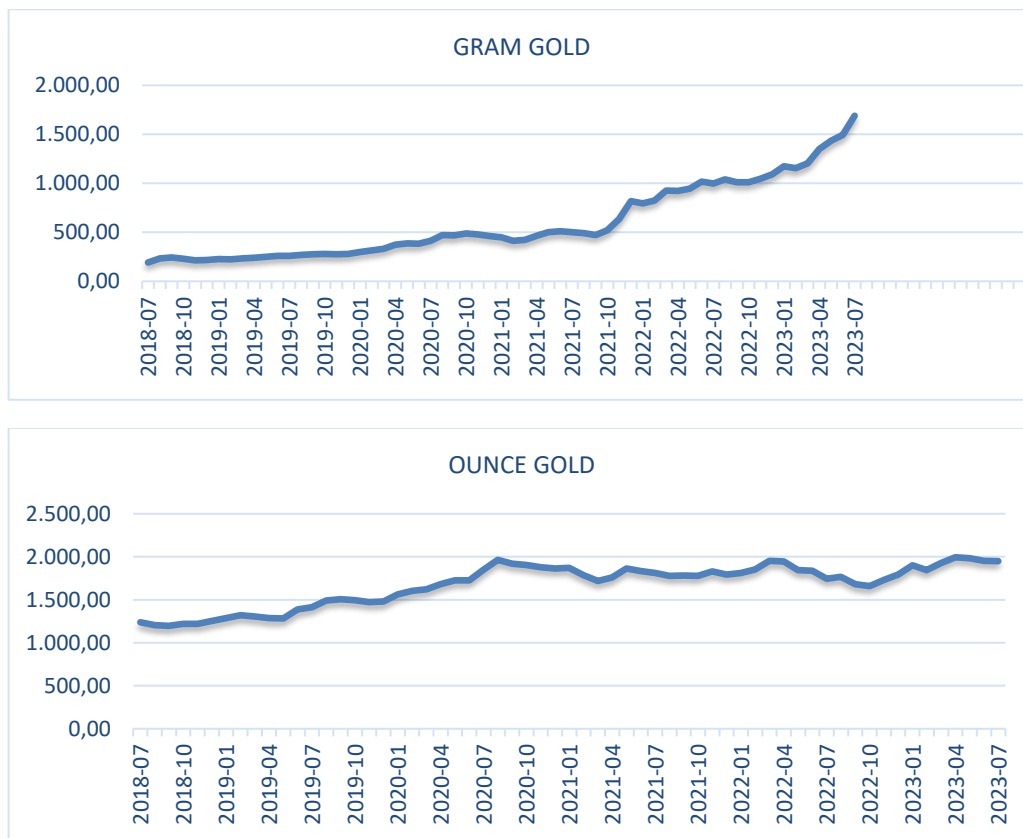
In Türkiye's financial markets, the two main factors that determine the price of gram gold in Turkish Lira are the value of gold in the international markets and the USD/TRY exchange rate. Accordingly, a rise in the USD/TRY exchange rate will raise the price of the gram of gold. Similarly, if the USD/TRY exchange rate drops, the gram of gold will fall. The price of gram gold is also affected by global gold prices. A change in global demand for gold, and therefore in the price of the ounce gold, will lead to changes in the value of the gram of gold. The aim of this study is to analyze the influence of the value of the USD/TRY exchange rate and the ounce gold on the price of the gram of gold in the Turkish lira. The stationarity of the series in the study is determined by the ADF unit root test, as well as by the Fourier unit ADF root test developed by Enders and Lee (2012). In the following phase, the existence of a long-term relationship

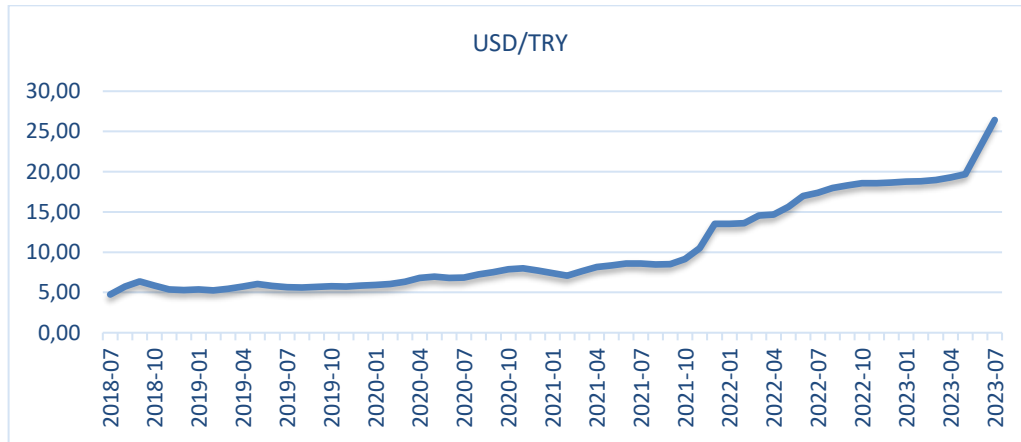
between the series is investigated with the co-integration test developed by Banerjee et al. (2017). Finally, the magnitude of the effect is analyzed using the FMOLS model. The study is organized as follows. The following section gives information about data, methodology, and findings. Finally, the last section concludes and give some policy implications.

2. DATA, METHODOLOGY AND FINDINGS

In this study, we examine the impact of the value of the ounce gold and USD/TRY exchange rate on the value of the gram gold in the Turkish lira for the period of 2018:07-2023:07. We use the logarithmic forms of variables in our analysis. Below are graphs showing the trend of price of ounces gold, USD/TRY exchange rate and the gram gold in Turkish lira during the period 2018:07-2023:07.

Graph 1: Trend of the gram of gold, ounce of gold, and USD/TRY exchange rate





Source: CBRT (2023).

Table 1 shows the dependent-independent variables used in the analysis, the abbreviations, and the expected relationship between variables. The data is obtained from the CBOT Electronic Data Distribution System.

Table 1: Dependent and independent variables used in the analysis

	Variables	Abbreviation	Expected Relationship
Dependent variable	Value of gram gold	GRAM	
Independent variable	Value of ounce gold	OUNCE	(+)
In dependent variable	USD/TRY exchange rate	USD	(+)

We examine the long-run relationship between the variables using the Fourier ADL cointegration test proposed by Banerjee et al. (2017). At first, we determine the stationary properties of the variables.

The following model is estimated as:

$$\Delta y_t = \rho y_{t-1} + \beta_1 + \beta_2 \text{trend} + \beta_3 \sin\left(\frac{2\pi kt}{T}\right) + \beta_4 \cos\left(\frac{2\pi kt}{T}\right) + u_t \quad (1)$$

Table 2: The findings of the ADF and Fourier ADF unit root test

Variables	Frequency	MinSSR	Fourier ADF t-statistic	ADF t-statistic	t- statistic	Fourier ADF F-
GRAM	3	0,202	1,244	0,633	7,153	
DIFGRAM	3	0,180	-5,447	-5,969	6,535	
OUNCE	4	0,048	-2,027	-1,573	2,158	
DIFOUNCE	4	0,049	-5,461	-6,335	2,154	
USD	3	0,171	2,204	1,192	5,881	
DIFUSD	3	0,139	-4,737	-5,124	4,192	

Note: We use the critical values in Table 1(b) of Enders and Lee (2012) for Fourier ADF test statistics and F statistics, since the constant model is used. Critical values for ADF t-statistics are -3,546, -2,911 and -2,593 for %1, %5 and %10 respectively.

The test results show that the series have unit root; the series become stationary when they are I(1).

In the following phase, the Fourier ADL co-integration test is used to test the existence of long-term relationships between variables. The FADL model is shown below;

$$\Delta y_t = d(t) + \beta_1 y_{t-1} + \gamma_1 x_{t-1} + \phi' \Delta x_t + u_t \quad (2)$$

The Fourier ADL cointegration test results are shown below.

Table 3: The findings of the Fourier ADL test

Relationship	Frequency	AIC	Fourier ADL t-statistic	Lag of Y	Lag of X
OUNCE-GRAM	3	-2,901	-5,171	3	1
USD-GRAM	3	-2,904	-4,445	3	1

Note: The critical values in Table 1(a) in the study of Banerjee et al. (2017) are used.

The findings in table 3 indicate the existence of a cointegration relationship between the variables. So, we can say that the ounces of gold and the dollar have a long-term effect on the dry gram of gold. The FMOLS (Full Modified OLS) technique developed by Phillips and Hansen (1990) is used to obtain cointegration predictors.

Table 4: *FMOLS Results*

MODEL: GRAM=f(OUNCE, USD)				
Variable	Coefficient	Standard dev.	t-statistic	Prob.
OUNCE	0,687	0,289	2,373	0,021
USD	0,027	0,009	2,045	0,003

Table 4 shows that there is a statistically meaningful and positive relationship between OUNCE, USD, and GRAM. Accordingly, an increase of 1% in the value of ounce of gold rate leads to a 0.6% rise in the value of gram of gold, while a 1% increase in the USD/TRY exchange rate results in a rise of 0,02% in the gram of gold.

3. CONCLUSION

Since gold is considered a safe-haven asset against inflation as an investment tool, depreciation in the national currency, uncertainty and fluctuations in financial markets, gold prices generally have an increasing trend, although there are occasional profit realizations. In international financial markets, among the factors that determine gold prices are variables such as the US dollar, demand for gold, limited supply of gold, inflation and interest rates. The value of gold in Turkish Lira has provided great returns to its investors in recent years, especially due to the significant depreciation of Turkish Lira against the US dollar. According to the data obtained from the electronic data distribution system of the Central Bank of the Republic of Turkiye, the gram gold price, which was 216,50 TL at the end of 2018, saw the value of 279,74 at the end of 2019 and 462,72 at the end of 2020 approached the level of almost 1.700 TL in July 2023. In this study, the existence of the relationship between these variables is tested by focusing on the value of ounce gold and the USD/TRY exchange rate that are the two major variables affecting the value of gram gold in Turkish Lira.

Our results support the evidence of a long-run impact of the value of ounce of gold and USD/TRY exchange rate on the value of gold of gram. Therefore, gold is considered a safe-haven asset against depreciation in the national currency, uncertainty, and fluctuations in financial markets. Gold is also used as safe haven asset against inflation. Gold's price rises when inflation or inflationary predictions enhance investors' desire to buy the metal; on the other hand, when inflation or inflationary expectations decline, gold prices fall. Expected long-term real interest rates have an impact on gold. Gold's price is anticipated to have a significant inverse connection with the long-term real interest rate since it is a long-term durable asset with a reasonably consistent dividend yield. All else being equal, a rise in anticipated real rates should result in a decrease in the price of gold.

REFERENCES

- Banerjee, P., Arčabić, V. & Lee, H. (2017) Fourier ADL Cointegration Test to Approximate Smooth Breaks with New Evidence from Crude Oil Market, *Economic Modelling* 67, 114-124.
- Barsky, R., Epstein, C., Lafont-Mueller, A. & yoo, Y. (2021). What drives gold prices? *Chicago Fed Letter*, 464(6).
- Chirwa, T. G. & Odhiambo, N. M. (2020). Determinants of gold price movements: An empirical investigation in the presence of multiple structural breaks. *Resources Policy*, 69, 101818.
- Dickey, D. A. & Fuller, W. A. (1981). “Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root”, *Econometrica*, 49, pp. 1057-1072.
- Enders, W. & Lee, J. (2012). “The Flexible Fourier Form and Dickey-Fuller Type Unit Root Tests”, *Economics Letters* 117, pp. 196-199.
- Elfakhani, S., Baalbaki, I. B. & Rizk, H. (2009). Gold price determinants: empirical analysis and implications. *Journal of International Business and Entrepreneurship Development*, 4(3), 161-178.
- Murach, M. (20109). Global Determinants of the Gold Price: A Multivariate Cointegration Analysis. *Scottish Journal Political Economy*, 66(1), 198-214.
- Qian, Y., Ralescu, D. A. & Zhang, B. (2019). The analysis of factors affecting global gold price. *Resources Policy*, 64, 101478.
- Phillips, P. & Hansen, B. (1990) Statistical Inference in Instrumental Variables Regression with I(1) Processes. *Review of Economic Studies*, 57, 99-125.
- Central Bank of Republic of Turkiye (CBRT) (2023). Electronic Data Distribution System. Available from: <https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket> (07.09.2023).

The revolutionary of AI and IoT (AIoT) on students' communication and critical thinking in EFL Classroom

Muthmainnah¹, Besse Darmawati², Ahmad Al Yakin³, Abdul Gafur Marzuki⁴,
Rapia Arcanita⁵, Eka Apriani⁶

Abstract

Introduction: Undergraduate students in an English education class were observed as they underwent AIOT therapy in this study. This course is designed using AI-ChatGPT, YouTube, and Google (IoT) as teaching content.

Purpose: The purpose of this study is to see how undergraduate students perceive the use of AIOT in English education and to observe the impact of AIOT on students' communication and critical thinking.

Method: The research methodology is a mixed method. The population of this study was 350 students from one of the universities in Indonesia, and a sample of 72 fourth-semester students taking the level 4 English programme was selected randomly.

Findings: Based on the results of this research, AIoT can help undergraduate students to be more adept at getting ideas and insights, thereby helping their critical abilities and increasing their chances of general academic achievement in speaking. Undergraduate students' perceptions of the research were overwhelmingly positive, and many expressed excitements about the potential use of AI and IoT to improve English education.

Originality and value: The findings of this study suggest the use of AIOT as a modern teaching material in university.

Keywords: AI, IoT, AIoT, ChatGPT, communication, critical thinking, and English Class.

¹ Assistant professor, Universitas Al Asyariah Mandar, Teacher Training and Education, Indonesian Language Department, Indonesia

² Assistant professor, Badan Riset dan Inovasi Nasional (BRIN), Indonesia

³ Assistant professor, Universitas Al Asyariah Mandar, Teacher Training and Education, Pancasila and civic Education Department, Indonesia.

⁴. Associate professor, Universitas Islam Negeri Datokarama Palu, English Tadris study program, Indonesia.

⁵. Assistant professor, Institut Agama Islam Negeri Curup , Islamic education Study Program Tarbiyah Faculty, Indonesia.

⁶. Associate professor, Institut Agama Islam Negeri Curup , English Study Program Tarbiyah Faculty, Indonesia

1. INTRODUCTION

As our society becomes increasingly digitised, artificial intelligence (AI) plays an important role. More and more aspects of human life will be transformed by the ability of artificial intelligence to automate tasks, process large amounts of data, and provide predictable insights (Al Darayseh, 2022). Previous definitions of artificial intelligence (AI) focused on the ability of machines to simulate human cognitive processes, including reasoning, decision-making, and goals (Ren et al. 2013).

To build various smart applications that function as media and learning technology, AIoT technology, which is widely used, integrates IoT and AI technology. All learning activities using project-based learning models and problem-oriented learning are compatible with AIoT technology. Through the learning process, students can hone their problem-solving and collaborative skills, as well as their knowledge of technology, and adapt to AI programs (Hundhausen et al., 2013).

The “maker movement” emphasizes “learning by doing” in social environments using digital apps and tools, completely overturning traditional modes of learning by using “innovative thinking” as the focus of courses. Traditional classroom teaching employs “hands-on” courses with “thinking,” whereas “maker” education emphasizes “learning by doing” in a social setting. Teachers are motivated by this type of learning, which is seen as the foundation of education and has emerged as a significant field of study. Maker education is closely related to English learning, which encourages students to express their ideas practically in accordance with the principle of “learning by doing” in order to cultivate their innovative spirit and practical talents. Maker education uses collaborative learning to address real-world problems and is based on “problem-oriented” and “topic-oriented” learning methodologies Chang et al. (2022)

To prepare students for the future, AIoT is a worldwide educational reform that can foster students' creative talents Wang et al. (2023). CCT, IoT, and AIoT are also included in the course outline as part of educational reforms to increase national competitiveness, shape students' information literacy and application skills, and cultivate their capacity for creativity and thought. These concepts have also recognized the significant benefits of “computational thinking” for learning and work. IoT and AI have emerged as two main topics of technology development of Industry 5.0 in education.

In the past, university course planning often prioritized lecturer expertise and teaching intent over meeting student needs or industry trends. This approach results in a significant gap between students' professional knowledge and industry demands. As a result, students have difficulty applying what they have learned, necessitating retraining for the industrial workforce. To bridge this gap and meet the needs of the digital age, it is important to assess the skills and course delivery methods of educators to ensure efficient delivery of courses in areas such as Artificial Intelligence of Things (AIoT) in a short time frame, thereby enabling students to achieve appropriate learning outcomes. maximum.

It is important to realize that the traditional classroom is no longer the primary place for learning, especially considering the rapid advances in science and technology. As highlighted by An et al. (2023) in their study, the prevailing trend in the world of education, which is often called Education 5.0, emphasizes "maker learning". This educational approach places great emphasis on developing independent learning among children, encouraging them to be actively involved in the learning process.

In short, the evolution of education towards Education 5.0 is driven by the need to align educational offerings with industry demands, drive efficient course delivery, and adapt to the changing learning landscape in the digital era. In addition, English course with AIoT teaching model are an educational environment capable of cultivating and improving students' communication and critical thinking (CCT) competencies due to the interdisciplinary integration of sensing technology and problem-solving objectives. However, due to the large number of applications and complex environments, AIoT can be used as a tool that can trigger learning motivation and gain meaningful learning experiences by exploring ICT or social media and AI application sectors that cause students to examine aspects of certain problems thoroughly.

As a result of the above, the focus of this research is on the influence of AIoT (AI-ChatGPT and IoT) learning on the development of CT skills and communication skills. It also introduces an AIoT teaching technique that utilizes AI-ChatGPT technology by combining IoT-based social media such as YouTube and Google to test its effect on AIoT English course learning outcomes and CCT (Communication and Critical Thinking) competency performance. By using AIoT in English classroom, we hope to improve data in the field of scientific education and raise awareness of the importance of communication skills and critical thinking skills, thus providing a basis for students' understanding of technological concepts and accelerating more efficient learning. Students are able to think about and develop communication project designs (dialogue, sharing ideas, and reflecting orally using English).

This study incorporates CCT teaching techniques into English courses, gradually introduces the necessary teaching models using AIoT, and examines how these teaching models influence students' learning intentions and CCT competencies in English courses. The English course in this study uses an AIoT teaching model that uses AI-ChatGPT and AIoT, and a teaching model for English courses has been created that can be used in schools and universities and other relevant courses.

2. LITERATURE REVIEW

In today's fast-paced digital era, the convergence of Artificial Intelligence (AI) and the Internet of Things (IoT) has given birth to a breakthrough paradigm known as AIoT (Artificial Intelligence of Things). This convergence is revolutionizing various aspects of our lives, including education.

AIoT refers to the integration of AI technology with IoT devices, creating a symbiotic relationship that strengthens the capabilities of both systems. In the educational context, AIoT includes leveraging AI-powered devices and applications

that collect, process, and analyze data from IoT sensors and objects. This ecosystem paves the way for interactive and personalized learning experiences that go beyond the traditional classroom Zhang et al. (2021).

2.1 Improve Communication Skills

Acquiring a second language requires extensive exposure to the target language. Chatbots powered by artificial intelligence can be used as learning media and efficient learning resources to provide new vocabulary and provide daily conversation practice for language learners (Khang et al., 2023). They can also arouse students' curiosity and foster their development (Chang et al., 2022). In addition, they can emphasize important information and respond to questions from students, both of which aid in the recognition and understanding of linguistic elements in language learning (Fryer, et al. 2019).

Students can improve their language skills anytime, anywhere for the accessibility of these chatbots (Vázquez-Cano et al. 2021). This kind of direct feedback allows students to adjust their communication output in real time, thereby improving their English learning outcomes (Moqbel and Al-Kadi, 2023). Chatbots enabled by artificial intelligence (AI) can adjust the level of difficulty faced by undergraduate students, deliver subject matter individually, and recommend unique lesson plans if students experience difficulties (Rahman and Watanobe, 2023). An authentic and interactive language learning environment can be created with the help of this chatbot in the classroom (Jeon et al. 2023), which can provide expressions, questions, and vocabulary that human language communication partners may not have (Liu et al., 2023).

AI-powered chatbots play an important role in enhancing English language learning by conducting formative assessments and providing fast feedback. According to research studies like those by Huang et al. (2022) and Kuhail et al. (2022), these technological advancements are crucial for efficient language acquisition. A number of investigations have demonstrated the efficacy of chatbots in language education.

According to research by Kohnke (2023) and Smutny & Schreiberova (2020), they are useful tools that not only keep students interested but also facilitate increased learning and motivation. It is known that chatbots contribute to creating a supportive learning environment where students feel comfortable participating in class discussions. According to research by Fryer and Carpenter (2006), they encourage students to be more expressive and confident in their language abilities. Additionally, chatbots play an important role in bridging the gap between students and instructors, fostering better communication and support in the learning process, as emphasized in the work of Kohnke (2022). In short, AI-powered chatbots have proven to be a valuable asset in language learning, offering benefits such as formative assessment, rapid feedback, increased engagement, improved learning outcomes, and increased student-instructor interaction.

2.2 Growing Critical Thinking Ability

Critical thinking skills by making decisions based on data or information obtained. The presence of AIoT generates massive amounts of data from multiple sources within the educational environment. Students can learn to analyse this data, identify patterns, and draw maximum insights. Engaging in data-driven processes fosters critical thinking skills by encouraging students to question, interpret, and evaluate information effectively Muthmainnah et al. (2022).

In addition, efforts to solve problems through IoT can be made because AIoT introduces students to the concept of interconnected devices and systems. By understanding how IoT and ChatGPT devices work together, students can develop innovative solutions to real-world problems, provide the right solutions, and solve problems accurately Lai et al. (2021). This hands-on experience encourages them to face challenges critically and devise creative strategies. Ethical considerations as a form of critical thinking where the AIoT landscape raises ethically related questions about privacy, security, and user data biases Kumar et al. (2023) also students participating in these discussions are encouraged to think critically about the implications of AIoT for society and maximise technology literacy. Critical evaluation of these complex issues enhances their ability to dissect multiple issues and consider different and creative perspectives, Huang and Looi (2021).

Maximising adaptive learning is done to support the Hyplex learning environment with the aim of improving critical thinking skills. AIoT platforms can adapt learning paths based on student performance and engagement, maximising learning in intelligent environments. This approach challenges students with appropriately challenging material, developing problem-solving and critical thinking skills as they navigate content appropriate to their individual level of progress in the classroom Chou, et al. (2022).

The revolution brought by AIoT in the field of education is a testament to the transformative power of technology. By enhancing communication skills and critical thinking skills, AIoT equips students with the competencies needed to thrive in a digitally connected world Elliott (2019). When educators and students alike embrace this paradigm shift, we can witness a generation of students who are not only proficient in technology but also proficient in communication and critical thinking and ready to face the challenges of the future.

2.3 Impact of AIoT on Language Learning

The emergence of artificial intelligence (AI) has led to significant disruption and modernization in various sectors, including in education, as highlighted by Huang et al. (2023). Among transformative AI technologies, OpenAI Chat Generative Pre-Trained Transformer (ChatGPT) stands out as a powerful conversational AI interface. This innovative tool leverages natural language processing capabilities to understand and respond effectively to human questions, making it a valuable asset for data scientists in their efforts (Fanni et al., 2023).

ChatGPT's power lies in its ability to generate high-quality responses across a wide spectrum of queries, thanks to its foundation in deep learning algorithms. This process relies on a mix of natural language processing and machine learning algorithms, which allows for the generation of grammatically accurate and contextually relevant text (as briefly outlined in the model description by Rudolph et al. (2023). Notably, ChatGPT has gone beyond the realm of mere technology and has become a cultural phenomenon. This indicates the growing impact of AI on communication and human-machine interaction, as observed by Hepp et al. (2023). As a result, ChatGPT has the potential to reshape and improve many aspects of our education system and beyond.

Many experts in the field of technology are of the view that technological progress is inspired by natural phenomena. It has been stated that humans provide the best pattern to follow when designing AI system technologies Grudin, (2022). One of the most sophisticated tools humans have ever developed is language, and this viewpoint requires that language be duplicated. Language is seen as a soft technology (Casteck, 2023) that can be imitated from the point of view of ChatGPT as a generative artificial intelligence technology that uses machine and deep learning approaches for the purpose of foreign language acquisition. ChatGPT and similar generative AI systems are primarily trained to interpret and generate human language; they used the Generative Pre-training Transformer (GPT) model to analyze the complex patterns and structures of human-like language Haleem et al. (2023).

ChatGPT represents an innovative advancement in the field of natural language processing that functions as a generative AI technology. This innovative system excels at replicating human language not only in its responses but also in understanding natural language input. It serves as a powerful tool for natural language processing, although it is important to realize that ChatGPT is still a computer and does not have the same level of knowledge and contextual awareness as the average human (Haque, 2022).

Unlike humans, ChatGPT operates without innate knowledge or understanding of its environment. Instead, it interprets language based solely on the patterns and structures it absorbs from its training data (Haleem et al., 2023). However, ChatGPT is designed for interactive two-way dialogue with users and can be applied in the English classroom learning that will be carried out in this research, which can be applied to smartphones (Jefferson, 2019; Norouzi et al., 2020).

Language learning has long been a fundamental skill in cross-cultural communication and global engagement. With the rapid advancement of technology, the convergence of Artificial Intelligence of Things (AIoT) and AI-powered language models like ChatGPT is revolutionising the way languages are taught, learned, and mastered Pishghadam et al. (2023). This powerful combination is reshaping the language learning experience and opening up new possibilities for learners around the world. AIoT-personalised learning journeys are known to bring a personal touch to language learning Cho, (2016).. IoT devices equipped with AI capabilities can analyse students' progress, preferences, and patterns to customise the learning journey. This personalisation ensures that students receive content and exercises tailored to their level

of proficiency, learning style, and pace. As a result, the learner stays engaged and motivated, which is important for language acquisition. ChatGPT, powered by an advanced AI language model, can simulate natural and interactive conversations.

According to Huang et al. (2023) study showed that AI was commonly utilised to help students engage in dialogue with ChatGPT to practise speaking, listening, and understanding skills. This interactive learning approach provides a safe space for learners to experiment with language use, build confidence, and perfect their conversational skills. AIoT devices, such as smart speakers or language learning apps, can integrate ChatGPT to offer dynamic language practise opportunities.

AIoT devices equipped with real-time language recognition and translation capabilities offer an immersive language experience Kordian (2023). Learners can use these devices to interact with foreign languages in everyday life Topsakal and Topsakal, (2022) example, smart home devices can be set to communicate in the target language, thereby creating an environment where the learner is constantly exposed to the use of the native language Jeon et al. (2023). This immersion accelerates language learning by replicating the way humans learn their first language. During classroom learning, language learners often need timely feedback and correction to improve their skills. ChatGPT, being an AI language model, can provide instant feedback on grammar Hong, (2023); Ulla, et al. (2023), vocabulary Yildiz, (2023), Kovačević, (2023) pronunciation, and sentence structure Shaikh et al. (2023); Young et al. (2023) This immediate response helps the learner identify and correct errors, reinforcing proper use of language. IoT-enabled language learning tools can integrate ChatGPT capabilities to offer real-time feedback, creating efficient and effective learning loops.

AIoT tools ensure that language learning is not limited to a specific time or place. Learners can access language learning content through their IoT-connected devices whenever they want Dhanaraj et al (2020). This flexibility accommodates a variety of learning schedules and preferences, making language learning more accessible to a wider audience. Plus, students can practise language skills during everyday activities like travelling, playing sports, or cooking, maximising their study time.

Katz, (2019) AIoT interventions also increase cultural understanding and context because language learning is closely linked to cultural understanding. AIoT tools can provide context to language lessons by offering cultural insights, idiomatic expressions, and real-world scenarios. AIoT can help students understand the cultural nuances of language use Bonne, et al. (2023) helping them communicate effectively and respectfully with native speakers. This holistic approach to language learning prepares learners for meaningful cross-cultural interactions.

In line Alharbi (2023) stated AIoT break down language barriers in various language teaching contexts. IoT devices with language translation capabilities can instantly convert spoken or written content from one language to another, including English, thereby enabling seamless communication between individuals who speak different languages (English). This has far-reaching implications for global connectivity and collaboration.

The integration of AIoT into language learning is a transformative development with major implications. This empowers learners to embark on a personalised language learning journey, engage in interactive conversations, and immerse themselves in authentic language use, maximum practise, and accurate imitation. By leveraging the capabilities of language models and AI-powered IoT devices, language learning is made more accessible, efficient, and culturally enriching, paving the way for a new era of global communication, and understanding.

3. RESEARCH METHODOLOGY

3.1. Research Design

The purpose of this study was to evaluate the performance of ChatGPT in improving communication skills and critical thinking skills in EFL classes. The population of this study was 350 students from universities in Indonesia, and a sample of 72 fourth-semester students who took part in the level 4 English programme were selected randomly. They were surveyed using a mixed-methods research methodology; the research instruments used were questionnaires and interviews. After eight weeks of teaching English, students were given a questionnaire regarding communication skills and critical thinking skills after using AIoT while learning English, which consisted of 10 questions about communication skill and 10 questions about critical thinking skill. Numbers, percentages, and averages are calculated using descriptive statistics to test the data using SPSS version 26.

As a first step towards elucidating the layout of EFL classrooms at the university, a questionnaire was issued to students enrolled in the fourth-level English Sunset programme with agribusiness, agrotechnology, and public health courses who were treated using AIoT (ChatGPT, Google sites and YouTube) for eight weeks. The feature list of EFL classes would lead one to believe that not all of them pilot AIoT in the classroom. How much AIoT can be used in EFL classrooms is then discussed with the learning instructions contained in the syllabus, the learning process for eight weeks presenting the topic (1) asking for an opinion; (2) Comparatives with *er*, *more* and *most*; (3) question with *how* and *what*; (4) adjectives; (5) past passive, (6) expressing agreement and disagreement, (7) comparing similar people or thing; (8) describing house for advertisement, and learning evaluations.

This research provides a foundation for understanding how the role of AIoT in university-level EFL courses can improve communication skills and critical thinking skills as an implementation of 21st century-based learning.

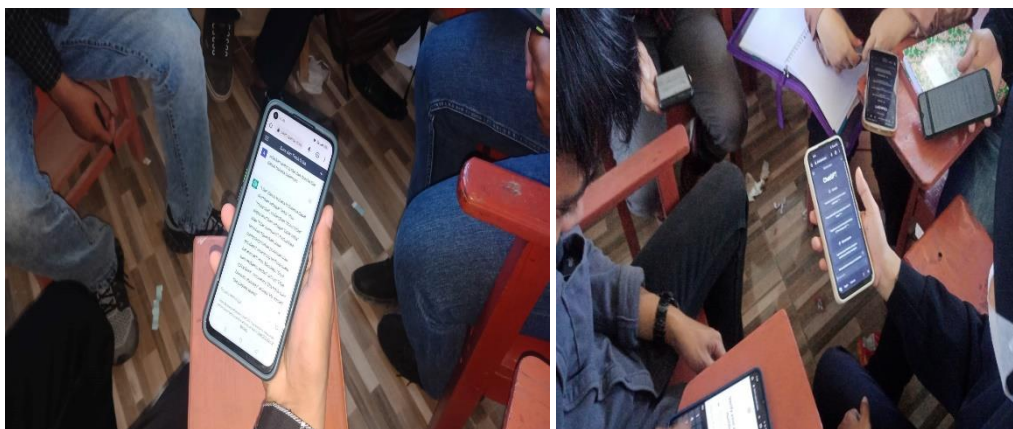


Figure 1. ChatGPT as teaching materials (student work in group)



Figure 2. YouTube as teaching materials.



Figure 3. Critical thinking; discussion and sharing ideas using Google sites.

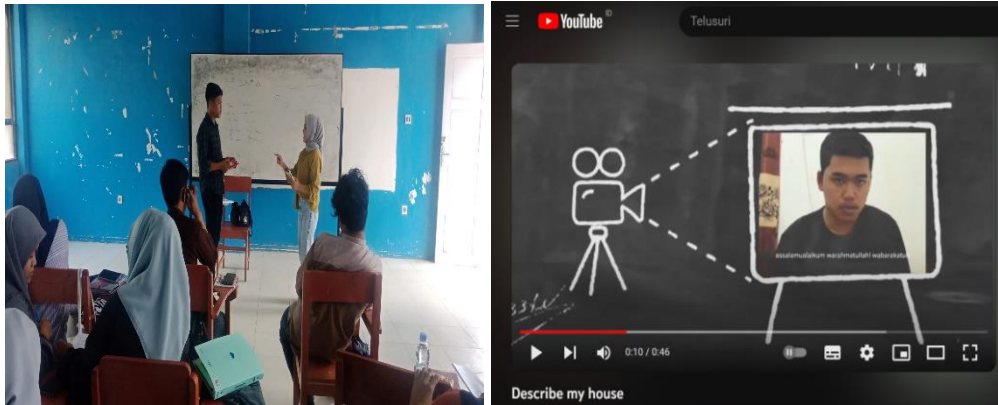


Figure 4. Communication practices in the classroom and presenting in YouTube
<https://www.youtube.com/watch?v=H1KAGtFKkQg>

Next step, researchers conducted in-depth interviews with students to get an overview of AIoT implementation in the classroom. This study interviewed six people who were selected because they had positive responses and were available to be interviewed about the use of AIoT-ChatGPT for the purpose of improving communication skills and critical thinking skills. The interviewer has been working with chatbots on improving English communication skills for at least two months and is an AIoT user. Selected participants were asked to rate their level of communication proficiency, AIoT-assisted critical thinking skills, comfort with chatbots, and motivation to learn with AIoT on a five-point scale, with lower scores indicating less perceived AIoT impact and higher scores indicating significant impact. bigger. This is done to ensure the findings are reliable. The participants who were interviewed had an average score of 3 from the questionnaire results, so they met the requirements for the study (Flick, 2009).

3.2 Participants

The population of this study amounted to 350 undergraduate students. Overall, 72 EFL students took part in this survey. Participants in this study volunteered their time after being exposed to AIoT. Most English as a foreign language (EFL) learner have never used AIoT while studying EFL. Students at Al Asyariah Mandar University in West Sulawesi, Indonesia, participated in this study, and all participants in the English Sunset level 4 programme had an intermediate level of English proficiency. Each group of potential participants was given an equal opportunity to be included in the research sample using a random sampling strategy.

3.3. Data Collecting Procedure

Analysing data collected from questionnaires using a Likert scale involves a structured process that offers valuable insights into various aspects of research. The Likert scale is a method commonly used to measure respondents' attitudes, opinions,

and perceptions regarding AIoT interventions while studying EFL. To collect data, the researcher distributed questionnaires to the participants, who then assessed their level of agreement or disagreement with a series of statements using a predetermined scale of 1–5 (strongly agree 5, agree 4, neutral 3, disagree 2, strongly disagree 1).

Table 1. The classification of questionnaire score from students' responses

Score		Classification
5	85-100	Very good
4	75-84	Good
3	65-74	Fairly
2	45-64	Low
1	0-44	Very low

3.4. Data Analysis

This research carried out Likert-scale data analysis; the researcher followed a structured process. First, after collecting the data, you use the Statistical Package for Social Sciences (SPSS) software to analyze and interpret the results. The initial step requires inputting the collected data into the software and assigning a numerical value to each answer choice, usually ranging from 1 for strongly disagree to 5 for strongly agree. Next, the researcher calculated various descriptive statistics such as mean, median, and standard deviation for each Likert scale item. These statistics serve to summarize participants' responses, revealing key trends and the distribution of their answers.

Likert scale data analysis was carried out, involving collecting responses through questionnaires and using tools such as SPSS for data processing and interpretation. This systematic approach provides researchers with valuable insights into participants' attitudes and perceptions, thereby contributing to a more comprehensive understanding of the AIoT phenomenon being studied.

3.4.1. AIoT for communication skills

Based on the findings obtained after conducting the survey, 72 participants met the prerequisites for inclusion in the analysis because of their willingness to express their perspective on the impact of AIoT on communication skills and critical thinking skills in English courses and their desire to understand the language. Furthermore, the task involved evaluating the answers given by each student to the survey questions. To interpret student scores effectively, the researcher refers to the following table which explains the results of the questionnaire assessment.

Table 2. AIoT impact on students' communication skills

Descriptive Statistics					
	N	Mini mum	Maxi mum	Mean	Std. Deviation
1. Using AIoT devices or applications (Google sites, YouTube, and ChatGPT are very helpful in learning English).	72	3.00	5.00	4.597 2	.52164
2. After using AIoT, I believe my English communication skills are better than before.	72	3.00	5.00	4.597 2	.52164
3. I practise my English communication skills by interacting with ChatGPT, lecturers, and friends. Listen to video material via YouTube.	72	4.00	5.00	4.569 4	.49863
4. I practise my English communication skills by interacting with ChatGPT, lecturers, and friends. Listen to video material via YouTube.	72	3.00	5.00	4.319 4	.49863
5. English communication (speaking, listening, writing, and reading) improves with AIoT.	72	4.00	5.00	4.652 8	.47943
6. I believe that using AIoT to learn English has a positive impact on communication skills	72	4.00	5.00	4.638 9	.48369
7. I often use AIoT devices or applications to learn English	72	3.00	5.00	4.763 9	.45943
8. Do I feel that my communication skills have improved? (e.g., pronunciation, vocabulary, fluency, volume, expression, and body language)	72	3.00	5.00	4.388 9	.54529
9. Using AIoT increases motivation to learn English and confidence to communicate.	72	3.00	5.00	4.430 6	.60109
10. Overall, I believe that AIoT has had a positive impact on my journey to improve my English communication skills	72	3.00	5.00	4.152 8	.57310
Valid N (listwise)	72				

Based on the data presented in the table above, 72 students or respondents were in the good category with an average score of 3 in the questionnaire. They argued that the AIoT intervention on communication skills was in the "good" category, of the total number of them. gave positive responses and expressed the view that AIoT used in English classes had better communication skills than before, they were also actively involved in exploring material with AIoT and they stated that they found it easy to understand courses effectively with YouTube and Chatbot facilities. Instructions given with AIoT are known that listening communication skills are facilitated by YouTube, reading and writing using Chatbots and Google sites (google translate and google search). This data set can also be visualized effectively via the histogram graph with good categories depicted below, which clearly illustrates that, overall, the students or respondents rated the AIoT intervention for communication skills as increasing their motivation to learn English and they feel confident with these conditions.

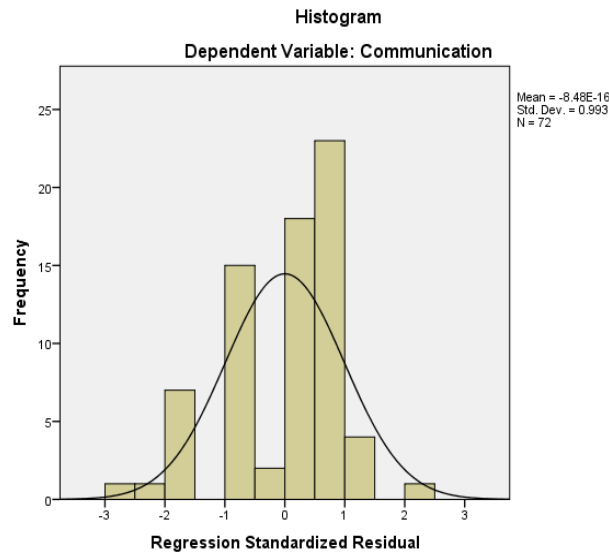


Figure 5. Communication skill histogram

3.4.2. AIoT for Critical Thinking Skills

Table 3. AIoT impact on students critical thinking skills

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. Using AI-powered language learning tools increased my interest in learning English.	72	4.00	5.00	4.3889	.49092
2. AIoT technology helps me analyse and understand complex English texts more effectively.	72	3.00	5.00	3.7361	.80479
3. Integrating AI chatbots and Internet of Things (IoT) tools into learning English increases my engagement with language material	72	3.00	5.00	4.3056	.70489
4. Using language applications based on AI Chatbots and IoT encourage me to think critically when solving language-related problems	72	3.00	5.00	4.1389	.86081
5. AI-supported language learning adapts to my pace and individual learning style.	72	3.00	5.00	4.1389	.86081
6. AIoT facilitates collaborative English learning activities with peers, fostering critical thinking through group discussions and projects.	72	3.00	5.00	4.1389	.86081
7. The AI-powered language tool suggests specific English exercises that challenge my cognitive abilities.	72	3.00	5.00	3.9861	.56899
8. AIoT technology have a positive impact on the ability to relate concepts when learning English.	72	3.00	5.00	4.1250	.67003
9. AIoT has helped me overcome barriers to formulating conclusions on language learning that require critical thinking	72	4.00	5.00	4.4583	.50176
10. Using AIoT tools helps increase the ability to ask critical questions and analyse information sources.	72	4.00	5.00	4.4583	.50176
Valid N (listwise)	72				

The data presented in the table above provides a clear picture of the responses collected from a sample of 72 participants. Among these respondents, it can be seen that in general they stated that their critical thinking skills had increased in the area of ability to analyze English texts more effectively with this AIoT, language problems were resolved efficiently using Google translate and Chatbot, in addition to AIoT fostering group discussions and help make video presentation projects using English. The presence of AIoT can help undergraduate students in relating concepts such as grammar and examples of sentences using 16 tenses. These comprehensive results underline the positive trend of overall student interest in AIoT. These findings are also presented visually in the accompanying histogram chart.

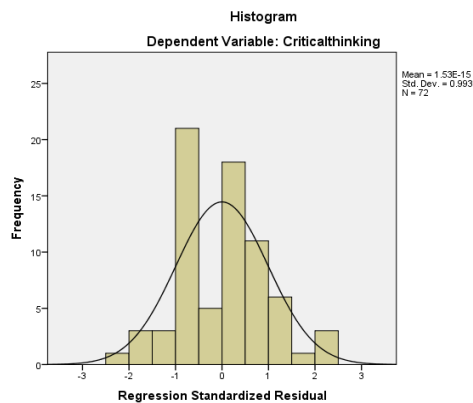


Figure 6. Critical thinking histogram.

Table 4. The mean score of the student's response on AIoT used in EFL class.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
AIoT in English	72	76.00	99.00	86.9861	6.29888
Valid N (listwise)	72				

The data provided presents descriptive statistics for the variable “AIoT in English”, possibly referring to some AIoT (Artificial Intelligence of Things) related measurement or score in the English context. The dataset consists of 72 observations. The minimum recorded value for this variable is 76.00, while the maximum value is 99.00. The mean (average) value of the variable across observations is around 86.9861 with a very good category, and the standard deviation, which indicates the spread of values around the mean, is around 6.29888. All of these statistics are calculated from a valid list of 72 observations, meaning that there are no missing values in this data set.

Table 5. AIoT ANOVA
ANOVA

AIoT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	282.827	10	28.283	5.670	.000
Within Groups	304.284	61	4.988		
Total	587.111	71			

In the analysis of variance (ANOVA) conducted to evaluate the impact of artificial intelligence of things (AIoT) on the provided dataset, the data was categorized into two main groups: "between groups" and "within groups." The sum of squares for the "between groups" category amounted to 282.827, with 10 degrees of freedom (df), resulting in a mean square of 28.283. The corresponding F-statistic was computed as 5.670, and the associated significance level (Sig.) was reported as .000, indicating a highly significant relationship.

Conversely, the "within groups" sum of squares was determined to be 304.284 with 61 degrees of freedom, leading to a mean square value of 4.988. The total sum of squares for the analysis was 587.111 across 71 degrees of freedom. These findings strongly suggest that AIoT has a statistically significant influence on the dataset, as indicated by the significant F-statistic and the associated p-value of .000.

Table 6. Communication Skills and Critical Thinking Skills Correlation

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	29.909	2.858		10.467	.000
CT	.363	.068	.539	5.347	.000

a. Dependent Variable: Communication

The data provided presents the coefficients of a model, which indicate the relationship between variables. The model includes one dependent variable, communication, and computational thinking predictor variables. The intercept term (constant) is 29.909, with a standard error of 2.858 and a t-value of 10.467, resulting in a significant p-value of 0.000. The critical thinking predictor variable has an unstandardized coefficient of 0.363, a standard error of 0.068, and a standardized beta coefficient of 0.539. This predictor variable is also statistically significant, with a t-value of 5.347 and a p-value of 0.000. These coefficients provide insight into the relationship between variables in the AIoT model, thereby enabling a better

understanding of their impact on the dependent variable. Improved communication skills affect the critical thinking skills of undergraduate students at this university. In addition, the semi-structured interviews aim to strengthen the data collected regarding the impact of AIoT on improving communication skills and critical thinking skills for learning English in the context of the English Sunset programme in a hybrid classroom environment. The results of the interviews can be described as follows:

Q1. How do you see the integration of Artificial Intelligence of Things (AIoT) in language learning affecting students' communication skills, especially in learning English?

Extract 1. (15th June 2023).

"I think the integration of AIoT into language learning has the potential to revolutionise the way I develop my communication skills in English. Devices and apps connected via AIoT can provide immersive language experiences, real-time feedback, and personalised learning paths that allow me to practise speaking and listening in authentic contexts."

Q2. Can you provide some specific examples of AIoT tools or applications that are starting to impact your English communication skills?

Extract 2. (15th June 2023).

"Of course. One notable example is a language learning app that uses AIoT to analyze pronunciation, but the ChatGPT it uses is unable to analyze pronunciation and correct pronunciation. However, the advantage of this application is that it can listen to students' speech, compare it to native pronunciation patterns, and offer instant feedback on areas that need improvement".

Q3. Based on technology and traditional language learning methods?

Extract 3. (15th June 2023).

"Hmmm..... AIoT can provide efficient practise and feedback, but real communication also involves nuances such as body language and cultural context that technology cannot fully replicate".

Q4. What advice would you give about the ever-growing field of AI-assisted language learning?

Extract 4 and Extract 6 (15th June 2023).

"I recommend using AIoT tools to create engaging language learning experiences. Stay informed about the latest technologies and their pedagogical implications. Students should view AIoT as a support resource to improve their skills, but they should also actively engage in natural conversation to develop overall communication skills.

"In my point of view, parents also can encourage a balanced approach by ensuring that their children are exposed to AIoT-based activities and human interaction to promote comprehensive language growth".

Q5. How does the integration of AIoT in a language learning environment affect your critical thinking skills?

Extract 5 and extract 2. (15th June 2023).

“In my opinion AIoT integration in language learning introduces interactive and adaptive elements that stimulate students' critical thinking”.

“As we feel that intelligent language learning apps can personalise content based on individual progress and preferences, this encourages us to analyse and make decisions about what and how they learn”.

Q6. Can you provide an example of an AIoT application that specifically targets critical thinking skills in learning English?

Extract 6. (15th June 2023).

“Of course. One example is a language learning platform that uses AIoT to analyse students' reading patterns, vocabulary retention, and comprehension levels. This data is then used to suggest relevant reading material, encourage students to evaluate different types of texts, and synthesise information, thereby enhancing their critical and analytical reading skills”.

Q7. It's interesting how technology can be used in such a way. Can you discuss collaborative learning and how AIoT can impact students' ability to think critically in groups while learning English?

Extract 3 and Extract 2. (15th June 2023).

“Of course. AIoT can facilitate collaborative learning by enabling real-time practise of language and communication between students, even if they are geographically far apart.

“I believe, AI-mediated virtual language exchange programmes or group discussions can encourage critical thinking as students engage in debate, analyse one another's arguments, and construct coherent responses to multiple perspectives”.

Q8. Virtual language exchange sounds like a powerful tool. On the other hand, are there any potential drawbacks or challenges regarding AIoT integration in this context?

Extract 1 and Extract 5. (15th June 2023).

“Of course, it is important to consider that over-reliance on AI-based platforms can hinder students' independent critical thinking. Relying solely on personalised content recommendations can prevent students from exploring diverse resources or developing the skills to evaluate course material on their own.

“I felt, balancing assisted AI by encouraging autonomous exploration is critical”.

Q9. Thanks for highlighting that balance. Before we conclude, what advice would you give to educators and institutions who want to take advantage of the benefits of AIoT while developing students' critical thinking skills in learning English?

Extracts 1-6. (15th June 2023).

Our advice is to view AIoT as a tool to enhance, not replace, traditional teaching methods. Encourage students to reflect on the resulting suggestions.

One of the most extraordinary novelties in this study is that AIoT has a significant impact on students' communication and critical thinking skills. This article investigates how AIoT is changing the educational landscape by improving students' ability to communicate effectively and think critically.

AI-assisted communication skills create a personalised learning environment. AIoT enables the creation of a personalised learning environment tailored to the needs of each student. AIoT can adapt to students' learning preferences and communication styles. This adaptability encourages more engaging interactions between students and educational content, thereby enhancing their communication skills. Then, this research found that AIoT helps undergraduate students communicate with human-machine simulations by real-world simulations and increase their critical thinking skills.

In this study, AIoT-based simulation provides students with opportunities to engage in real-world scenarios. Language learning in this study is enriched through immersive experiences where students communicate with AI-powered language bots or interact with IoT devices to learn English as a foreign language.

The possibility of collaboration beyond boundaries can occur because AIoT transcends geographical boundaries, allowing students to collaborate with colleagues from various backgrounds and various countries. AIoT-enabled ChatGPT classrooms can facilitate global interaction, where students solve problems, exchange ideas, and communicate effectively while honing their communication skills in a multicultural context. However, undergraduate students in this study are still lacking in developing their communication skills by collaborating in cross-country interactions because they have not been facilitated by lecturers and universities to carry out this collaboration with the aim of developing their English, Table 2.

This AIoT research that engages students in the learning process through activities, experiments, and inquiry-based projects is the key to effective science teaching. Students are better able to apply their knowledge to real-world scenarios with this method. Students carry out experimental projects using ChatGPT in class with the assumption that it is a source for reference and functions as an assistant robot that helps humans be responsive by providing efficient feedback in class. The expected involvement and feedback certainly involve critical thinking skills on Table 3.

Making connections between the science in the classroom and students' everyday lives is critical to effective education. This helps make the material more applicable and attractive to undergraduate students. When they are instructed to use ChatGPT in designing dialogues and material summaries and then practise communicating in the real world with their peers, of course, it really helps their English communication performance Table 2.

Effective language teaching differentiates instruction to meet the needs of individual students. Teachers use a variety of methods to adapt learning to the needs of each student, from presenting material in different formats to carrying out a series of tests using ChatGPT. A series of activities carried out in the classroom not only involve ChatGPT but also the elaboration of IoT. Learning instructions are carried out by involving Google Translation, Google, YouTube, Quizalize, and ChatGPT in class. This series of AIoT activities maximises communication skills and critical thinking skills Table 4.

Working together to find solutions to problems and exchanging ideas is a hallmark of an effective in English class in line with Schleppegrell and Oteíza explanation (2023). Undergraduate student collaboration activities greatly benefit from this, as it helps in the growth of their interpersonal, analytical, and collaborative abilities. They exchange ideas, use AIoT in the classroom, and give suggestions and critiques to each other.

This study recommends science education that effectively utilises technological tools to increase students' understanding of complex scientific concepts and improve communication and critical thinking skills. In this context, "digital tools" can refer to anything from AIoT simulations and virtual labs to other online resources and applications. In addition, effective science educators employ a series of tests, quizzes, and other evaluations to measure students' progress and inform their learning. There are many types of evaluation that fall into this category. Teachers need regular opportunities to learn about and use the latest research, best practises, and technology in their fields to effectively disseminate scientific knowledge in the classroom.

Based on the results of this study, we conclude that AIoT may be useful for helping ESL students based on its responses and our study of communication and critical thinking skills. AIoT can help; it is best used with the guidance of a lecturer or teacher in class before students use it outside of class while continuing to consult with lecturers, and the real purpose of this monitoring is to ensure the best results for students. To get the most out of AIoT, it is important to tailor your teaching to each student's level of English proficiency. For example, a student who is just starting to learn English may not benefit from chatting with AIoT. Instead, we can give them basic grammar, reading, and vocabulary practise with ChatGPT de Winter (2023), YouTube (Muthmainnah et al. 2022) and Google AI Yakin et al. (2022).

The presence of AIoT can cover learning styles that vary from student to student; some people retain information best through reading, while others learn better through hearing or action. AIoT must be used in a way that is conducive to teaching methods according to students' needs and preferences. ChatGPT can be used to connect students with relevant resources based on their areas of interest. If a student needs help with the UK or USA language or culture, for example, they can ask ChatGPT, Google Scholar and YouTube to find resources such as articles, films, and podcasts on AIoT.

4. CONCLUSION

This study also implies similar findings and answers the research questions by showing positive relation between AIoT usage, communication skills and critical thinking. It suggests that the more students engage in, the more they get informed about English. Along with the gradual implementation of the AIoT approach to increase learning activities at all levels of education, this study highlights how this approach is used in learning English to see how this AIoT impacts communication skills and critical thinking skills in EFL. The results of the study show that by using AIoT-assisted technology in English courses, this study offers several learning advances in the domains of communication and critical thinking skills. This AIoT intervention has

various functions, such as helping undergraduate students to increase their vocabulary, listening to material directly from native speakers, collaborating and teamwork, discussing and sharing critical ideas, and visualizing activities and interactions of undergraduate students that are impacted by AIoT in the future and in the present. This program, which automatically grades videotaped project-based spoken presentations uploaded to YouTube, introduces AIoT literacy to today's educators and designs learning instruction around the needs of undergraduate students. Some of the research we've looked at even refers to autonomous AI. Finally, it is important for more educators, practitioners, educational authorities, and decision-makers to get involved and study the potential benefits and drawbacks of using AIoT technology for teachers and students at the higher education level. As well as AIoT interventions in 21st century skills-based English learning in the AI era.

REFERENCES

- Al Darayseh, A. (2023). Acceptance of artificial intelligence in teaching science: Science teachers' perspective. *Computers and Education: Artificial Intelligence*, 4, 100132.
- Al Yakin, A., Obaid, A. J., & Massyat, M. (2022). Students' Motivation and Attitude Based on Google Classroom Utilization. *Journal of Positive School Psychology*, 6(2), 1053-1059.
- Alharbi, W. (2023). AI in the Foreign Language Classroom: A Pedagogical Overview of Automated Writing Assistance Tools. *Education Research International*, 2023.
- An, X., Chai, C. S., Li, Y., Zhou, Y., Shen, X., Zheng, C., & Chen, M. (2023). Modeling English teachers' behavioral intention to use artificial intelligence in middle schools. *Education and Information Technologies*, 28(5), 5187-5208.
- Bibri, S. E. (2023). The Metaverse as a Virtual Model of Platform Urbanism: Its Converging AIoT, XReality, Neurotech, and Nanobiotech and Their Applications, Challenges, and Risks. *Smart Cities*, 6(3), 1345-1384.
- Bonner, E., Lege, R., & Frazier, E. (2023). Large Language Model-Based Artificial Intelligence In The Language Classroom: Practical Ideas For Teaching. *Teaching English with Technology*, 23(1).
- Castek, J., Leu, D. J., Coiro, J., Gort, M., Henry, L. A., & Lima, C. O. (2023). Developing new literacies among multilingual learners in the elementary grades. In *Technology-Mediated Learning Environments for Young English Learners* (pp. 111-154). Routledge.
- Chang, C. Y., Hwang, G. J., & Gau, M. L. (2022). Promoting students' learning achievement and self-efficacy: A mobile chatbot approach for nursing training. *British Journal of Educational Technology*, 53(1), 171-188.

- Chang, H. Y., Chung, C. C., Cheng, Y. M., & Lou, S. J. (2022). A study on the development and learning effectiveness evaluation of problem-based learning (PBL) virtual reality course based on intelligence network and situational learning. *J. Netw. Intell*, 7, 1-20.
- Cho, S. (2016). “A Personal Touch of Advocacy to My Profession”: Counter-Narratives of Immigrant Latina Teachers in English as a Second Language Education. *Ethnic Studies Review*, 39(1), 19-35.
- Chou, C. M., Shen, T. C., Shen, T. C., & Shen, C. H. (2022). Influencing factors on students’ learning effectiveness of AI-based technology application: Mediation variable of the human-computer interaction experience. *Education and Information Technologies*, 27(6), 8723-8750.
- de Winter, J. C. (2023). Can ChatGPT pass high school exams on English language comprehension. *Researchgate. Preprint*.
- Dhanaraj, R. K., Rajkumar, K., & Hariharan, U. (2020). Enterprise IoT modeling: supervised, unsupervised, and reinforcement learning. *Business Intelligence for Enterprise Internet of Things*, 55-79.
- Elliott, A. (2019). *The culture of AI: Everyday life and the digital revolution*. Routledge.
- Fanni, S. C., Febi, M., Aghakhanyan, G., & Neri, E. (2023). Natural language processing. In *Introduction to Artificial Intelligence* (pp. 87-99). Cham: Springer International Publishing.
- Fryer, L. K., Nakao, K., & Thompson, A. (2019). Chatbot learning partners: Connecting learning experiences, interest and competence. *Computers in human Behavior*, 93, 279-289.
- Grudin, J. (2022). *From tool to partner: The evolution of human-computer interaction*. Springer Nature.
- Haleem, A., Javaid, M., & Singh, R. P. (2022). An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *BenchCouncil transactions on benchmarks, standards and evaluations*, 2(4), 100089.
- Haleem, A., Javaid, M., & Singh, R. P. (2022). An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *BenchCouncil transactions on benchmarks, standards and evaluations*, 2(4), 100089.
- Haque, M. A. (2022). A Brief Analysis of “ChatGPT”—A Revolutionary Tool Designed by OpenAI. *EAI Endorsed Transactions on AI and Robotics*, 1(1), e15-e15.
- Hepp, A., Loosen, W., Dreyer, S., Jarke, J., Kannengießer, S., Katzenbach, C., ... & Schulz, W. (2023). ChatGPT, LaMDA, and the Hype Around Communicative AI: The

Automation of Communication as a Field of Research in Media and Communication Studies. *Human-Machine Communication*, 6(1), 4.

Hong, W. C. H. (2023). The impact of ChatGPT on foreign language teaching and learning: opportunities in education and research. *Journal of Educational Technology and Innovation*, 5(1).

Huang, W., & Looi, C. K. (2021). A critical review of literature on “unplugged” pedagogies in K-12 computer science and computational thinking education. *Computer Science Education*, 31(1), 83-111.

Huang, X., Zou, D., Cheng, G., Chen, X., & Xie, H. (2023). Trends, research issues and applications of artificial intelligence in language education. *Educational Technology & Society*, 26(1), 112-131.

Jefferson, M. (2019). Usability of automatic speech recognition systems for individuals with speech disorders: Past, present, future, and a proposed model.

Jeon, J., Lee, S., & Choe, H. (2023). Beyond ChatGPT: A conceptual framework and systematic review of speech-recognition chatbots for language learning. *Computers & Education*, 104898.

Jeon, J., Lee, S., & Choe, H. (2023). Beyond ChatGPT: A conceptual framework and systematic review of speech-recognition chatbots for language learning. *Computers & Education*, 104898.

Katz, J. S. (2019). Aiot: Thoughts on artificial intelligence and the internet of things. *IEEE Internet of Things*.

Khang, A., Muthmainnah, M., Seraj, P. M. I., Al Yakin, A., & Obaid, A. J. (2023). AI-Aided Teaching Model in Education 5.0. In *Handbook of Research on AI-Based Technologies and Applications in the Era of the Metaverse* (pp. 83-104). IGI Global.

Kordian, P. (2023). Exploring the potential of AI to support team effectiveness in interdisciplinary product development.

Kovačević, D. (2023, March). Use of chatgpt in ESP teaching process. In *2023 22nd International Symposium INFOTEH-JAHORINA (INFOTEH)* (pp. 1-5). IEEE.

Kumar, P., Chauhan, S., & Awasthi, L. K. (2023). Artificial intelligence in healthcare: review, ethics, trust challenges & future research directions. *Engineering Applications of Artificial Intelligence*, 120, 105894.

Lai, Y. H., Chen, S. Y., Lai, C. F., Chang, Y. C., & Su, Y. S. (2021). Study on enhancing AIoT computational thinking skills by plot image-based VR. *Interactive Learning Environments*, 29(3), 482-495.

- Liu, Y., Han, T., Ma, S., Zhang, J., Yang, Y., Tian, J., ... & Ge, B. (2023). Summary of chatgpt/gpt-4 research and perspective towards the future of large language models. *arXiv preprint arXiv:2304.01852*.
- Moqbel, M. S. S., & Al-Kadi, A. M. T. (2023). Foreign language learning assessment in the age of ChatGPT: A theoretical account. *Journal of English Studies in Arabia Felix*, 2(1), 71-84.
- Muthmainnah, Ibna Seraj, P. M., & Oteir, I. (2022). Playing with AI to Investigate Human-Computer Interaction Technology and Improving Critical Thinking Skills to Pursue 21 st Century Age. *Education Research International*, 2022.
- Muthmainnah, M. (2023). Expanding on the use of YouMiMe as technology instructional design in learning. *Pegem Journal of Education and Instruction*, 13(1), 367-378.
- Norouzi, N., Chaturvedi, S., & Rutledge, M. (2020, April). Lessons learned from teaching machine learning and natural language processing to high school students. In *Proceedings of the AAAI conference on artificial intelligence* (Vol. 34, No. 09, pp. 13397-13403).
- Pishghadam, R., Derakhshan, A., Zhaleh, K., & Al-Obaydi, L. H. (2023). Students' willingness to attend EFL classes with respect to teachers' credibility, stroke, and success: a cross-cultural study of Iranian and Iraqi students' perceptions. *Current Psychology*, 42(5), 4065-4079.
- Rahman, M. M., & Watanobe, Y. (2023). ChatGPT for education and research: Opportunities, threats, and strategies. *Applied Sciences*, 13(9), 5783.
- Ren, M., Chen, N., & Qiu, H. (2023). Human-machine Collaborative Decision-making: An Evolutionary Roadmap Based on Cognitive Intelligence. *International Journal of Social Robotics*, 1-14.
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?. *Journal of Applied Learning and Teaching*, 6(1).
- Schleppegrell, M. J., & Oteíza, T. (2023). Systemic functional linguistics: Exploring meaning in language. In *The Routledge handbook of discourse analysis* (pp. 156-169). Routledge.
- Shahriar, S., & Hayawi, K. (2023). Let's have a chat! A Conversation with ChatGPT: Technology, Applications, and Limitations. *arXiv preprint arXiv:2302.13817*.
- Shaikh, S., Yayilgan, S. Y., Klimova, B., & Pikhart, M. (2023). Assessing the Usability of ChatGPT for Formal English Language Learning. *European Journal of Investigation in Health, Psychology and Education*, 13(9), 1937-1960.

- Topsakal, O., & Topsakal, E. (2022). Framework for a foreign language teaching software for children utilizing AR, voicebots and ChatGPT (Large Language Models). *The Journal of Cognitive Systems*, 7(2), 33-38.
- Ulla, M. B., Perales, W. F., & Busbus, S. O. (2023). 'To generate or stop generating response': Exploring EFL teachers' perspectives on ChatGPT in English language teaching in Thailand. *Learning: Research and Practice*, 1-15.
- Vázquez-Cano, E., Mengual-Andrés, S., & López-Meneses, E. (2021). Chatbot to improve learning punctuation in Spanish and to enhance open and flexible learning environments. *International Journal of Educational Technology in Higher Education*, 18(1), 1-20.
- Wang, S., Sun, Z., & Chen, Y. (2023). Effects of higher education institutes' artificial intelligence capability on students' self-efficacy, creativity and learning performance. *Education and Information Technologies*, 28(5), 4919-4939.
- Wu, T. T., Lee, H. Y., Li, P. H., Huang, C. N., & Huang, Y. M. (2023). Promoting Self-Regulation Progress and Knowledge Construction in Blended Learning via ChatGPT-Based Learning Aid. *Journal of Educational Computing Research*, 07356331231191125.
- Yildiz, M. (2023). Exploring the Potential of Chatbots and ChatGPT in Enhancing Vocabulary Knowledge. In *Transforming the Language Teaching Experience in the Age of AI* (pp. 160-188). IGI Global.
- Young, J. C., & Shishido, M. (2023). Investigating OpenAI's ChatGPT Potentials in Generating Chatbot's Dialogue for English as a Foreign Language Learning. *International Journal of Advanced Computer Science and Applications*, 14(6).
- Zhang, Y., Ning, Y., Li, B., & Liu, Y. (2021, November). An innovative classroom teaching technology assisted by artificial intelligence of things. In *2021 2nd International Conference on Information Science and Education (ICISE-IE)* (pp. 1661-1664). IEEE.

The asymmetric impact of foreign direct investments on ecological footprint: Evidence from Turkiye

N. Serap Vurur¹, Münevvere Yıldız², Letife Özdemir³

Abstract

Introduction: The relationship between FDI and the environment has been an important research topic for many years. The main reason for this is that FDI has a different impact on the environmental conditions of each country.

Aim: The study aims to determine the asymmetric effects of foreign direct investments on the ecological footprint in Turkiye. In addition, another objective of the study is to determine whether the investments in Turkiye are perceived as a pollution haven or not.

Method: In the 1970-2022 annual data study, the ecological footprint variable was included as the dependent variable, and foreign direct investments as the independent variable. The Non-linear Autoregressive Distributed Lag (NARDL) method was used to identify asymmetric effects in the study.

Findings: The findings show that FDI has an asymmetric effect on the ecological footprint only in the long run. The positive shocks in FDI increase the ecological footprint, while negative shocks decrease the ecological footprint. This means that the “pollution Heaven” hypothesis is valid in Turkey in the long run.

Originality and value: The study is considered to contribute to the literature as it is a study that examines the relationship between ecological footprint and FDI in Turkiye in the context of asymmetric effects. In addition, while many studies in the literature use carbon emissions as an indicator of environmental degradation, a more inclusive variable, ecological footprint, is utilized here.

Key Words: Ecological Footprint, Foreign Direct Investments, NARDL, Turkiye.

Jel Codes: C32, F21, G15, Q53

1. INTRODUCTION

From past to present, high greenhouse gas emissions, biodiversity losses, high use of non-renewable energy, and economic growth have led to environmental problems. The United Nations Organization (UNO) has set sustainable development goals (SDGs) to eliminate environmental problems. The Conference of the Parties (COP) has been

¹ Associate Professor, Afyon Kocatepe University, Bolvadin Faculty of Applied Sciences, Department of Accounting and Financial Management, Afyonkarahisar, Turkiye

² Associate Professor, Afyon Kocatepe University, Bolvadin Faculty of Applied Sciences, Department of Banking and Insurance, Afyonkarahisar, Turkiye

³ Associate Professor, Afyon Kocatepe University, Faculty of Economics and Administrative Sciences, Department of International Trade and Finance, Turkiye

held every year since 1994 when the first intergovernmental environmental agreement on global warming (United Nations Framework Convention on Climate Change) signed under the leadership of the United Nations came into force. Although the Paris Agreement and COP26 practices put pressure on reducing international environmental pollution, most countries need help in establishing the balance between industrial production and environmental regulations.

Carbon dioxide (CO₂) emissions, which have the largest share among greenhouse gas emissions, are frequently used in studies on environmental degradation in the literature due to easy access to data. Ulucak and Apergis (2018) and Solarin and Bello (2018) stated in their studies that CO₂ emissions are a limited indicator, so a more comprehensive indicator is needed. Based on this, the ecological footprint is used in the literature to indicate ecological sustainability and environmental degradation (Solarin & Bello, 2018; Zafar et al., 2019; Chen et al., 2010). The ecological footprint is useful for identifying and managing natural resources for various sectors of society (GFN_a). Figures obtained from the global footprint network show that this ecological gap, which started in the early 1970s, constantly widened until 2018 (GFN_b). This situation forms the basis of environmental degradation. When evaluated from this aspect, it is essential to investigate the economic factors contributing to environmental degradation and their effects. Foreign capital inflows are a factor worth examining regarding their impact on disruption.

After the 1990s, when globalization rapidly spread, capital movements have become one of the most important phenomena of the world economy. Foreign direct investment (FDI) inflows not only contribute to the capital accumulation needed for developing countries but also enable domestic firms to benefit from new technology, technical knowledge, and management skills through backward linkages (Alfaro et al., 2004; Javorcik, 2004; Osei & Kim, 2023). Foreign direct investments also help develop export markets and personnel management skills, close the technological gap between developed and developing economies, provide economic opportunities, and reduce unemployment through job creation (Bashir et al., 2022; Shahbaz et al., 2015). With the understanding of the contribution of FDI to the economic development and stability of countries, countries are entering into intense competition to attract these investments to their own countries. In order to benefit more from foreign capital, developing countries have opened their markets to international capital and are removing obstacles to foreign capital movements. As a result, developing countries attract more foreign investments, and foreign direct investments, which are generally concentrated in developed countries, are shifting towards developing countries.

According to the literature, it is known that on the production side of the economy, foreign direct investments have a scale effect, composition effect, and technological effect on the economies receiving investment. The scale effect is an effect on the level of economic activity caused by the flow of additional investment into the economy. Scale effects are expected to contribute to pollution, waste, and ecological degradation. The composition effect of foreign direct investment refers to a structural change that

changes the industry composition of the economies receiving investment. Depending on which types of industries expand or contract, the compounding effect can translate into different environmental and ecological consequences. Technological impact refers to the transfer of new knowledge and techniques, including superior technologies that can improve productivity and the condition of ecosystems. With this effect, environmental quality can increase (Doytch, 2020).

It is seen that the relationship between foreign direct capital and the environment is discussed in the literature with two hypotheses: "(i) pollution haven" and "(ii) pollution halo effect." (i) The Pollution Heaven Hypothesis (PHH) states that the liberalized trade flow, businesses may shift their investments that cause environmental degradation from developed countries with strict environmental regulations to countries with loose regulations. Weak environmental regulations in developing host countries and the transfer of some industries with high pollution and consumption levels from other countries through foreign direct investment and trade increase environmental degradation (Copeland and Taylor, 1994; Akbostancı et al., 2007; Gallagher, 2009; Savona and Ciarli, 2019; Stef and Jabeur 2020 Saehnia et al. 2020; Pavlović et al. 2021; Farooq et al. 2022). (ii) The Pollution Halo effect hypothesis states that multinational companies from developed countries disseminate knowledge and implement environmentally friendly practices while also improving the environmental performance of domestic enterprises. Foreign direct investment flows that reduce environmental damage are known as the pollution halo effect (PHE) (Eskeland & Harrison, 2003; Jorgenson, 2007; Doytch & Uctum, 2016; Shao et al., 2019; Ashraf et al., 2021; Ulucak, 2022).

Turkiye has become one of the most preferred investment bases of international capital with the foreign capital and investment incentive system it has implemented since the early 2000s. According to the Presidential Investment Office data, Turkiye rose two places in Europe with 264 projects in 2021, becoming the fifth most popular International Direct Investment (UDY) destination, and its share in European FDI in 2020 was 3.7%, due to the serious impact of Covid-19. Despite its effects, it increased to 4.5% in 2021. In addition, Turkiye became the most preferred UDI destination among developing European countries in 2021, with a 27% increase in total FDI projects.

Different interactions between foreign direct investments and environmental degradation and determining which hypothesis is valid in countries have been curious for researchers for many years. In this respect, the study investigates the impact of foreign direct investments on environmental degradation in Turkiye. Thus, it is aimed to test the validity of the pollution Halo and pollution Paradise hypothesis. The contributions of the study to the literature can be expressed as follows. First, the study uses the ecological footprint variable, which is more up-to-date and comprehensive, instead of carbon emissions to represent environmental degradation. Secondly, studies in the literature have examined the relationship between two variables in a linear dimension. The fact that a non-linear method is used in this study is important regarding research results.

2. LITERATURE REVIEW

Many studies are encountered when the current literature investigating the impact of foreign direct investments on environmental degradation in Türkiye is examined. In most studies, carbon emissions (CO₂) have been taken into account as an indicator of phenomena such as environmental pollution and environmental degradation. In the empirical literature, the results have differed depending on the dynamics of the countries. In the literature, some of the studies examining the relationship between foreign direct investment and CO₂ emissions support the pollution haven hypothesis (Mutafoğlu, 2012; Seker et al., 2015; Gökmenoğlu and Taspınar, 2016; Kılıçarslan and Dumrul, 2017; Sahin et al., 2019; Terzi and Korkut Pata, 2020; Bulut et al., 2021; Yurtkuran, 2021; Ugur, 2022; Abasov and Üçler, 2022), others provide supporting evidence for the pollution halo hypothesis (Şahinöz and Fotourehchi, 2014; Öztürk and Öz, 2016; Mert and Caglar, 2020).). Additionally, some studies (Atay Polat, 2015; Üzar, 2019; Yilmazer and Karabiber, 2022) reveal that the hypotheses are not valid, that is, there is no relationship between foreign direct investments and CO₂ emissions. Differences in methods and periods in research and the environmental policies implemented by countries play an essential role in the differentiation of empirical results.

In the literature, especially in current studies, the ecological footprint value, a relatively new phenomenon, is also used to indicate environmental pollution/degradation. Ecological footprint also appears as a striking indicator that represents environmental degradation more comprehensively and measures environmental sustainability (GFNc). Based on this, ecological footprint was included in the study to represent environmental degradation, and studies in which the relevant variable was taken into account in Türkiye are summarized below.

In a study covering annual data for 1974-2017, Udemba (2020) revealed the impact of foreign direct investments, energy use, economic growth, and manufacturing-added value on the ecological footprint in Türkiye using the ARDL limited test and Granger causality test. The results show the existence of a positive relationship between foreign direct investments and ecological footprint. This means that foreign direct investments harm the environment. Additionally, as a result of the Granger causality test, a bidirectional causality relationship was determined between foreign direct investments and ecological attack traces. These findings support the Pollution Haven Hypothesis.

A study by Türköz (2021) aimed to determine whether foreign direct investment inflows in Türkiye during the 1974-2017 period had a pollution-increasing or pollution-reducing effect on the environment. For this purpose, the dynamic impact of foreign direct investments and energy use on the ecological footprint was investigated with the ARDL limit test. The findings show that foreign direct investment inflows do not cause any environmental deterioration either in the short term or in the long term; in other words, there is not enough evidence for the validity of the Pollution Haven Hypothesis in Türkiye. It can be said that the findings of Udemba (2020) and Türköz (2021) studies do not support each other because the variables included in the analysis differ.

Çabaş (2023) determined that foreign direct investments and ecological footprint in Türkiye for the period 1970-2018 move together in the long-term using the Fourier cointegration test. Coefficient estimates of variables integrated in the long term were found with the help of FMOLS and CCR estimators. According to the findings, a 1 unit increase in foreign direct investments in the long term causes a 0.015-unit increase in the ecological footprint. The findings support the findings of Udemba (2020) and reveal the validity of the "Pollution Paradise Hypothesis" in Türkiye.

Doytch (2020), who researched the impact of foreign direct investments on the ecological footprint of country groups, including Türkiye, found that 117 countries consisting of developed and developing countries, Chowdhury et al. (2021) analyzed the data of 92 countries with panel regression model. In both studies, a positive relationship was determined between foreign direct investments and ecological footprint, and it was determined that the Pollution haven hypothesis was valid for the countries within the scope of the analysis.

When the relevant literature is examined, it is seen that the CO₂ emission variable is considered in most of the studies investigating the impact of foreign direct investments on environmental pollution in Türkiye, and the ecological footprint variable is used in a limited number of studies. In addition, linear estimation methods were used in almost all of the studies. However, these models ignore possible non-linear relationships between variables. Based on this gap in the literature, the NARDL model was used to reveal the short and long-term non-linear relationship between foreign direct investments and ecological footprint. In this respect, it was evaluated that the study would contribute to the existing literature specifically for Türkiye.

3. ANALYSIS AND RESULTS

The aim of the study is to determine the relationship between ecological footprint (EF) and foreign direct investment (FDI) in Türkiye by using annual data for the period 1970-2022. For this purpose, ecological footprint is included as the dependent variable in the study, and the relevant data set is taken as footprint per capita from the Global Footprint Network. FDI data is obtained from the World Bank database. Variables are included in the analysis by taking their natural logarithms.

3.1. Descriptive Statistics

Firstly, descriptive statistics were calculated and analyzed to obtain information about the general structure of the variables. The results are presented in Table 1.

Table 1: Descriptive Statistics

	EF	FDI
Mean	0.9770	20.5970
Median	0.9770	20.5125

Maximum	1.2459	23.8164
Minimum	0.6382	16.1181
Std. Dev.	0.1777	2.3301
Skewness	-0.0066	-0.1188
Kurtosis	1.7234	1.6691
Jarque-Bera	3.5989	4.0360
Probability	0.1653	0.1329

The results obtained in Table 1 show that the mean of the EF variable is 0.9770, and the mean of the FDI variable is 20.5970. In addition, the Jarque-Bera statistic value and the related probability values reveal that both variables conform to the normal distribution.

3.2. Unit Root Tests

Unit root tests are effective methods in revealing the stationarity structure of time series data over time. At this stage of the study, the stationarity levels of the variables will be determined by utilizing the Augmented Dickey-Fuller (1981) and Phillips-Perron (1988) unit root tests, which are frequently used in the literature. Table 2 presents the unit root test results of the variables.

Table 2: Unit Root Tests

	ADF		PP	
	Level	First Difference	Level	First Difference
EF	-0.9306	-10.8861***	-1.3049	-13.8077***
FDI	-1.0408	-10.3098***	-0.7527	-10.9922

The critical value is significant at *** and 1% level.

The results of unit root tests show that both variables do not satisfy the stationarity condition at level values, but they are stationary in first difference series. In this respect, the appropriate methods can be used for the stationarity of the variables at I(1) in the analyses to be performed.

3.3. BDS Test

In studies where non-linear methods are to be employed, it is important to first test the linear structure of the variables. For this purpose, the BDS test proposed by Brock et al. (1996) was applied, and the results for both variables are presented in Table 3.

Table 3: BDS Test

Panel A: EF				
Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.
2	0.1382	0.0059	23.1097	0.0000
3	0.2393	0.0096	24.8397	0.0000
4	0.3137	0.0116	26.9891	0.0000
5	0.3575	0.0122	29.1399	0.0000
6	0.3797	0.0119	31.6912	0.0000
Panel B: FDI				
Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.
2	0.1650	0.0065	25.1245	0.0000
3	0.2737	0.0105	25.8886	0.0000
4	0.3436	0.0127	26.9616	0.0000
5	0.3917	0.0134	29.1286	0.0000
6	0.4192	0.0131	31.9272	0.0000

The findings in Table 3 show that the linearity condition is not met for both variables. The probability value (Prob.) is statistically significant in all dimensions, and the null hypothesis of linearity is rejected.

3.4. NARDL Results

The Non-linear Autoregressive Distributed Lag (NARDL) method was first introduced by Shin et al. (2014) as an extension of the Autoregressive Distributed Lag (ARDL) method. One of the most important advantages of the method is that it is sufficient for the variables included in the model to be non-stationary at I(2) level. In addition, another important advantage is that it reflects short and long-run positive/negative shocks by separating the explanatory variable into positive and negative components. The asymmetric bound test results obtained with the NARDL method are given in Table 4.

Table 4: Bound Test

			Critical Values	
			I(0)	I(1)
F-Statistic	6.1343	% 10	2.788	3.513
		% 5	3.368	4.178
		% 1	4.695	5.758

According to the bound test results, the value of the F statistic exceeds the bounds for all significance levels. This indicates the existence of a long-run asymmetric cointegration relationship between the variables.

Table 5: NARDL Short-run results

Variable	Coefficient	Std. Error	t-Statistic
D(FDI) ⁺	0.0004	0.0229	0.0180
D(FDI) ⁻	-0.0083	0.0212	-0.3927
D(FDI(-1)) ⁻	-0.0390	0.0216	-1.8019
ECT	-0.6283	0.1226	-5.1233***

Note: D represents the short-run of variables, ECT is the error correction coefficient. *** denotes the %1 significant level.

Table 5 shows the short-run results and the error correction term for the NARDL model. It is found that the asymmetric coefficients are not statistically significant in the short run. It is also seen in the table that the error correction term expressed by ECT is negative and statistically significant. Therefore, in the short run, investments are not statistically significant in terms of ecological footprint in Türkiye. In Table 6, Panel A represents the long-run coefficient estimates, Panel B presents the Wald test for the presence of long-run asymmetry, and Panel C presents the diagnostic test results for the NARDL model.

Table 6: NARDL Long-run results

Panel A: Long-run results			
Variable	Coefficient	Std. Error	t-Statistic
FDI ⁺	0.0581	0.0124	4.6571***
FDI ⁻	0.0420	0.0235	1.7844*
C	0.7294	0.0498	14.6409***
Panel B: Wald test			
	Test -statistics		
Wald test	3.9266*		
Panel C: Diagnostic Tests			
	Test -statistics (p-value)		
Breusch–Godfrey LM test	0.8695 (0.4267)		
Breusch–Pagan–Godfrey test	0.9163 (0.4926)		
Ramsey Reset test	0.6989 (0.4884)		

The critical value is significant at ***, *, and 1%, 10% levels.

The long-run results in Panel A show that the elasticity coefficients (FDI⁺ and FDI⁻) for positive and negative shocks in FDI are significant. According to the long-run coefficient of FDI for positive shocks, a 1% increase in FDI leads to a 0.0581% unit increase in the ecological footprint. On the other hand, according to the coefficient for

negative shocks in FDI, a 1% decrease in FDI leads to a 0.0420% decrease in ecological footprint. These results are similar to the findings of Cabas (2023), Doytch (2020), and Chowdhury et al. (2021) for Turkiye. The significant test statistic for the Wald test in Panel B provides evidence for the existence of asymmetry in the long run. Panel C also shows that important diagnostics of the model are met.

Figure 1 shows CUSUM, and Figure 2 shows CUSUM of Squares plots for the NARDL model.

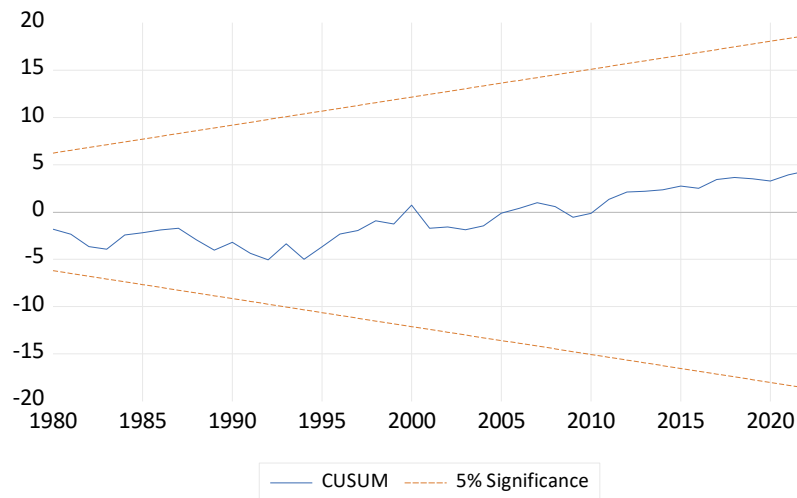


Figure 1. CUSUM

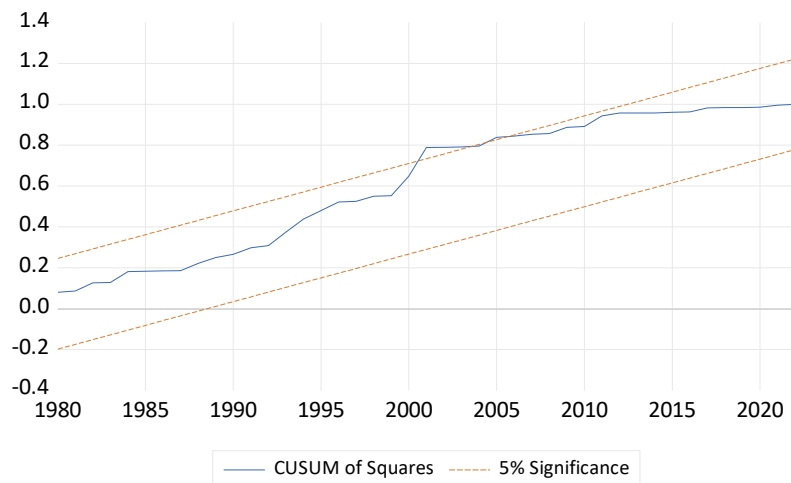


Figure 2. CUSUM of Squares

In the CUSUM graph in Figure 1, the curve is determined between the critical values at a 5% significance level. However, in the CUSUM of Squares graph in Figure 2, it is observed that the critical value is exceeded at one point but then returns to the critical limit range. The point at which the curve exceeds the critical threshold is the period of the 2001 crisis in Türkiye. In this respect, the main reason for the deviation and the subsequent return to the band can be considered as the coincidence of the serious turbulent period in the economy in the relevant period.

4. CONCLUSION

The relationship between FDI and the environment has been an important research topic for many years. The main reason for this is that FDI has a different impact on the environmental conditions of each country. The primary motivation for this study is the use of ecological footprint, an actual and comprehensive variable, and the curiosity of what kind of a picture will appear between the two variables in Türkiye.

In the study using annual data for 1970-2022, the NARDL, a non-linear method, was applied. The results obtained from the method show that FDI has asymmetric effects on EF only in the long run. Accordingly, positive shocks in FDI increase EF, while negative shocks decrease it. This means that the "pollution haven" hypothesis is valid in Türkiye in the long run. Türkiye is one of the developing countries, which is considered a country of opportunity for investors with flexible environmental restrictions. At this point, policymakers must consider policies to prevent environmental degradation and take the necessary precautions in addition to encouraging the flow of investments in terms of economic welfare.

REFERENCES

- Abasov, F., Üçler, G. (2022), "The Relationship Between Foreign Direct Investments and Environmental Pollution: Empirical Evidence From Nonlinear Smooth Transition Models for Türkiye", *Politics, Economics and Administrative Sciences Journal of Kırsehir Ahi Evran University*, 6(1), 22-39.
- Akbostanci E, Tunc GI, Türüt-Aşık S. (2007), "Pollution Haven Hypothesis and The Role of Dirty Industries in Türkiye's Exports", *Environ Dev Econ*, 12(2), 297–322.
- Alfaro, L., Chanda, A., Kalemli-Ozcan, S., Sayek, S. (2004), "FDI and Economic Growth: The Role of Local Financial Markets", *Journal Of International Economics*, 64(1), 89-112.
- Ashraf, A., Doytch, N., Uctum, M. (2021), "Foreign Direct Investment and The Environment: Disentangling The Impact of Greenfield Investment and Merger and Acquisition Sales", *Sustainability Accounting, Management and Policy Journal*, 12(1), 51-73.

- Atay Polat, M. (2015), “The Analysis of The Relationship Between Foreign Capital Investments and CO₂ Emissions in Turkiye Through Structural Break Tests”, *The Journal of International Social Research*, 8(41), 1127-1135.
- Brock, W., Dechert, D., Scheinkman, J. and LeBron, B. (1996), “A Test for Independence Based on the Correlation Dimention”, *Econometric Reviews*, 15(3), 197-235.
- Bulut, U., Ucler, G., Inglesi-Lotz, R. (2021) “Does the Pollution Haven Hypothesis Prevail in Turkiye? Empirical Evidence from Non-linear Smooth Transition Models”, *Environmental Science and Pollution Research*, 1-10.
- Bashir MF, Ma B, Xia W, Shahzad U, Radulescu M. (2022), “Do Economic Openness and Institutional Quality Influence Environmental Patents? Empirical Evidence From South Asia”, *Environ Eng Manag*, 21(1), 49–61.
- Chen, D. D., GAO, W. S., Chen, Y. Q., Zhang, Q. (2010), “Ecological Footprint Analysis of Food Consumption of Rural Residents in China in The Latest 30 Years”, *Agriculture and Agricultural Science Procedia*, 1, 106-115.
- Chowdhury, M.A.F., Shanto, P.A., Ahmed, A., Rumana, R.H. (2021), “Does Foreign Direct Investments Impair the Ecological Footprint? New Evidence From the Panel Quantile Regression”, *Environmental Science and Pollution Research*, 28, 14372–14385.
- Copeland, B. R., Taylor, M. S. (1994), “North-South Trade and the Environment”, *The Quarterly Journal of Economics*, 109(3), 755-787.
- Çabaş, M. (2023), “Fourier Approach to the Relationship of Foreign Direct Investments and Ecological Footprint In Turkiye”, *Karadeniz 12th International Conference On Social Sciences*, March 3- 5, Rize. 439-449.
- Dickey, D.A., Fuller, W.A. (1981), “Likelihood Ratio Statistics for Autoregressive Time Series with Unit Root”, *Econometrica*, 49, 1057-1072.
- Doytch, N., Uctum, M. (2016), “Globalization and the Environmental Impact of Sectoral FDI”, *Economic Systems*, 40(4), 582-594.
- Doytch, N. (2020), “The Impact of Foreign Direct Investment on the Ecological Footprints of Nations”, *Environmental and Sustainability Indicators*, 8, 100085.
- Doytch, N., Elheddad, M., Hammoudeh, S. (2023), “The Financial Kuznets Curve of Energy Consumption: Global Evidence”, *Energy Policy*, 177, 113498.
- Eskeland, G. S., Harrison, A. E. (2003), “Moving to Greener Pastures? Multinationals and the Pollution Haven Hypothesis”, *Journal of development economics*, 70(1), 1-23.
- Farooq TH, Xincheng X, Shakoor A, Rashid MHU, Bashir MF, Nawaz MF, Kumar U, Shahzad SM, Yan W (2022), “Spatial Distribution of Carbon Dynamics and Nutrient

Enrichment Capacity in Different Layers and Tree Tissues of Castanopsis Eyeri Natural Forest Ecosystem”, Environ Sci Pollut Res, 29(7), 10250-10262.
<https://doi.org/10.1007/s11356-021-16400-1>.

Gallagher, K. P. (2009), “Economic Globalization and the Environment”, Annual review of Environment and Resources, 34, 279-304.

Global Footprint Network (GFNa), <https://www.globalnature.org/en/global-footprint-network> (Accessed: 05.07.2023).

Global Footprint Network (GFNb), <https://data.footprintnetwork.org/> (Accessed: 01.09.2023).

Global Footprint Network (GFNe), Türkiye’nin Ekolojik Ayak İzi Raporu (2012). http://www.footprintnetwork.org/images/article_uploads/Turkiye_Ecological_Footprint_Report_Turkish.pdf, (Accessed: 10.08.2023).

Gökmenoğlu, K., Taspınar, N. (2016), “The Relationship between CO₂ Emissions, Energy Consumption, Economic Growth and FDI: The Case of Türkiye”, The Journal of International Trade & Economic Development, 25 (5), 706-723.

Javorcik, B. S. (2004), “Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages”, American economic review, 94(3), 605-627.

Jorgenson, A.K., (2007), “Does Foreign Investment Harm the Air We Breathe and The Water We Drink? A Cross-National Study of Carbon Dioxide Emissions and Organic Water Pollution in Less-Developed Countries, 1975 To 2000”, Organ. Environ, 20 (2), 137-156.

Kılıçarslan, Z., Dumrul, Y. (2017), “Foreign Direct Investments and CO₂ Emissions Relationship: The Case of Türkiye”, Business and Economics Research Journal, 8 (4), 647-660, <https://doi.org/10.20409/berj.2017.73>.

Mert, M., Caglar, A. E. (2020), “Testing Pollution Haven and Pollution Halo Hypotheses for Türkiye: A New Perspective”, Environmental Science and Pollution Research, 27, 32933-32943.

Mustafoglu, T.H. (2012), “Foreign Direct Investment, Pollution, and Economic Growth Evidence from Türkiye”, Journal of Developing Societies, 28(3), 281-297.

Osei, M. J., Kim, J. (2023), “Financial Development and The Growth Effect of Foreign Direct Investment: Does One Size Fit All?”, International Economics, 173, 276-283, <https://doi.org/10.1016/j.inteco.2023.01.001>.

Öztürk, Z., Öz, D. (2016), “The Relationship between Energy Consumption, Income, Foreign Direct Investment, and CO₂ Emissions: The Case of Türkiye”, Çankırı Karatekin Üniversitesi İİBF Dergisi, 6(2), 269-288.

- Pavlović, A., Njegovan, M., Ivanišević, A., Radišić, M., Takači, A., Lošonc, A., Kot, S. (2021), "The Impact of Foreign Direct Investments and Economic Growth on Environmental Degradation: The Case of The Balkans", *Energies*, 14, 566, <https://doi.org/10.3390/en14030566>.
- Phillips, P.C.B., Perron, P. (1988), "Testing for A Unit Root in Time Series Regression", *Biometrika*, Vol. 75, pp. 335-346.
- Salehnia, N., Karimi Alavijeh, N., Salehnia, N. (2020), "Testing Porter and Pollution Haven Hypothesis Via Economic Variables and CO₂ Emissions: A Cross-Country Review with Panel Quantile Regression Method", *Environ Sci Pollut Res*, 27, 31527-31542.
- Savona, M., Ciarli, T. (2019), "Structural Changes and Sustainability. A Selected Review of the Empirical Evidence", *Ecological economics*, 159, 244-260.
- Seker, F., Ertugrul, H. M., Cetin, M. (2015), "The Impact of Foreign Direct Investment on Environmental Quality: A Bounds Testing and Causality Analysis for Turkiye", *Renewable and Sustainable Energy Reviews*, 52, 347-356.
- Shahbaz, M., Nasreen, S., Abbas, F., Anis, O. (2015), "Does Foreign Direct Investment Impede Environmental Quality in High-, Middle-, and Low-Income Countries?" *Energy Economics*, 51, 275-287.
- Shao, Q., Wang, X., Zhou, Q., Balogh, L. (2019), "Pollution Haven Hypothesis Revisited: A Comparison of the BRICS and MINT Countries Based on VECM Approach", *J Clean Prod*, 227, 724-738.
- Shin, Y., Yu, B., Greenwood-Nimmo, M. (2014), "Modelling Asymmetric Cointegration and Dynamic Multipliers in a Non-linear ARDL Framework", In *Festschrift in Honor of Peter Schmidt*, 281-314, Springer, New York, NY.
- Solarin, S. A., Bello, M. O. (2018), "Persistence of Policy Shocks to an Environmental Degradation Index: The Case of Ecological Footprint In 128 Developed and Developing Countries", *Ecological Indicators*, 89, 35-44.
- Stef, N., Ben Jabeur, S. (2020), "Climate Change Legislations and Environmental Degradation", *Environmental and Resource Economics*, 77(4), 839-868.
- Şahin, G., Gökdemir, L., Ayyıldız, F. (2019), "An Empirical Research on Pollution Haven and Pollution Halo Hypothesis in Turkiye Case", *Journal of Süleyman Demirel University Institute of Social Sciences*, 2 (33), 104-140.
- Şahinöz, A., Fotourehchi, Z. (2014), "Foreign Direct Investments and Pollution Emission: "Pollution Haven Hypothesis" Test for Turkiye", *Sosyoekonomi*, 21(21), 187-710.
- Terzi, H., Korkut Pata, U. (2020), "Is the Pollution Haven Hypothesis (PHH) Valid for Turkiye?", *Panoeconomicus*, 67(1), 93-109, <https://doi.org/10.2298/PAN161229016T>.

Türkiye Cumhurbaşkanlığı Yatırım Ofisi,
<https://www.invest.gov.tr/tr/whyTurkiye/sayfalar/fdi-in-Turkiye.aspx>, (Accessed: 29.08.2023)

Türköz, K. (2021), “Effects of Foreign Direct Investment Inflows on Ecological Footprint and Sub-components in Türkiye”, International Global Climate Change Congress, 3-4-5 June, 149-163.

Udemba, E.N. (2020), “Ecological Implication of Offshored Economic Activities in Türkiye: Foreign Direct Investment Perspective”, Environmental Science and Pollution Research, 27, 38015–38028, <https://doi.org/10.1007/s11356-020-09629-9>.

Ugur, M.S. (2022), “The Relationship Between Foreign Direct Investment, Economic Growth, Energy Consumption and CO₂ Emissions: Evidence from ARDL Model with a Structural Break for Türkiye”, Ege Academic Review, 22(3), 337-352, Doi:10.21121/eab.1100759.

Ulucak, R., Apergis, N. (2018), “Does Convergence Really Matter for The Environment? An Application Based on Club Convergence and on The Ecological Footprint Concept for The EU Countries”, Environmental Science & Policy, 80, 21-27.

Ulucak, R. (2022), “Analyzing Energy Innovation-Emissions Nexus in China: A Novel Dynamic Simulation Method”, Energy, 244, 123010.

Üzar, U. (2019), “The Relationship among Foreign Direct Investment, Growth, and Environmental Quality: Is Valid "Race to the Bottom" in Türkiye?”, Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty”, 6 (2), 439-451.

Yilmazer, M., Karabiber, B. (2022), “The Relationship of Export, Foreign Direct Investment, Economic Growth and Carbon Emission in Türkiye”, Business and Economics Research Journal, 13(2), 199-220, <http://dx.doi.org/10.20409/berj.2022.369>.

Yurtkuran, S. (2021), “Is the Pollution Haven Hypothesis Valid for Türkiye? Evidence from Fourier Cointegration and Causality Methods”, Journal of Academic Researches and Studies, 13 (24), 61-77.

World Bank, <https://databank.worldbank.org/>, (Accessed: 01.09.2023)

Zafar, M. W., Zaidi, S. A. H., Khan, N. R., Mirza, F. M., Hou, F., Kirmani, S. A. A. (2019), “The Impact of Natural Resources, Human Capital, and Foreign Direct Investment on The Ecological Footprint: The Case of The United States”, Resources Policy, 63, 101428.

The usefulness of authentic partnerships, through the involvement of all stakeholders, with the aim of reducing the risks generated by the pandemic context in the educational environment

Mihaela Miron¹, Larisa Mistrean²

Abstract

Introduction: Valuing each stakeholder according to their skills, abilities, interests regarding the reduction of risks generated by the pandemic context has become an immediate priority for school management.

Aim: To identify in the specialized literature and in the educational environment some main elements that can constitute the basis for the realization of authentic partnerships between stakeholders, in order to reduce the risks generated by the new context, given by the pandemic Covid-19.

Method: The bibliographic research was carried out, developed in parallel with the research on the realities in the field in order to provide data for their processing, analysis and interpretation.

Findings: Realizing authentic partnerships between stakeholders requires a redefinition of the realities of educational environments, in the sense of updating the roles and responsibilities assumed jointly, according to indicators and rapid and continuous adaptations.

This approach being not only necessary, but also essential to support the reduction and even elimination of the effects generated by the Covid-19 pandemic, in the educational environment, but also the anticipation of possible risks.

However, such a partnership is based on mutual trust, cooperation, involvement, immediate and assumed support, resulting in equal opportunities for each learner.

Originality and value: The present study offers the opportunity to identify those factors of the organizational contexts in education that can work to achieve functional, applicable, adaptable partnerships in order to reduce the risks generated by the pandemic context.

Key Words: Covid-19 pandemic, stakeholder, partnership, school organization, risk

Jel Codes: I21, I24, I25, I29, Q15, Q35

1. INTRODUCTION

With certainty, when society is undermined by a deep crisis, when certain structures, traditions, values are ruined, when the rate of aggression, crime, suicide increases,

¹ PhD student, Alexandru Ioan Cuza University of Iasi, Doctoral School of Economics and Business Administration, Romania

² PhD, Post-Doctoral Researcher, Academy of Economic Studies of Moldova, Behavioral Research Center, Moldova

special attention is required from all stakeholders with the aim of reducing the risks generated by the pandemic context in the educational environment.

Thus, it is particularly important for stakeholders to identify which risks were generated by the unwanted context of the pandemic, to focus their attention on students at risk of dropping out of school, who often withdraw into personal isolation and loneliness. This loneliness can be reduced by a caring atmosphere, by a sense of belonging in the classrooms, by a perception that the teachers are supportive and that they really care about the student's personality, both in terms of school results and the person when they are encouraged to be responsible and capitalize on their sense of self-esteem. Valuing every pre-adolescent, even the one who creates problems, would set in motion a system of moral stimuli that ensures the objective success of every student at risk of dropping out of school, for example: the best athlete, the best classmate, the best at practical skills, best reader, dancer.

The importance of ensuring a positive learning environment where educational and organizational strategies are effectively integrated represents a challenge that requires dynamism, professionalism and responsibility.

These are carried out systematically and operationally, taking into account the suitability of the learning contents and the study time of the characteristics and requirements of each student, but also the particularities of each school unit.

For the educational environment, stakeholders are those people who are actively involved in the life of the school, propose strategies and set targets, assuming different roles through the main contribution of improving the quality, the inclusion of education of disadvantaged groups, depending on the social particularities, the different expectations of the school community, starting from the premise that each student can succeed, they can gain added value, regardless of their socio-economic contexts or other external factors.

Stakeholders are the main resource of the institution, which is why it is necessary to maximize their personality (cognitive, affective, volatile, social skills), capabilities, behavior, attitude, decisions, initiatives, actions, related to individual and organizational performance. Their engagement in school activities is the key element in rebuilding trust that needs to be restored and maintained through clear communication through credible channels.

The pandemic period was an exceptional stage that society had to go through, a period that not only brought it out of the "comfort zone" but also placed it in an area of insecurity, unforeseen, family catastrophes, fear, fears and anxiety. Even though these elements manifested differently within family groups, society as a whole was under tremendous pressure, and this could not fail to reflect on the school as an institution.

Although there are many examples of good practices in the educational system with attempts and successes of some strategies, policies applied for the student at risk of dropping out based on a correct, concise analysis of the context of each student, the percentage of dropping out of school registers a significant increase.

Every school organization tries to own and successfully implement an effective school dropout management system to achieve the expected results, in accordance with the harmonization of the needs, interests, aspirations and expectations of the entire school community, but also of the society in general.

Managers of school units develop and identify systemic and coherent strategies by involving stakeholders in the decision-making process, starting from a unanimous consensus on individual and organizational goals and objectives, the mission and vision of the assumed school, but also the development of the resilience of students at risk of school dropout.

Every school organization tries to own and successfully implement an effective stakeholder's management system to achieve the expected results, in accordance with the harmonization of the needs, interests, aspirations and expectations of the entire school community, but also of the society in general.

Thus, by its nature, the school is one of the institutions most exposed to contact with all the social environments, because the subjects of its activity are represented by children who come from all social environments, from the elites to the layers located towards the peripheral areas of society. This mosaic also requires versatility in adapting communication to what we could call the social horizontal and institutional vertical which can refer to the relationship with School Inspectorates, Town Halls, Ministries (Education, Health, Interior, etc.).

The authors, Mokhtaripoor, M. and Siadat, S. (2010) consider the importance of ensuring an organizational climate in the educational institution where individuals have a sense of freedom, respect, motivation, authority.

The study created by Van Den Berghe, L., Vandeveld, S., De Pauw, S. S (2022) aims to delimit stakeholders' knowledge accumulated through experience related to the key elements of engagement in solving the problems of school attendance and school dropout.

Given that "an organization's problems are generated, directed and felt by stakeholders" and at the same time that there are specialized studies that highlight the fact that the leaders of organizations know the importance of valuing their views/expertise/opinions, but they fail to create and implement effective strategies for managing and coordinating stakeholders, an approach in this sense is more than necessary Rumberger (2017).

The study proposed by Moon-Heum Cho and Yoonjung Cho (2016) shows that the focused efforts of teaching staff to create an engaging and active learning environment in which physical and emotional security is ensured through academic, emotional and social learning lead to greater social focus, emotional openness, awareness of the classroom environment, satisfaction and openness to learning.

One of the solutions identified at the European level to reduce school dropout is the creation of networks with stakeholders, outside the school space. These networks aim to identify substantive issues affecting students and support them in resolving them.

The involvement of stakeholders in the activities of schools is also a significant element in the search and detection of methods, means of continuous improvement of the organization's performance at any level (Chină, 2015).

2. METHODOLOGY

The present study captures the first 5 internal and external stakeholders who get involved at the level of school units in preventing and combating school dropout, according to 557 respondents.

Thus, in the category of internal stakeholders Class masters, School principal, School counselors, Representatives of the Commission for the prevention and elimination of violence, acts of corruption and discrimination in the school environment and the promotion of interculturality, Faculty council were nominated (Table 1 and Figure 1).

Table 1. Answer counts for internal stakeholders – Top 5

	Not at all or barely helpful	Moderately helpful	Substantially or greatly helpful
Class masters	11	71	475
School principal	24	85	448
School counselor	33	77	447
Representatives of the Commission for the prevention and elimination of violence, acts of corruption and discrimination in the school environment and the promotion of interculturality	29	103	425
Faculty council	21	114	422

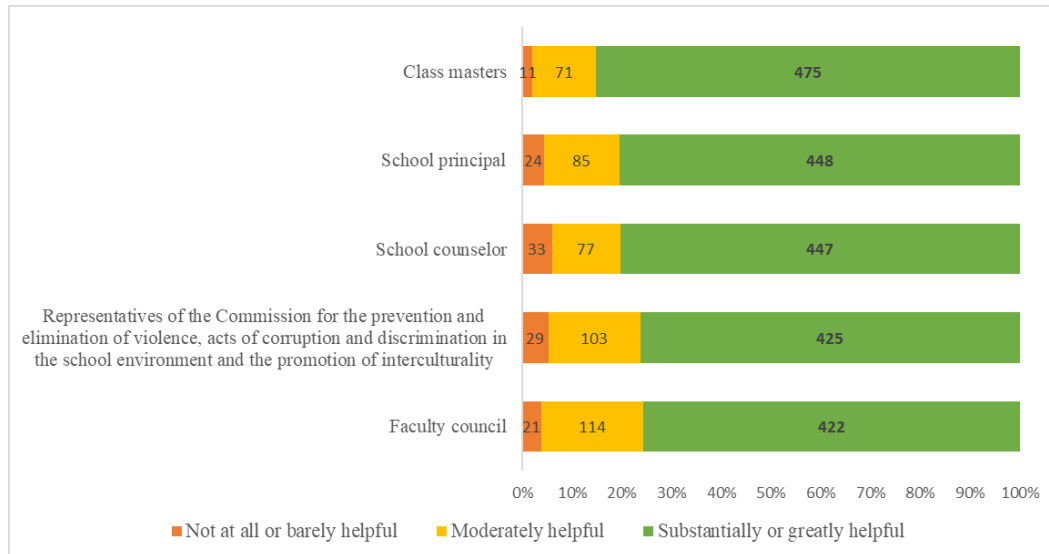


Figure 1. Top 5 internal stakeholders

Table 2 and figure 2 highlight the most representative external stakeholders who contribute to preventing and combating school dropout (Parents, Representatives of the General Directorate of Social Assistance and Child Protection, Police representatives, NGO sources, Volunteers).

Table 2. Answer counts for external stakeholders – Top 5

	Not at all or barely helpful	Moderately helpful	Substantially or greatly helpful
Parents	36	120	401
Representatives of the General Directorate of Social Assistance and Child Protection	48	129	380
Police representatives	57	141	359
NGO sources	55	163	339
Volunteers	66	154	337

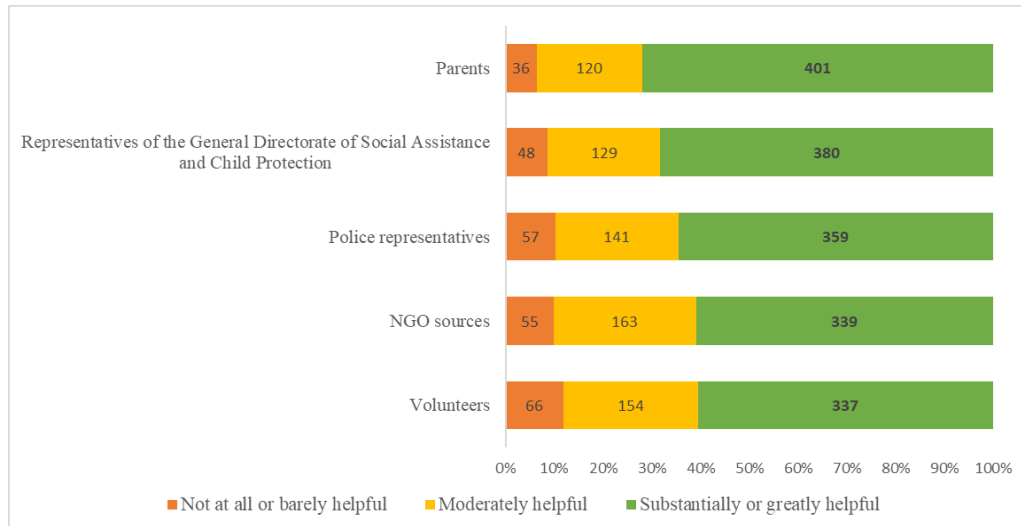


Figure 2. Top 5 external stakeholders

The process of orienting stakeholders in order to achieve organizational objectives starts, first of all, from "identifying key stakeholders and gaining their support or, as the case may be, their involvement in the organization's actions and projects" (Chină, 2015).

The processing, systematization and rethinking from several perspectives of effective stakeholder management strategies require organization, decision, coordination, systematic, structured and coherent search with emphasis on developing, supporting and encouraging creativity, innovation and rewarding results that surprise a high degree of originality.

The study undertaken also highlighted that there is a real interest on the part of stakeholders (regardless of the environment in which the urban/rural school organization is located) for the creation and implementation of strategies that offer support relationships and help for students at risk by offering them a stimulating, rewarding, safe and favorable educational environment (Băcanu, 2006) in order not to drop out of school regardless of the personal, family, community factors that could contribute to leaving the educational environment.

3. CONCLUSION

In educational institutions in Romania, educational and organizational approaches are directly associated and correlated with the degree of involvement of the stakeholders, maximizing their approach and technique acquired as a result of the experience in working with students. Also, the same aspects influence the various challenges that may arise, such as the complex issue of school dropout or social inequity. Every school environment is intended to provide safety and support for both students and teachers, and for this to happen, it is necessary for today's institutional leaders to have a progressive, needs-centered vision to observe in order to provide feedback folded

on needs and significantly useful, to emphasize practice (correlated with theory), but also on encouraging communication in the teacher-manager, teacher-student and teacher-parent triad.

The pandemic context offered another dynamic of the manager-teacher-student-stakeholders relationship, in the sense that, before training, leading, it is necessary to have harnessed and maximized all human potential.

In this context, the valorization of stakeholders in preventing and combating school dropout has received new and challenging valences of crucial importance, so that the need to adjust/implement the most effective strategies is one of the ways in which this phenomenon can be diminished/eliminated.

REFERENCES

- Bogdan Băcanu (2006), *Practici de management strategic, metode și studii de caz*, Polirom, Romania.
- Chină, R. (2015), *Managementul Calității în Învățământul Preuniversitar*, Editura Universitară București, Romania.
- Cho, M. H., Cho, Y. (2016), “Online instructors’ use of scaffolding strategies to promote interactions: A scale development study”, *International Review of Research in Open and Distributed Learning: IRRODL*, 17(6), 108-120.
- Mokhtaripoor, M., Siadat, S., A. (2010), “A comparative study of the relationship between organizational intelligence and team leadership of faculty members of Isfahan State University”, *Journal of Public Administration Perspective*, (1), 87-99.
- Rumberger, R. W., Addis, H., Allensworth, E., Balfanz, R., Bruch, J., Dillon, E., Tuttle, C. (2017), *Preventing Dropout in Secondary Schools. Educator's Practice Guide. What Works Clearinghouse*, NCEE 2017-4028, USA.
- Vandeveld, S., Sarah De, P., Berghe Van Den L. (2022), “School dropout as the result of a complex interplay between individual and environmental factors: A study on the perspectives of support workers”, *Teachers and Teaching*, 603-617.

Reporting for Sustainability: Practices in Environmental Accountability among Bulgarian companies

Petya Petrova¹

Abstract

Introduction: As the world's focus on the role of business in environmental stewardship and global concern for sustainability increases, so does the importance of corporate responsibility, transparency and environmental accountability.

Aim: To investigate the sustainability reporting practices with a focus on environmental accountability among Bulgarian companies.

Method: This study was conducted using a combination of research methods to gain an in-depth understanding of how Bulgarian companies report on their environmental practices, the rules and regulations that govern these reports, and how accountable they are for their environmental actions. It is based on an examination of public information in ESG reports, financial statements and other relevant documents, company websites and social media.

Findings: The study highlights a strong positive link between environmental accountability and reporting, as Bulgarian companies increasingly adopt this practice for transparency and stakeholder engagement. However, the current state of environmental reporting is worrying due to the insufficient quality and quantity of disclosures, which can be attributed to neglect, lack of expertise and varying guidelines. Encouragingly, more responsible companies are showing a willingness to improve the sharing of environmental data.

The **Originality and value** of this research lies in its exploration of sustainability reporting practices in a specific regional context, shedding light on the unique challenges and opportunities that Bulgarian companies face in addressing environmental accountability. By examining corporate commitment to environmental sustainability, this study contributes to a broader understanding of environmental accountability and transparency.

Key Words: sustainability, environmental reporting, environmental accountability.

Jel Codes: M41, Q 56

INTRODUCTION

From the emergence of environmental issues and the first signs of pollution and environmental degradation in the mid-20th century, through the birth of pioneering environmental movements such as Greenpeace and the Environmental Defense Fund, to the adoption of sustainability, as a comprehensive paradigm encompassing economic, environmental, and social dimensions, the world has become aware of the negative impact of human activities on the environment. This gradual evolution reflects an increasing sense of environmental responsibility. With the growing awareness of the

¹ Assoc. Prof., Dr., St. Cyril and St. Methodius University of Veliko Tarnovo, Faculty of Economics, Department of Finance and Accounting, Bulgaria

importance of environmental sustainability, environmental deterioration is becoming a global concern (Miklosik & Evans, 2021) with global implications. Consequently, there has been a shift in societal expectations, putting emphasis on the role of business in protecting and preserving the environment, with companies becoming increasingly sensitive to, and committed to, social and environmental issues. Corporate environmental responsibility extends beyond mere adopting eco- friendly practices. It requires transparency and accountability as well as submission of environmental reports, that disclose a company's environmental activities and initiatives and their impact. In the light of the above, it is clear that:

- Companies have begun to recognise their empathy, their responsibility and their commitment to environmental issues;
- Companies have started to provide, share and disseminate information (voluntarily or compulsorily) about their ecological footprint, environmental policies, programmes, actions and their impact on nature, society and financial performance;
- It increases transparency and trust between companies and investors, regulatory bodies and other interested parties;
- Environmental reporting is a contributes to communication between the company and its stakeholders by enabling companies to align their values with their actions, demonstrate their commitment to environmental protection and promote a culture of environmental sustainability within the company.

The study aims to explore environmental accountability. It focuses on the environmental reporting practices of the top 50 Bulgarian companies. By assessing their current environmental accountability, it identifies their propensity to share and disclose environmental information and analyses sustainability reporting trends in Bulgarian business.

The study was conducted using a mixed-methods approach designed to provide a comprehensive understanding of the nature of environmental reporting, the regulatory framework and the environmental accountability practices of Bulgarian companies. Methods included:

Literature review: A literature review was conducted to establish the theoretical and regulatory framework of environmental reporting. The aim was to establish a theoretical framework and gain a comprehensive understanding of environmental reporting concepts and principles, best practices and global trends;

Data collection and analysis: environmental data and figures were collected from environmental sustainability reports and related documents, surveys, websites and social media, and document analysis was used to assess the quality, scope and transparency of environmental disclosure;

Comparative analysis: this enabled the assessment of Bulgarian practice against global trends.

A combination of quantitative and qualitative research methods was used to ensure the validity and reliability of the findings.

Environmental accountability

Fundamentals

Accountability is a fundamental concept that encompasses many dimensions and is constantly expanding. It plays a crucial role in building a transparency in society. The complexity and chameleon nature (according to Mulgan, 2000) of accountability helps it to adapt and be implemented in different fields. The traditional field - and the one that is most often associated with it - is accounting². From an accounting perspective, accountability is described, based on the corporation–shareholders relationship (Yusoff et al., p.1718) as 'the duty to give an account of the actions for which one is held responsible' (Gray et al., 1997, p. 333). Accountability is concerned with the right to receive information and the duty to supply it. (Grey, 1992 p.413) In this sense, it contributes to the creation of dignified relationships in society. (Giri, 2000, p.173-174), responsibility and trustworthiness.

Environmental accountability is a specific area of accountability that focuses on 'the actions made of behalf of organizations and the impact of resulting activities on ecological system' (Burritt and Welch, 1997, p. 534). From this aspect, environmental accountability is taking responsibility for one's actions towards the environment and their impacts. It encourages organisations both to share information with stakeholders about their environmental practices, resource management and overall approach to preserving and sustaining the environment and to demonstrate their transparency. Environmental accountability contributes to improve problem-solving as well as responsiveness to the stakeholders affected by environmental problems (Kramarz and Park, 2016).

Three tools support environmental accountability. One is environmental reporting³. In general terms, environmental reporting refers to the provision and presentation of information about the environment and an organisation's impact on it. More specifically, it is an accountability mechanism used by organisations to communicate information about an organisation's interactions with the natural environment to its stakeholders (Gray, 2005). Although initially designed to demonstrate an organisation's commitment to the environment, environmental reporting has evolved to communicate environmental performance (according to Azzone et al., 1997, p. 699), encompassing an organisation's understanding of its environmental objectives, actions and achievements. Environmental reporting is typically associated with the reporting of quantitative and detailed environmental data. (Gray, 2005). It also demonstrates organizational`s stewardship for the environmental resources (Gray and Guthrie, 2007), and rise the trustworthiness as a part of a reputation building process (Owen et al., 2001). Considering all this, environmental reporting could be defined as a communication

² Another field often links with the concept of accountability is political science. (See Lindberg, 2009)

³ Others are environmental accounting and environmental auditing. These are beyond the scope of this study.

channel for organisations (companies) to share their environmental responsibilities and performance.

Environmental reporting principles

Environmental reporting⁴ contributes to the accountability and transparency of an organisation's environmental efforts in its activities. It provides useful information for decision making by interested parties and at the same time is a catalyst the organisation (company) to commit to environmental issues and make efforts to address them. Environmental reporting has both an internal and an external (social) function. The internal function promotes environmental efforts in the activities of organisations in establishing their environmental policies, objectives and programmes and in encouraging management and employees to engage in environmental activities. (Environmental Reporting Guidelines, 2004, p.8) From an external (social) accountability perspective, it meets the information needs of stakeholders for disclosure. There is no “environmental reporting ‘ready-made recipe’ or ‘blueprint’ “(UNEP's Technical Report on Company Environmental Reporting, 1994, p.5) but the focus should be on eco-balance, eco-efficiency and ecological footprint, which estimate the total environmental impact of the company (Gray, 2005). Each company develops its own practice based on its experience, with the help of guidelines issued by environmental reporting initiatives. The number of environmental reporting initiatives has increased in recent decades. Those that are commonly referenced are:

- Global Reporting Initiatives (GRI)⁵
- Climate Disclosure Standard Board (CDSB)⁶
- Greenhouse Gas Protocol Initiative (GHGP)⁷
- Sustainability Accounting Standard Board (SASB)⁸

⁴ Environmental reporting can be referred to by different names depending on its intent and content. These include "sustainability reports", which include social and economic aspects, and "ESG reports", which focus on environmental, social and corporate governance data.

⁵ Global Reporting Initiatives (GRI) is an international, independent organisation that develops standards and promotes the practice of sustainability reporting. It helps companies and other organisations to take responsibility for their impacts.

⁶ The Climate Disclosure Standard Board (CDSB) is an international consortium of companies and environmental NGOs that has developed a framework for reporting environmental and climate change information. The CDSB Framework sets out an approach to reporting environmental information in mainstream reports.

⁷ The Greenhouse Gas Protocol Initiative (GHGP) is a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The GHG Protocol establishes a comprehensive, globally standardised framework for measuring and managing greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation activities.

⁸ The Sustainability Accounting Standard Board (SASB) is a not-for-profit organisation established to develop sustainability accounting standards. Its mission is to establish and improve industry-specific disclosure standards for financially material environmental, social and

- European Commission's Directive 2022/2464/EU on corporate sustainability reporting, known as the Corporate Sustainability Reporting Directive (CSRD).

Taken together, they form the framework for environmental reporting and the following key principles can be derived from them:

Materiality: Focusing on material impacts that can influence stakeholder assessments and decisions, ensuring that disclosed information is relevant and meaningful.

Reliability: Collecting, recording and reporting information in a way that allows verification, establishing the quality and significance of the data, and building trust in the reporting process.

Comparability: Ensuring consistent reporting that is accurate and detailed, making it easy for stakeholders to understand and analyse changes in the organisation's performance over time, and facilitating comparisons with other organisations.

Five levels of corporate environmental disclosure have been identified:

Level 1: Green glossies, newsletters, short statement on the organisation's website.

Level 2: One-off environmental policy, objectives and programs.

Level 3: Annual reporting with short statements linked to a section of the annual management report or a separate section of the financial statement report.

Level 4: Full environmental report on an annual basis.

Level 5: Annual sustainability report linked to environmental, economic and social aspects of the company's performance. (Adapted from UNEP's Technical Report on Company Environmental Reporting, 1994, p.5).

The current practice of environmental reporting is largely voluntary and GRI is the most widely used anchor globally, according to KPMG's Survey of Sustainability Reporting (2022). In the EU, environmental reporting is only mandatory for certain public interest entities. Under the Non-Financial Reporting Directive (Directive 2014/95/EU)⁹, large listed companies, banks and insurance companies ('public interest entities') with more than 500 employees are required to publish reports on their environmental policies. The forthcoming CSRD¹⁰ will significantly broaden the scope of companies¹¹ affected by the new sustainability reporting rules, and the requirements will be more extensive.

Companies have four options for environmental disclosure: a separate report, a report included as a separate section of the annual management report, a report included as a separate section of the annual financial statements, or a report included in the annual

governance issues that facilitate communication of decision-useful information between companies and investors.

⁹ In December 2022 NFRD is replaced by CSRD (Directive 2022/2464/EU).

¹⁰ For companies already subject to the Non-Financial Reporting Directive, the start date for the application of the CSRD is 2025 for the financial year 2024.

¹¹ All undertakings that meet 2 of these criteria: more than >250 employees; net turnover exceeding 40 million euro >€40M Turnover and/or total assets exceeding EUR 20 million >€20M Total assets

management report with references. This gives them the flexibility to experiment with both the information disclosed and the form of the environmental report.

Environmental reporting: Focus on Bulgaria

Background

Environmental reporting in Bulgaria is an integral part of sustainability reporting. It has increased in recent years, mainly as a result of

- the pressure for greater accountability and transparency on environmental issues; and
- the incorporation of Directive 2014/95/EU into the provisions of the Accounting Act. NFRD has introduced semi-compulsory measures, in particular for public interest entities with an average of more than 500 employees during the financial year. These companies are required to disclose non-financial information related to environmental and social responsibility in the non-financial declaration. Although the number of companies covered by this regulation is relatively small compared to all registered companies (in fact, a very small percentage of companies prepare a non-financial declaration), it has had a positive effect: companies have become more environmentally and socially aware and have started to share information on their environmental performance and efforts. For example: At present 47 companies are involved in UN Global Compact, 12 of them joined in the last five years. For comparison, twenty years ago the number of Bulgarian participants in the UNGC was only 5 (information derived from UNGC, 2023)

Environmental reporting is voluntary. There is no one-size-fits-all approach and companies have their own practices, making it difficult for interested parties to compare. Environmental reporting takes various forms, including stand-alone reports, non-financial statements or integration into an organisation's annual management report. This enables stakeholders to gain a more comprehensive insight into an organisation's development, performance, position and overall impact (especially when companies prefer to use more than one disclosure method). In addition, this reporting covers a wide range of non-financial issues, including not only environmental issues but also social and ethical issues such as human rights, anti-corruption and anti-bribery.

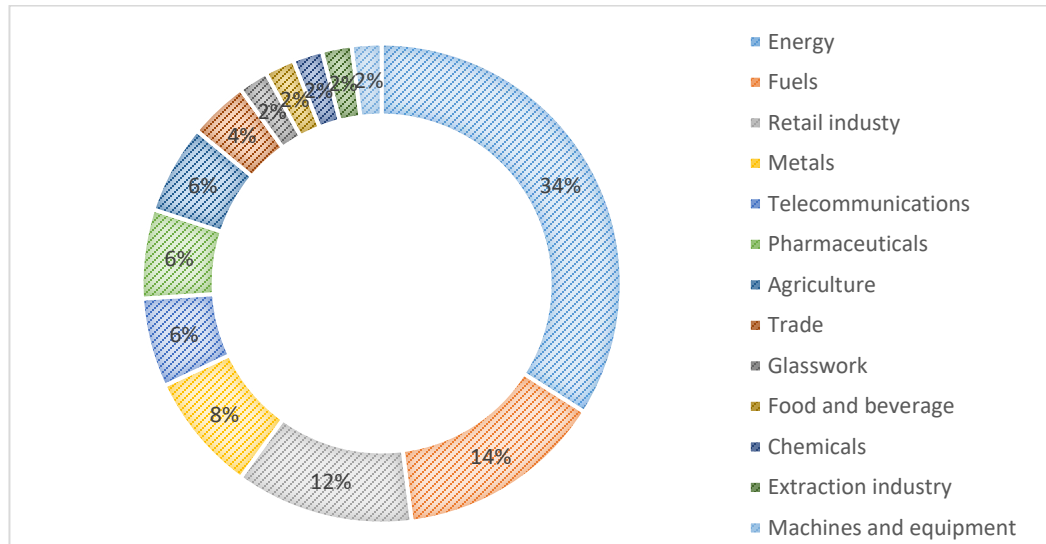
Methodology and Data

Data collection

The sample consists of the 50 largest Bulgarian companies for the year 2023¹². This selection is based on the assumption that companies with high revenues are often motivated to demonstrate their sustainability performance. At the same time, these larger companies are more likely to face public scrutiny than smaller ones. It ensures representativeness through heterogeneity, as identified by Kruskal and Mosteller (1979,

¹² Annual Ranking of Bulgarian`s 100 biggest businesses, made by Capital (<https://www.capital.bg/k100/>)

p. 22). The sample includes companies from 13 industries. The segmentation is shown in Figure1.



Source: Own calculation based on data analysed from public information provided by the Registry Agency of the Republic of Bulgaria and Capital 100

Figure 1. Industry segmentation

The study covers the period from 2019 to 2022¹³. Observations are derived from companies' information on their environmental practices. This information is taken from their sustainability reports, annual financial statements and other documents (146 in total)¹⁴, other public documents, company websites.

Research approach

This research used a mixed-methods approach to explore and gain insight into environmental reporting practices. Based on data analysis, with a particular focus on document and content analysis, the study assessed both the quantity and quality of information disclosed by companies on their commitment and involvement in

¹³ The sustainability (including environmental) disclosure practice is permanently established after 2017 in accordance with the NFRD (Directive 2014/95/EU) and the subsequent amendment to the Accounting Act for companies to make environmental and social disclosures. Two years after the entry into force of the new requirements is an acceptable period for companies to set up their own practices.

¹⁴ The number of observations of financial data varies because a) some companies have not published their reports and financial statements and they are yet unavailable to the public (30 September 2023 is the deadline for registering financial statements for 2022 with the Registry Agency); b) not all companies have issued reports for the years 2019, 2020, and 2021.

environmental matters, as well as their environmental policies, initiatives and activities to protect the environment. This research approach allowed for a holistic examination of the environmental responsibility and transparency of Bulgarian companies.

Research limitations are as follows:

- The selection of the top 50 largest companies, classified on the basis of net turnover, is not in line with the definition of "large companies" in the Commission Recommendation 2003/361/EU. As leaders in Bulgarian business, they set the trends in transparency and accountability in environmental reporting.
- Environmental accountability is broadly defined to encompass all information that companies disclosed by companies on environmental matters. Environmental reporting is a tool for communication between companies and interested parties.
- Environmental reporting in Bulgaria is voluntary, except for a certain category of companies that are required to prepare a non-financial declaration. The non-financial declaration differs in scope, structure, content and requirements from the sustainability (environmental) reports prepared according to the rules of the GRI or other relevant bodies.
- The use of statistical models to evaluate and analyse information in environmental reports is limited due to the challenges of collecting sufficiently reliable and representative data for Bulgarian companies.

Findings

Cross-sectional analysis of empirical data shows that

- 78% of the top 50 largest companies disclose environmental information. The percentage of companies that do not disclose any information is relatively high - 26% or 13 of the companies in the sample¹⁵. (Table 1)

Table 1: Disclosure attitudes by industry

<i>Industry</i>	<i>Represented companies in cross section</i>	<i>Companies that disclose environmental data*</i>	<i>Companies that disclose detail information* *</i>	<i>Companies with ESG report***</i>
Energy	17	13	7	4
Fuels	7	6	5	3
Retail industry	6	3	2	2
Metals	4	4	2	1
Telecommunications	3	2	2	2
Pharmaceuticals	3	2	2	2

¹⁵ This includes also companies that report on sustainability in the broad sense, but do not report on specific environmental issues. They account for 46% of those.

Agriculture	3	2	2	2
Trade	2	1		
Glasswork	1	1	1	1
Food and beverage	1			
Chemicals	1	1	1	
Extraction industry	1	1	1	
Machines and equipment	1	1		
Total	50	37	25	17

* It covers both Level 1 and Level 2 of the environmental disclosure

** It covers both Level 3 and Level 4 of the environmental disclosure

*** It covers both Level 5 of the environmental disclosure

Source: Author, own calculations based on observations and data analysis

Companies operating in the energy and oil industry have a more positive attitude towards environmental disclosure than other industries. As can be seen in Table 1, they represent 51% (both) of the cross section. Relatively high intentions for environmental disclosure have representatives from retail industry, metal industry, telecommunications and agriculture (only those that are subsidiaries of international companies).

Representatives of the energy and oil industry again have the highest percentage (38%) of reluctance to provide an information on environmental matters. Other industries include retail, trade, telecommunications, agriculture, pharmaceuticals, food and beverages.

74% of the companies analysed provide information on their commitment to environmental issues. The majority (36%) of them disclose information in a separate part of the annual management report. 34% or 17 companies in the cross section produce a separate sustainability report. Only four companies produce a non-financial declaration in accordance with the Accounting Act. Half of them disclose environmental information in both the non-financial declaration and the annual management report.

Environmental disclosures mainly cover environmental policies, practices and initiatives (40% of disclosures). The descriptive approach is preferred to quantitative disclosure. Detailed information is provided by half of the companies in the cross-section (segmentation by industry is shown in Table 1). The primarily environmental aspects covered are greenhouse gas emissions, waste management and biodiversity.

42% of the top 50 have an environmental management system with ISO 14001:2015 certification and are regularly monitored.

One company is completely environmentally friendly, certified in accordance with sustainability requirements, and produces biodiesel fuel, refined and unrefined oil, free fatty acids, glycerine and oil meal. And it ranks high, second in terms of net turnover.

Based on foregoing, it has been established that:

First. Bulgarian companies are proactive in environmental disclosure. It is characterised by environmental commitment, ecology and environmental issues.

Second. The level of environmental disclosure is average. At the highest level (producing a sustainability report, ESG report or communication on progress), one third of the companies in the cross section are reporting. Environmental policies, initiatives and activities are mostly reported. ESG ratings or other measurable and quantitative metrics are rarely published.

Third. Companies use different channels to communicate with their stakeholders. Websites take priority (80% of companies in the sample publish environmental data on their websites). Annual management reports, sustainability reports and non-financial statements (in a hierarchical order) are also favoured.

Fourth. Separate sustainability report (part of which is environmental report) is an emerging practice for Bulgarian companies. In line with the global trends, it is being prepared in accordance with the GRI standards and with reference to the UN Global Compact. The Task Force on Climate-related Financial Disclosure (TCFD) and the Sustainability Accounting Standards Board (SASB) standard are also used as additional guidelines.

Fifth. Companies with a foreign parent are the ones with the strongest involvement in environmental issues. Only two companies established with the entire Bulgarian capital are certified according to the GRI standards and prepare a sustainability report, and they clearly demonstrate their commitment to environmental issues and undertake activities for the protection and preservation of the environment. The percentage is extremely low and is not sufficient.

Sixth. The industry profile determines the quantitative and qualitative aspects of environmental reporting. Some industries, such as telecommunications and gas, are under less pressure to address environmental issues than others, such as transport, manufacturing and chemicals. These latter industries, often identified as polluters, are closely monitored and required to be environmentally accountable and report on their commitment to environmental issues, activities and impacts.

Seventh. Stakeholders in Bulgaria are still more interested in financial performance than in non-financial performance. This is gradually changing, mainly as a result of EU regulation.

CONCLUSION

The study reveals a significant positive relationship between environmental accountability and environmental reporting in terms of the sharing of data on initiatives, activities and environmental impacts. A practice that Bulgarian companies are increasingly adopting to increase transparency and communication with their stakeholders on their environmental responsibilities and the results of their efforts to protect and preserve the environment. It was found that the current state of environmental reporting is somewhat disturbing: the quality and quantity of disclosure is inadequate, caused by neglect of these disclosures by both companies and interested parties; lack of specific expertise in disclosure practice; varying in guidelines for the preparation of a separate report. Encouragingly, the number of responsible companies

is growing, as is their willingness to share environmental data, expand the scope and improve the quality of disclosure.

The implementation of the CSRD (Directive 2022/2464/EU) and its associated standards is expected to strengthen environmental reporting and unify the disclosure practice of Bulgarian companies. On the other hand, the introduction of an electronic format (XHTML) with digitally tagged sustainability data is expected to increase the opportunities for content analysis of reports and figures contained therein, as well as for correlation analysis of key performance indicators for environmental performance.

REFERENCES

- Azzone, G., Brophy, M., Noci, G., Welford, R., Young, W. (1997), "A stakeholders' view of environmental reporting", *Long Range Planning*, Vol. 30, Issue 5, pp. 699-709, [https://doi.org/10.1016/S0024-6301\(97\)00058-7](https://doi.org/10.1016/S0024-6301(97)00058-7) (Accessed: 11.10.2023)
- Burritt, R.L., Welch, S. (1997), "Accountability for environmental performance of the Australian Commonwealth public sector", *Accounting, Auditing & Accountability Journal*, Vol. 10 No. 4, pp. 532-561. <https://doi.org/10.1108/09513579710367494> (Accessed: 11.10.2023)
- Capital, (2023) <https://www.capital.bg/k100/> (Accessed: 11.10.2023)
- Environmental Reporting Guidelines, 2004, Ministry of the Environment (Japan Government) <https://www.env.go.jp/content/900496835.pdf> (Accessed: 11.10.2023)
- Giri, A. (2000), "Audited accountability and the imperative of responsibility: beyond the primacy of the political", in *Audit Cultures*, Ed. by Marilyn Strathern, Routledge, pp. 173 – 195 ISBN 0-415-23327-5
- Gray R. (2005), "Environmental Reporting" *Kaikeigaku Jiten* (Dictionary of Accounting) Y.Jinnai (eds) Tokyo: Aoki Shoten, <https://www.researchgate.net/publication/333632490> (Accessed: 11.10.2023)
- Gray R., Dey, C., Owen, D., Evans, R., Simon, Z. (1997) "Struggling with the praxis of social accounting: Stakeholders, accountability, audits and procedures", *Accounting Auditing & Accountability Journal* Vol. 10 No. 3, pp. , pp. 325-364., DOI:[10.1108/09513579710178106](https://doi.org/10.1108/09513579710178106) (Accessed: 11.10.2023)
- Gray, R. (1992), "Accounting and environmentalism: An exploration of the challenge of gently accounting for accountability, transparency and sustainability", *Accounting Organizations and Society* Vol.17, No. 5, pp. 399-425 DOI:[10.1016/0361-3682\(92\)90038-T](https://doi.org/10.1016/0361-3682(92)90038-T) (Accessed: 11.10.2023)
- Gray, R., Guthrie, J. (Eds.) (2007). "Social accounting, mega accounting and beyond: a festschrift in honour of M.R. Mathews". CSEAR Publishing. ISBN 9780955507601
- Grey. R. (2000), "Current Development and Trends in Social and Environmental Auditing , Reporting and Attestation: A Review and Comment", *International Journal*

of Auditing, Vol. 4., No. 3., pp 247-268, DOI:[10.1111/1099-1123.00316](https://doi.org/10.1111/1099-1123.00316) (Accessed: 11.10.2023)

KPMG. (2022), “Big shifts, small steps Survey of Sustainability Reporting 2022, https://assets.kpmg.com/content/dam/kpmg/no/pdf/2022/10/SSR-Report_FINAL_High.pdf (Accessed: 11.10.2023)

Kramarz,T., Park S. (2016), “Accountability in Global Environmental Governance: A Meaningful Tool for Action?”, *Global Environmental Politics*, Vol. 16 No. 2, pp. 1–21., https://doi.org/10.1162/GLEP_a_00349 (Accessed: 11.10.2023)

Kruskal, W., Mosteller, F. (1979), “Representative Sampling, I: Non-Scientific Literature”, *International Statistical Review / Revue Internationale de Statistique*, Vol. 47, No. 1, pp. 13-24, <https://doi.org/10.2307/1403202> (Accessed: 11.10.2023)

Lindberg, S. (2009), “Accountability: the core concept and its subtypes”, London, <https://assets.publishing.service.gov.uk/media/57a08b4740f0b652dd000bd6/APPP-WP1.pdf> (Accessed: 11.10.2023)

Miklosik, A. Evans, N. (2021), “Environmental sustainability disclosures in annual reports of mining companies listed on the Australian Stock Exchange (ASX)”, *Heliyon*, Vol. 7, Issue 7, <https://doi.org/10.1016/j.heliyon.2021.e07505> (Accessed: 11.10.2023)

Mulgan, R. (2000), “Accountability’: an ever-expanding concept?”, Blackwell Publishers Ltd, pp. 555 – 573, https://crawford.anu.edu.au/pdf/staff/richard_mulgan/MulganR_02.pdf (Accessed: 11.10.2023)

Owen. D., Swift. T., Hunt. K. (2001), “Questioning the Role of Stakeholder Engagement in Social and Ethical Accounting”, *Auditing and reporting. Accounting Forum*, Vol. 25. No.3. pp 264-82

UNEP's Technical Report on Company Environmental Reporting. (1994), “Company environmental reporting. A measure of the progress of business and industry towards sustainable development”, Technical Report 24, United Nations Environment Programme, Paris, ISBN 92-807-1413-9

United Nations Global, (2023), <https://unglobalcompact.org/participation> (Accessed: 11.10.2023)

Yusoff, H., Othman, R., Yatim, N. (2013), “Environmental Reporting Practices In Malaysia And Australia”, *The Journal of Applied Business Research*. Vol.29, No 6, pp. 1717 – 1726 DOI:[10.19030/jabr.v29i6.8209](https://doi.org/10.19030/jabr.v29i6.8209) (Accessed: 11.10.2023)

Identifying the potential of consumer cooperatives in the development of circular business models in the Republic of Moldova

Iordachi Victoria¹, Șavga Larisa², Perciun Rodica³

Abstract

Introduction: This article explores how consumer cooperatives can contribute to circular business models in the context of climate change and sustainable development, emphasizing their pivotal role in Moldova's transition to circular practices.

Aim: The aim of the article is to assess the potential role of consumer cooperatives in the development and promotion of circular business models in the Republic of Moldova.

Method: To provide concrete evidence of the contribution of consumer cooperatives to the evolution of circular business models, we designed a comprehensive survey tailored for cooperatives. This survey aimed to gather pertinent information regarding the current involvement of these cooperatives and their constituent entities in the circular economy system. Additionally, it sought to outline future strategies and initiatives in this domain. This survey was thoughtfully designed as an essential element within a scientific research initiative under the State Program (2020-2023) for the Development of Circular Economy Mechanisms in the Republic of Moldova.

Findings: The results of this research, obtained through the survey and subsequent data analysis, furnish a clear and detailed portrayal of the extent of consumer cooperatives' participation and their potential contributions to the Republic of Moldova's circular economy. This comprehensive understanding of their role can inform policy decisions and strategic initiatives aimed at fostering a more sustainable economic landscape in the country.

Originality and value: This article contributes significantly to the understanding of the sustainable development transformations needed in the Republic of Moldova, serving as a valuable guide for decision-makers fostering a responsible economy.

Key Words: Consumer cooperatives, Circular business models, Circular economy, Climate change, Sustainable practices, Sustainable consumption, Waste management.

Jel Codes: Q01, Q56, P13

¹ Associate researcher, PhD., Academy of Economic Studies of Moldova, National Institute for Economic Research, Republic of Moldova.

² Prof., Ph.D., Trade Co-operative University of Moldova, Management and Law Faculty, Department of Economy and Administration, Republic of Moldova, "Dunarea de Jos" University of Galati, Romania.

³ Prof., Ph.D., Academy of Economic Studies of Moldova, National Institute for Economic Research, Republic of Moldova.

1. INTRODUCTION

In recent years, the world has witnessed an increasing urgency to combat climate change and promote sustainable development. Circular business models have emerged as a promising solution to address these pressing global challenges.

Circular business models are an innovative approach to economic activities that prioritize resource efficiency, waste reduction, and sustainable consumption. They aim to break away from the traditional linear "take-make-waste" model and create a closed-loop system where products and materials are reused, recycled, and regenerated. Such models align perfectly with the goals of mitigating climate change and promoting sustainable development.

Consumer cooperatives, characterized by their member-owned and member-driven nature, possess unique attributes that make them ideal contributors to circular business models. Their commitment to social and environmental responsibility, combined with their capacity to foster community engagement, positions them as catalysts for transformative change in the country's pursuit of a more circular and sustainable economy.

Consumer cooperatives in Moldova, deeply rooted in their communities and driven by principles of cooperation and sustainability, can play a pivotal role in advancing circular business models. In the face of climate change and the need for sustainable development, these cooperatives have the potential to drive positive change, create resilient local economies, and contribute significantly to Moldova's journey towards a circular and sustainable future. Embracing the cooperative advantage is not just a choice but a necessity in the global quest to address climate change and promote sustainable development.

In this article, we delve into the significant contribution that consumer cooperatives can make in advancing circular business models, with a particular focus on their pivotal role in Moldova's transition to circular practices.

In order to substantiate the role of consumer cooperatives in the advancement of circular business models, we meticulously crafted a comprehensive survey exclusively tailored for these cooperatives. The primary objective of this survey was to collect relevant data pertaining to the existing engagement of these cooperatives and their members within the circular economy framework, while also delineating forthcoming strategies and undertakings in this realm. It is noteworthy that this survey was intentionally devised as an integral component within a broader scientific research initiative operating under the framework of the State Program (2020-2023) for the Development of Circular Economy Mechanisms in the Republic of Moldova.

2. LITERATURE REVIEW

A literature review on the role of consumer cooperatives in the development of circular business models reveals a growing body of research highlighting the significance of these cooperatives in fostering sustainable, circular economies.

Numerous studies emphasize the symbiotic relationship between consumer cooperatives and circular business models. Thus there is a strong belief that the circularity strategies and business models resonate with cooperatives across strategies and business models (Ziegler, R., Poirier, S., Lacasse, M., Murray, e., 2023). Cooperatives inherently prioritize member interests (Navkovic, S., Puusa, A., Miner, K., 2022), including sustainable consumption and responsible resource management, making them natural advocates for circular economy principles. Thus, cooperatives play a vital role in enhancing food security by assisting small-scale farmers, fishers, livestock caretakers, forest owners, and other food producers in overcoming various obstacles they encounter in their food production efforts. They are progressively emerging as significant stakeholders in improving access to clean water and sanitation services, bridging the gaps left by both public and private sectors. Furthermore, energy cooperatives are actively contributing to the realization of sustainable energy objectives, including expanded energy access, heightened energy efficiency, and decreased emissions (ILO, Coop, 2014).

Consumer cooperatives are acknowledged for their potential to enhance resource efficiency and reduce waste. They often implement practices such as bulk purchasing, minimizing packaging, and encouraging members to bring reusable containers, which align with circular economy goals (Pellegrini, G., Annosi, M.C., Conto, F., Fiore, M., 2020).

Also, literature review of some authors suggests that consumer cooperatives are often deeply embedded in local communities, enabling them to facilitate localized circular systems by connecting producers and consumers (Wahn, I., 2023), reducing transportation emissions (Alan, A., et al., 2015), and strengthening community ties (Majee, W., Hoyt, A., 2011).

Many studies highlight how cooperatives educate their members about sustainable consumption and the benefits of circular practices, thus promoting active participation in circular initiatives (Sutton-Brady, C., Raswant, A., 2016).

Researchers highlight the importance of consumer cooperatives collaborating with various stakeholders, including government agencies, NGOs, and private enterprises. Such collaborations can provide access to funding, technical expertise, and market opportunities to further circular objectives (Hammond, D., Luiz, J., 2016).

Literature also acknowledges challenges faced by consumer cooperatives in implementing circular business models. These challenges include the need for investment in infrastructure and technology, regulatory barriers, and the necessity of balancing economic sustainability with environmental goals (Ziegler, R., et al., 2023).

Several studies offer case studies and best practices from consumer cooperatives around the world (Kurimoto, A., 2020). These examples demonstrate how cooperatives

have successfully integrated circular principles into their operations, providing practical insights for others (Eurocoop, 2018).

The role of government policies and regulatory frameworks in supporting consumer cooperatives' transition to circular business models is a recurrent theme. Researchers emphasize the importance of creating an enabling environment through supportive policies and incentives (International Co-operative Alliance, 1988).

Finally, literature highlights the positive social and environmental impacts of consumer cooperatives' involvement in circular business models. These impacts include job creation, reduced waste generation, decreased carbon emissions, and enhanced community resilience (Calvo-Porrà, C., Levy-Manguin, J.P., 2020).

The literature underscores the vital role of consumer cooperatives in driving the development of circular business models. Their member-centric approach, commitment to sustainability, and ability to foster community engagement position them as key actors in the transition towards more circular and sustainable economies. Additionally, collaborative efforts with various stakeholders and supportive policy frameworks are instrumental in realizing their full potential in advancing circular practices.

2.1. Cooperatives: A Global, European, and Moldovan Perspective

Recent statistics on the global, European, and Republic of Moldova cooperative systems underscore their substantial role in both the economy and society. According to data from the International Cooperative Association (ICA) and European Community of Consumer Cooperatives (EuroCoop), cooperatives continue to thrive and offer valuable contributions on both a global and local scale.

Globally, cooperatives make a remarkable impact with staggering figures. There are approximately 1 billion cooperative members worldwide, belonging to over 3 million cooperative enterprises. This cooperative sector provides employment for no less than 10% of the global workforce, underscoring its pivotal role in generating job opportunities and fostering sustainable economic development (International Cooperative Alliance, 2022).

At the European level, cooperatives serve as a robust foundation of the economy and society. EuroCoop reports a membership of more than 141 million individuals across cooperatives, employing approximately 4,7 million people within more than 180,000 cooperative enterprises (European Community of Consumer Cooperatives, 2020). These statistics vividly demonstrate the substantial contribution of cooperatives to the European economy and the creation of stable employment.

In the Republic of Moldova, cooperatives are integral to the economic landscape. Currently, there are 2,212 registered cooperatives in the country, accounting for roughly 1,8% of the total number of registered enterprises (National Bureau of Statistics, 2022). These cooperatives actively contribute to local community development, offer employment opportunities (serve 57% of the country's population), and advocate for principles like solidarity, participation, and sustainability.

These data underscore the paramount importance and influence of the cooperative system at the global, European, and local levels. Cooperatives embody an innovative

and sustainable business model that prioritizes collective benefits and enduring development. They make substantial contributions in vital areas such as employment generation, community advancement, and the promotion of equitable social and economic values.

3. RESEARCH METHODOLOGY

The circular economy represents a fundamental economic concept in sustainable development, with the objective of using resources efficiently and minimizing the impact on the environment through a continuous cycle of production, consumption and reuse. Implementing circular economy principles within cooperatives would bring enormous potential for sustainable development. By adopting a continuous cycle of production, consumption and reuse, cooperatives can reduce dependence on finite resources, minimize environmental impact and promote efficient use of available resources. This can lead to cost savings, increased efficiency and generate competitive advantages for cooperatives. They can also carry out activities with a positive social impact, such as creating jobs for disadvantaged groups or supporting local communities.

The objective of this study is to explore the way by which the consumer cooperative sector in the Republic of Moldova participates in and contributes to the circular economy.

3.1. Research Model and Hypothesis

In this research, we adopted a descriptive and analytical approach to investigate the involvement of cooperatives and their entities in the circular economy system within the Republic of Moldova.

The research model consisted of the following key components:

- **Survey Instrument:** We designed a comprehensive survey to collect data from cooperatives operating in the Republic of Moldova. This survey served as our primary data collection tool, capturing information on the then-current participation in the circular economy and future strategies.

- **Data Collection:** We distributed the survey to a representative sample of cooperatives across various sectors and regions in Moldova. The collected data provided insights into the then-current state of circular economy practices among cooperatives.

- **Data Analysis:** Using statistical and analytical methods, we analyzed the survey responses to identify trends, patterns, and correlations related to cooperative involvement in the circular economy. This analysis helped us draw meaningful conclusions.

- **Hypothesis Testing:** Based on the survey data, we tested hypotheses related to the factors influencing cooperative engagement in the circular economy. This

provided empirical evidence to support our research objectives at that time. Thus, we submitted the following hypotheses for validation:

- Hypothesis 1: Cooperatives in the Republic of Moldova actively engage in circular economy practices, with a significant portion of their operations focused on sustainability and resource efficiency.
- Hypothesis 2: The level of participation in the circular economy by cooperatives is influenced by factors such as size, sector, and geographic location.
- Hypothesis 3: Cooperatives that have adopted circular economy principles are more likely to have long-term sustainability strategies and a positive impact on their communities.

3.2. Explanation of Scales

In order to elucidate the extent of cooperative involvement in the adoption of circular economy principles, our research instrument encompasses three distinct scales within the questionnaire:

The Likert Scale: Consisting of three items, the Likert scale is designed to gauge the cooperative's commitment to environmental and climate considerations. Specifically, it evaluates the degree to which the cooperative factors in the environmental and climatic ramifications of its operations, while also delving into the underlying rationales for any lapses in such considerations.

The Multiple-Choice Scale: Comprising a comprehensive set of 43 items, this scale delves into a wide spectrum of queries. It encompasses challenges, issues, and outcomes encountered throughout the integration of circular economy practices within cooperative operations, providing a holistic overview of their experiences and endeavors in this regard.

Open-Ended Questions: Open-ended questions serve as an invaluable means to gather essential information about the cooperative's fundamental profile. These questions encompass key details such as geographical location, year of establishment, the range of localities served, and the demographic scope of the population under their purview.

This methodological approach has been meticulously crafted to obtain a comprehensive understanding of how cooperatives engage with circular economy principles, with each scale serving a specific role in illuminating various aspects of their endeavors in this context.

3.3. Data Analysis

3.3.1. Demographics

A total of 28 cooperatives, hailing from various regions of our nation, actively participated in this survey. These cooperatives, comprising 53.6% rural and the remaining urban, offer a diverse and representative sample. This diversity significantly

enhances the credibility of the survey results. By encompassing both rural and urban cooperatives, our study delves into a wide array of contexts and perspectives, allowing for a holistic analysis of the cooperative landscape.

Among the survey respondents, consumer cooperatives predominate, representing 67.9% of the sample. The remaining respondents include territorial Unions of consumer cooperatives, cooperative enterprises (17.9%), the central union of consumer cooperatives, and educational institutions. This diversity underscores the richness of experiences and insights present in our dataset.

Notably, some of the surveyed cooperatives trace their roots back to as early as 1948. This longevity signifies the enduring history and accumulated expertise within these organizations, which are highly relevant to their field of operation. This historical depth instills a sense of validity and confidence in the responses garnered during the survey.

Around 71.4% of the cooperatives in our sample employ between 10 and 49 individuals, while 25% have staff ranging from 50 to 249 employees. This distribution is representative of the cooperative landscape in our study.

In terms of business focus, 75% of the respondents are involved in retail, 21.4% in purchasing, and 17.9% in manufacturing. This diversity in cooperative activities provides valuable insight into the sector's multifaceted operations.

With respect to business income, 28.6% reported annual revenues falling within the range of 1 to 5 million lei, while another 25% reported incomes spanning 16 to 20 million lei. This diverse income range reflects the economic landscape of the cooperatives under examination.

The majority of the cooperatives primarily serve a single locality. However, it's worth noting that four cooperatives extend their services to four different localities, while the remaining cooperatives serve two localities each. This insight into the range of localities served provides valuable context for understanding the cooperative networks.

In conclusion, the diverse and representative nature of our survey sample, coupled with the historical depth, employee distribution, and income range, paints a comprehensive picture of the cooperative landscape under study. These demographic details enrich the validity and reliability of the responses collected, allowing for a robust analysis of the cooperative sector as a whole.

3.3.2. Analysis of Survey Data

In the subsequent section of the questionnaire, our focus shifted towards gauging the understanding of the circular economy concept and the cooperative system's significance within this framework.

Remarkably, our findings indicate a high degree of familiarity with the circular economy concept among respondents, with a notable 71.4% reporting awareness. Even more striking is the widespread consensus, as an impressive 94.6% of participants regard the transition from the linear economic model (characterized by the use-produce-consume-throw pattern) to a circular economic model as both imperative and urgent.

These findings underscore the collective awareness of the circular economy's vital importance and an overwhelming endorsement of the necessity for a fundamental shift in consumption and production paradigms.

Our results further reveal that a substantial proportion of respondents, comprising 28.6% to a significant degree and 57.1% to some extent, believe that the consumer cooperative sector possesses the potential to play a pivotal role in the integration of the circular economy into the economic system. These cooperative systems are seen as key facilitators in transitioning from a linear to a circular economic model, with a strong emphasis on advancing environmental sustainability.

In summary, this section of the survey with its results illuminates a widespread understanding of the circular economy's significance and a resounding call for transformative change. Moreover, it underscores the pivotal role that consumer cooperatives are poised to play in driving this transition and championing environmental sustainability within the circular economy.

A significant 85.7% of our survey respondents hold the perspective that the responsibility for the successful implementation of the circular economy system, as well as the assurance of environmental sustainability, transcends individual entities and is a collective duty borne by society at large. This collective responsibility encompasses all stakeholders involved in the development of legislation and policies, the production and consumption sectors, and information and education initiatives. A smaller percentage, 7.1%, attribute this responsibility primarily to producers and processors.

It is vital to emphasize that the task of implementing the circular economy system and fostering environmental sustainability is a multifaceted challenge. It necessitates the active involvement and collaboration of all relevant parties, including the broader society, producers, processors, governing authorities, various organizations, and individual citizens. This cooperative approach underscores the complex nature of the endeavor and highlights the importance of unified efforts among diverse stakeholders to achieve sustainable and circular economic practices.

According to our survey respondents, the concept of the circular economy is linked to various dimensions as exposed in the following table.

Perceptions of the Circular Economy: A Multifaceted View

Recycling and Waste Recovery	For 21.4% of participants, the circular economy is synonymous with the recycling and responsible recovery of waste materials.
Sustainable Production and Consumption	A significant 25% associate the circular economy with an efficient and sustainable model for production and consumption that prioritizes environmental protection.
Resource Utilization (Zero Waste Principle)	An equal 21.4% view the circular economy as a novel business model focused on achieving comprehensive resource utilization, in line with the "Zero Waste" principle.
Integration with Natural Environment	Similarly, 21.4% regard the circular economy as an economic system that harmoniously integrates production and consumption with the natural environment.
Renewable Energy	A smaller proportion, 7.1%, links the circular economy with the utilization of renewable energy sources.

Limited Knowledge	It's worth noting that 3.6% of our respondents indicated having limited or no prior knowledge of the circular economy.
--------------------------	--

Source: elaborated by authors

These diverse associations underscore that the circular economy is perceived as a multifaceted framework that addresses various dimensions of sustainability and environmental protection. It encompasses recycling, efficient resource use, sustainable production and consumption, and the harmonious alignment of economic activities with the natural environment, highlighting its potential to drive holistic sustainability efforts.

Assessing Cooperative Actions in Support of Circular Economy

The following section of the questionnaire was dedicated to evaluating the current initiatives undertaken by cooperatives and cooperative enterprises in their commitment to the principles of the circular economy.

When respondents were asked whether they sort the collected waste into separate containers, the findings revealed that merely 14.3% of participants affirmed that they indeed engage in waste sorting practices. In stark contrast, a substantial 78.6% responded in the negative, with an additional 7.1% indicating a lack of knowledge on the subject. These responses strongly indicate the pressing need for enhancements in the area of waste sorting within these entities.

Further insights from our survey revealed that a significant 67.9% of respondents face a challenge in delivering their segregated waste to waste collection and utilization units. This challenge arises from the fact that waste collectors typically collect the waste in a mixed fashion, rendering sorting at the source futile. Additionally, 17.3% of respondents reported their inability to engage in waste sorting, primarily due to the absence of proper containers or dedicated spaces. A mere 14.3% of participants confirmed that they possess the means to hand over their segregated waste to authorized waste collection and recovery units.

Collectively, these statistics underscore the imperative for infrastructural improvements and advancements in waste management capacity within the entities and cooperatives under consideration. The pursuit of circular economy goals necessitates effective waste sorting practices and streamlined waste collection processes, emphasizing the significance of targeted improvements in these domains.

Waste Treatment and Reusable Packaging Practices

Simultaneously, it's noteworthy that a substantial 89.3% of the respondents indicated that they do not currently oversee the treatment or recycling of waste within their cooperative or enterprise. Another 7.1% acknowledged their limited knowledge in this domain. These findings underscore the critical need for the formulation and implementation of concrete strategies and actions aimed at managing and recycling waste within these cooperative and enterprise settings. Such efforts align with the principles of the circular economy and play an integral role in environmental protection.

Furthermore, an examination of survey results reveals that 53.6% of the respondents reported that their respective entities do not partake in the collection of returnable

packaging, which includes items such as pallets, cardboard boxes, plastic crates, and glass, among others, to return to manufacturers and distributors. In contrast, 46.4% confirmed that their entities do engage in this practice. These statistics signify that there exists a noteworthy proportion of entities yet to adopt the approach of collecting and returning reusable packaging. It's crucial to emphasize that the promotion of such practices can significantly contribute to waste reduction and the cultivation of a more sustainable economic ecosystem.

In essence, these findings underscore the importance of advancing waste treatment and recycling strategies and promoting the collection and return of reusable packaging. These measures are integral to advancing the circular economy and fortifying our commitment to environmental preservation.

Promoting Responsible Packaging Collection and Recycling

The survey findings reveal a substantial trend, with 92.9% of respondents indicating that their respective cooperatives and enterprises do not currently engage in the collection of returnable and recyclable packaging from the public and consumers. These types of packaging include materials such as cardboard, plastic, glass, wood, and more. This statistic underscores that a significant majority of cooperatives and enterprises have yet to embrace the practice of collecting these packaging materials for recycling or reuse.

This presents a pivotal opportunity for entities to explore and implement innovative solutions for the proper collection and management of recyclable packaging. By doing so, they can play a vital role in reducing environmental impact and actively contribute to the advancement of a more sustainable circular economy.

For instance, a food cooperative could take the lead by initiating a collaborative program in partnership with local authorities and regional producers. The program could establish strategic collection points at accessible locations within the community, including supermarkets, local markets, and community centers. Incentives and encouragement can be extended to consumers to participate in this initiative by bringing their cardboard, plastic, glass, and wood packaging to these designated collection points.

Once the recyclable packaging is amassed, the cooperative can facilitate its transfer to local recycling centers or directly to manufacturers and distributors. This proactive approach ensures that the collected packaging materials are responsibly processed and recycled, ultimately transformed into secondary raw materials that can fuel new production cycles.

In conclusion, these steps empower cooperatives and enterprises to make a meaningful difference in the promotion of responsible packaging collection and recycling. By embracing these strategies, they can significantly contribute to environmental sustainability and the advancement of a more circular and eco-conscious economy.

This program is poised to serve as a catalyst not only for the promotion of sustainable waste management but also for actively engaging the local community in the recycling and circular economy processes. Through this initiative, consumers will not only gain

education but also heightened awareness regarding the significance of packaging collection and recycling. Consequently, they'll play an integral role in fostering a greener and more responsible community.

Out of the respondents representing 3.6% who confirmed that they collect returnable and recyclable packaging from the public and consumers (including materials like cardboard, plastic, glass, wood, and more), the distribution of their practices is as follows:

- 50% entrust the collected packaging to waste collectors for responsible management.
- 16.7% are committed to returning the packaging in full to producers and distributors.
- Another 16.7% opt to partially return packaging materials to producers and distributors.
- An additional 16.7% take the sustainable route by sending the collected packaging to specialized recycling enterprises.

These diverse approaches reflect the ingenuity and dedication of these entities in managing returnable and recyclable packaging. They demonstrate an unwavering commitment to fostering the principles of the circular economy and responsible waste management. In doing so, they contribute significantly to reducing environmental impact and advancing the efficient utilization of resources, ultimately enriching the collective environmental consciousness of the community.

Identifying Obstacles to Collecting Returnable/Recyclable Packaging

The obstacles hindering the collection of returnable and recyclable packaging from the public and consumers, encompassing materials such as cardboard, plastic, glass, wood, and more, are delineated by respondents as follows:

- A significant 48.1% of respondents point to the limitations posed by inadequate resources, whether financial or in terms of personnel, as a primary impediment to collecting such packaging.
- For 37% of respondents, the absence of designated locations for the surrender of collected packaging emerges as a significant challenge.
- 11.1% of respondents cite the lack of requisite storage spaces for the collected recyclable packaging. This challenge often stems from logistical constraints, where cooperatives and enterprises face limitations in securing or providing adequate storage facilities.
- A smaller portion, 3.7% of respondents, mentions that the concept of collecting returnable and recyclable packaging has yet to be integrated into their operational activities.

These instances underscore the multifaceted challenges confronting cooperatives and businesses in the establishment of a recyclable packaging collection system. They emphasize the essential requisites, which encompass resources, infrastructure, storage capacity, and heightened awareness, needed to surmount these hurdles. These essential elements are integral to propelling forward a more sustainable circular economy.

Collection of Unneeded Packaging and Waste: Challenges and Commitment

An overwhelming 96.4% of respondents made it clear that they do not engage in the collection of unneeded packaging or waste, such as metal cans, paper/cardboard, plastic bottles, and similar materials, from the general population. This statistic suggests that the majority of cooperatives and enterprises do not actively collect these types of superfluous packaging or waste that is not utilized by the public. This abstention can stem from a range of factors, including capacity constraints for storing and managing surplus waste, the absence of requisite infrastructure, or a lack of demand or viable markets for these recyclable materials.

Among the minority who indicated that they do collect such materials, some follow responsible waste management practices by forwarding these items to authorized waste collectors, while others return them to companies specializing in recycling or processing. These actions underscore a commitment to the principles of responsible waste management and the advancement of the circular economy. By engaging with these specialized entities, cooperatives and enterprises actively contribute to the recovery and recycling of these materials, thereby reducing their environmental impact and promoting the efficient use of resources.

For those who responded that they do not collect such unneeded packaging or waste, specific reasons were provided to elucidate the challenges faced by these cooperatives and enterprises:

- 39.3% expressed that they lack avenues for the proper disposal of this waste, given the absence of specialized companies equipped to collect these specific types of waste packaging.
- 35.7% cited financial constraints as a significant obstacle, which hindered them from carrying out additional collection activities.
- An additional 21.4% indicated that the absence of designated spaces for the storage and management of these specific types of waste was a limiting factor.

These explanations highlight the multifaceted difficulties encountered by cooperatives and enterprises in their efforts to establish extensive waste collection programs. They underscore the necessity for additional resources to efficiently manage these materials and surmount the logistical challenges associated with broader waste collection initiatives.

Establishing Collection Spaces and Assessing Collaboration with Producers/Distributors

A substantial 82.1% of respondents have indicated that they have not instituted dedicated collection spaces for the gathering of non-returnable used packaging and waste arising from their company's operations. In contrast, 10.7% of respondents have noted the presence of such collection points situated in proximity to their businesses, while 7.1% reported the coexistence of collection points both near businesses and within

their respective localities or local areas. These findings underscore that the majority of cooperatives and enterprises have yet to establish specialized areas for the collection of these specific types of waste, which may impact the proper management and recycling of such materials.

The evaluation of collaboration with producers and distributors along the value chain concerning the transition to the circular economy elicits a spectrum of responses from the respondents. Notably, 39.3% rated this collaboration as weak, signifying that challenges and obstacles exist within this partnership. A further 14.3% characterized this collaboration as very weak, indicating a substantial lack of engagement and commitment on the part of manufacturers and distributors in facilitating the transition to a circular economy. Moreover, 17.9% specified that there is no collaboration whatsoever, revealing a complete absence of interaction and cooperation with manufacturers and distributors.

Conversely, a quarter of the respondents, accounting for 25%, rated the collaboration as good, signifying a sustained commitment and substantial effort from manufacturers and distributors in championing the circular economy and orchestrating a seamless transition toward a more sustainable economic model. This positive assessment points toward the existence of robust partnerships and concerted endeavors to implement circular economy practices within the value chain.

These results indicate notable disparities in collaboration levels with producers and distributors concerning the transition to the circular economy. Strong and effective collaboration appears to be a pivotal factor in driving sustainable practices and achieving overarching sustainability objectives.

Perceptions of Product Shelf Life: Trends and Influences

A majority of respondents (60.7%) perceive that the shelf life of current non-food products is notably shorter in comparison to 10-20 years ago. This observation potentially points to a trend favoring products with abbreviated life cycles or the swifter utilization of non-food products in general. However, it's worth noting that 21.4% of respondents hold the view that the shelf life of non-food products has lengthened, while 14.3% believe it has remained stable.

Conversely, with regards to contemporary food products, 57.1% of respondents opine that their lifespan has increased compared to 10-20 years ago. This shift could be attributed to advancements in preservation and packaging technologies and processes, which effectively extend the shelf life of food items. On the flip side, 25% of respondents contend that the shelf life of food products has diminished, a trend that may be ascribed to factors such as a preference for fresh food or concerns over product quality. A further 10.7% maintain that the shelf life of food products has remained consistent over the past 10-20 years.

These perceptions concerning the shelf life of both non-food and food products can be subject to influence from a plethora of factors. These may encompass technological innovations, evolving market demands, and shifting consumer preferences. It is of paramount importance to thoroughly assess and adapt production and consumption

strategies to strike a balance between extending product life, reducing waste, and minimizing environmental impact.

Collecting and Extending Product Lifespan: Current Practices and Future Intentions

Analysis of the questionnaire results reveals that the vast majority of respondents (96.4%) confirm that their company currently does not engage in the collection or acquisition of used products from the public for the purpose of reselling or redistributing them to extend their lifespan. Notably, 60% of respondents specify that they currently lack designated spaces or facilities for such initiatives.

Within the subset of respondents who indicated that their company does not currently possess dedicated spaces for the collection and resale of used products from the public, with the goal of extending their lifespan, 11.5% express a clear intention to introduce such activities in the future. These forward-looking respondents are committed to organizing and establishing specialized areas for this purpose, indicating a proactive stance toward sustainable practices and product lifespan extension.

After-Sales Services and Environmental Management: Current Practices and Potential Future Considerations

All respondents uniformly indicated that their entity does not currently provide after-sales services, including repairs, exchange of old products for new ones, or product refurbishment. This observation suggests that the entity presently does not have plans to incorporate such services into their core business operations.

It is crucial to underscore that the provision of after-sales services holds substantial potential for advancing the principles of the circular economy. These services contribute to the extension of product lifespans and a reduction in waste generation. By offering such services, businesses have the opportunity to fortify their relationships with customers and advocate for more sustainable product utilization and management practices.

In contemplating the future, the entity may wish to explore the possibility of developing after-sales services. This could entail a thorough assessment of demand and the feasibility of implementation within their business framework. Key steps in this process might involve the establishment of appropriate infrastructure, the training of staff, and the formulation of relevant policies and procedures.

Turning to the topic of environmental management, the survey results reveal that a noteworthy 78.6% of respondents indicated that their company does not currently have an environmental management system in place. A smaller portion, 10.7%, answered affirmatively, while 1.7% expressed uncertainty about the matter.

An environmental management system encompasses a suite of practices and processes designed to enable organizations to manage and curtail their adverse impact on the environment throughout their operations. The implementation of such a system serves to assist businesses in identifying and mitigating environmental risks, enhancing

resource efficiency, and ensuring compliance with environmental regulations and standards.

In light of the substantial percentage of respondents who reported the absence of an environmental management system within their company, it is advisable to consider strategies for raising awareness and encouraging the adoption of environmental management practices. These initiatives can contribute to a more environmentally responsible and sustainable approach to business operations.

Consumer Awareness Campaigns: Opportunities and Challenges

The survey results underscore that a significant 92.9% of respondents have not initiated or are not currently organizing campaigns or activities aimed at enhancing consumer awareness regarding crucial aspects of rational consumption, the reduction of food waste, recycling, and the responsible return of packaging. A mere 3.6% of respondents affirmed that they have conducted such awareness campaigns, while an additional 3.6% expressed a lack of knowledge about these initiatives.

Given the substantial percentage of respondents who have yet to launch such campaigns, an evident opportunity arises to develop and implement consumer awareness and education initiatives. These concerted actions hold the potential to elevate awareness of the significance of responsible consumption and to encourage the adoption of environmentally friendly practices. Through well-crafted campaigns, consumers can be educated and inspired to embrace more sustainable behaviors, both in terms of consumption practices and in the realms of waste management and environmental conservation.

To further delineate the reasons for the absence of consumer awareness campaigns, respondents provide the following explanations:

- 63% cited limited financial resources as a primary constraint, which hampers the ability to execute extensive campaigns and engage a broad consumer base.
- 22.2% reported previous efforts to initiate campaigns but encountered consumer disinterest, signifying a notable challenge in promoting sustainable practices.
- 11.1% disclosed a shortage of time as a hindrance, while 3.7% indicated a lack of initiative.

These instances signify diverse obstacles and challenges faced by businesses in orchestrating awareness-raising endeavors. Scarcity of financial resources may curtail the capacity to mount large-scale campaigns and engage a substantial consumer audience. The challenge of consumer disinterest underscores the need to craft compelling campaigns that resonate with target audiences. Constraints related to time and organizational priorities can further impede the development of such initiatives.

Identifying these underlying causes is a valuable step for businesses, as it enables the formulation of strategies and action plans to surmount these obstacles and pave the way for the effective implementation of awareness campaigns in the future.

Identifying Future Strategies for the Circular Economy

The following questions in the questionnaire were strategically designed to unveil prospective strategies and actions in the realm of bolstering the circular economy and fostering the adoption of circular business models.

A resounding 82.1% of respondents unequivocally affirmed that their entity actively takes into account the environmental and climatic ramifications of their activities. This unequivocal commitment underscores the pivotal significance attributed to environmental and climate impact considerations within these businesses. Such conscientiousness is often motivated by a sense of moral responsibility, a recognition of the critical role of environmental stewardship in shaping corporate image, and a strategic imperative aimed at ensuring long-term operational efficiency.

Responding to Environmental and Climate Impact: External Pressures and Sustainability

A significant portion of respondents have acknowledged that their attention to the environmental and climatic consequences of their activities is substantially driven by external forces, primarily including customer demands, governmental regulations, and the influence of NGOs and other organizations. This confluence of external influences strongly indicates that stakeholders, such as customers, government bodies, and environmental organizations, have articulated a compelling need for businesses to shoulder responsibility for sustainability and environmental stewardship.

This external pressure could be attributed to various factors, encompassing mounting concerns about climate change, an expanding recognition of the adverse environmental effects stemming from economic activities, and the burgeoning corpus of environmental legislation and regulatory requirements.

It is heartening to observe that businesses are attuned to these external pressures and are proactively considering their impact on the environment and climate. This heightened sensitivity presents an encouraging impetus for the wider adoption of sustainable practices and the incorporation of circular economy principles into their business strategies.

Understanding Barriers to Considering Environmental Impact

It is noteworthy that some respondents pointed to specific reasons for not giving due consideration to environmental impact, including insufficient knowledge, a perceived absence of immediate business benefits, a lack of clear economic advantages, and even a disinterest in the matter.

Insufficient knowledge can indeed pose a significant hurdle, as it may limit the ability to fully comprehend the environmental impact of their activities and the potential steps they can undertake to mitigate it. This underscores the critical need for sustainability education and training initiatives targeted at businesses and their key decision-makers.

The concerns regarding the absence of apparent business benefits and economic advantages are legitimate apprehensions, especially within the context of a competitive market environment. Some companies might view environmental initiatives as costly or incompatible with their existing business models. However, it is imperative to recognize that a sustainability-oriented approach can also yield long-term advantages, including cost reductions, enhanced reputation, and access to new markets or customer segments.

The reported lack of interest may partly result from a general unawareness or a lack of prioritization of sustainability within the organization. In such instances, focused awareness and education efforts can play a pivotal role in emphasizing the significance of environmental protection and the manifold benefits associated with a responsible approach.

Recognizing and addressing these various reasons is pivotal to advancing a more sustainable and conscientious approach toward environmental matters.

Key Motivations for Developing Circular Business Models

The impetus behind developing circular business models is underscored by a range of compelling reasons, as elucidated by survey respondents:

Rational Use of Resources: As articulated by 42.9% of respondents, this facet signifies the paramount importance of efficiently harnessing natural resources and curbing consumption by embracing practices that center on the reuse and recycling of raw materials and products.

Production and Consumption Efficiency: Cited by 17.9% of respondents, this motivation aligns with the core objective of circular business models, which strives to enhance production processes, curtail waste, and thereby reduce operational costs.

Enhanced Market Competitiveness: Acknowledged by 14.3% of respondents, the adoption of circular practices can confer a competitive edge through avenues such as innovation, diversification, and the development of sustainable products and services.

Improved Organizational Image: Recognized by 10.7% of respondents, a circular business model has the potential to fortify the image of a cooperative or enterprise, magnetizing environmentally conscious customers and contributing to the cultivation of a positive and sustainable reputation.

These motivations collectively underscore the manifold economic, social, and environmental advantages associated with the cultivation of circular business models. These models are strategically designed to optimize resource utilization, promote sustainability within the realm of business activities, and manifest benefits that span across diverse facets of economic, environmental, and social dimensions.

Integration of Environmental Protection Principles in the Company

Within the company where they are employed, a significant 50% of respondents perceive environmental protection principles as strategic development opportunities. This signifies their recognition of the pivotal role that environmental protection plays

in shaping business success and fostering growth. Their intention is to seamlessly integrate these principles into the organization's long-term development strategy.

Furthermore, a noteworthy 17.9% of respondents affirm that environmental protection principles are not merely theoretical notions but are deeply embedded in their company policies. These policies are characterized by well-defined objectives, concrete actions, and unwavering commitments. This demonstrates the enterprise's unwavering dedication to environmental protection, as evidenced by its clear policies and directives. Such policies encompass specific environmental objectives, the implementation of sustainable practices, and a systematic monitoring of environmental performance.

These insights underscore the company's profound understanding of the significance of environmental protection and its firm commitment to addressing this issue in a strategic and integrated manner across all facets of its operations. This holistic approach can significantly fortify the company's standing in the market and confer competitive advantages in an economic landscape that increasingly values sustainability and social responsibility.

The survey results reveal that a substantial 64.3% of respondents report the absence of specific strategies or actions related to the application of circular economy models within their respective entities. This observation may imply that the enterprise has not yet undertaken the formulation of dedicated plans or strategies focused on the implementation of circular economy practices and a sustainable approach to their operations.

Concurrently, 21.4% of respondents disclose that sustainability objectives and the integration of circular economy principles are integrated into the cooperative's or enterprise's development strategy, albeit partially. This suggests that while there may exist certain objectives and intentions regarding the adoption of circular economy principles, their execution might still be in its nascent phases, indicating a potential need for strengthening these aspects within the enterprise's overarching strategy.

It's important to underscore that the development and execution of circular economy strategies can necessitate a considerable investment of planning, resources, and organizational commitment. Nonetheless, embracing these strategies can yield substantial long-term benefits, including the reduction of environmental impact, the optimization of resource utilization, and the cultivation of fresh business prospects within the ambit of the circular economy.

Awareness and Strategies for Circular Economy Integration

If a significant majority of respondents (75%) express a lack of awareness about applicable business models in the circular economy or have not identified models suitable for their cooperative/enterprise, it may suggest a deficit in knowledge or dedicated research in this area.

Nevertheless, the circular economy offers a diverse array of business models, adaptable to the specificities of cooperatives/enterprises and the industries in which they operate. Several examples of circular economy business models include:

The Rental or Leasing Model: Rather than selling products, enterprises can offer products for lease or as services. This transfers responsibility for product maintenance and durability to the enterprise, allowing consumers to use products without the need for purchase.

The Resale or Remarketing Model: Businesses can acquire used products, refurbish or repair them, and then resell them. This extends product lifecycles and diminishes waste production.

The Waste Recycling or Valorization Model: Enterprises can collect and recycle waste, transforming it into new raw materials or products.

The Circular Production Model or Design for the Life Cycle: Enterprises can create products that are easily repairable, recyclable, or regenerable, thereby promoting resource sustainability and waste reduction.

The Collaboration Model or Sharing Platforms: Enterprises can establish online or offline platforms facilitating product exchange, rental, or lending among interested parties.

A comprehensive analysis of the cooperative/enterprise's activities and the relevant industry is crucial to identify the most fitting business models. Consulting circular economy experts and studying successful industry examples can be invaluable in selecting the most suitable models to uphold circular economy principles within the cooperative/enterprise.

Regarding respondents' intentions, if a substantial portion (45%) is uncertain about whether they intend to formulate a strategy or devise actions for integrating their entity into the circular economy system, and 25% outright negate such intentions, this may indicate a lack of clarity or commitment on this subject.

On a positive note, 30% of respondents express their intentions to develop a strategy or design actions for circular economy integration. This suggests a growing awareness of the significance of sustainable approaches and the advantages linked to the circular economy.

For those respondents looking to develop a strategy or plan actions related to the circular economy, it is advisable to commence by comprehensively understanding the nuances of their operations and their impact on the environment and resources. This foundational knowledge allows the identification of opportunities for applying circular economy principles, leading to the development of strategies and action plans for their implementation within the entity.

Conducting research and engaging with circular economy experts can provide valuable guidance and support in crafting appropriate strategies and actions. Furthermore, ongoing monitoring and evaluation of circular economy implementation progress are essential to ensure the success and lasting impact of these initiatives.

Preferred Circular Economy Models

Among the options presented, a significant portion of respondents (39.3%) indicates a preference for the circular consumables model. This model emphasizes the use of products that can be reused, remanufactured, or recycled, as opposed to consuming

single-use items. Implementing this approach allows the cooperative to play a role in waste reduction, resource optimization, and overall sustainability.

A substantial percentage of respondents (35.7%) express their inclination towards the waste recovery/reuse model. This model centers on the collection and recovery of waste, encompassing processes like recycling, remanufacturing, and other forms of reuse. By adopting this model, cooperatives can actively contribute to environmental impact reduction and resource reclamation from waste streams.

The "Extended Product Life Cycle" option resonates with 17.9% of respondents. In this model, the focus lies on extending the lifespan of products through maintenance, repair, and upgrades. Prolonging product life minimizes the need for new purchases and, concurrently, reduces the overall environmental footprint.

Ten point seven percent of respondents opt for the "From Product to Service" model. This approach emphasizes delivering services and solutions in lieu of selling physical products. This transformation encourages resource efficiency and fosters the creation of sustainable business models.

Similarly, 10.7% of respondents favor the "Sharing Platforms" model. This choice revolves around the development and utilization of digital platforms designed for the sharing of goods and services among various stakeholders. These platforms foster resource efficiency and promote collaborative consumption.

It is essential for cooperatives to conduct comprehensive analyses of each model, evaluating how well they align with the cooperative's specific context and objectives. Each model offers distinct advantages and benefits, and the appropriate choice hinges on a cooperative's unique circumstances and goals. This evaluation process helps ensure that the selected model effectively contributes to the cooperative's sustainability efforts.

Circular Supply Chain and Barriers to Circular Business Model Adoption

The majority of respondents (71.4%) acknowledge that their supply chain is not yet circular. This revelation underscores the potential for further enhancement in incorporating circular practices within their supply processes.

A modest fraction of respondents (10.7%) affirm that their supply chain has already achieved circularity. This assertion reflects the proactive adoption of measures and practices that champion resource efficiency, recycling, remanufacturing, and the reuse of materials and components within their supply chain.

A minority segment (17.9%) expresses uncertainty regarding the circularity of their supply chain. This uncertainty may signify a lack of information or a dearth of assessments in this area. These entities stand to gain from acquiring greater clarity and knowledge concerning the circular nature of their supply chain.

It's crucial to recognize that the shift toward a circular supply chain necessitates strategic planning and execution. This includes evaluating and optimizing material flows, identifying recycling and reuse opportunities, fostering partnerships with suppliers and other stakeholders, and promoting sustainable practices throughout the supply chain.

Irrespective of the current state of the supply chain, there's always room for improvement and progression toward a more circular supply chain, with enduring economic and environmental benefits.

As per the respondents, the principal barriers to transitioning to the circular economy system and implementing a circular business model within their enterprises are as follows:

Lack of Financial Resources - 42.9%: This barrier signifies that many enterprises face financial constraints when allocating the necessary resources for implementing a circular business model.

Lack of Technological and Technical Solutions for Valorization - 39.3%: This challenge indicates the difficulties that enterprises encounter in discovering or developing suitable technological and technical solutions for resource and waste valorization.

Lack of Adequate and Clear Information on Circular Economy - 32.1%: Respondents believe that the absence of clear and comprehensive information about the circular economy can be a significant hurdle in the path toward implementing this business model.

Lack of Competent Staff - 39.3%: This finding underscores the deficiency in having a sufficient number of skilled and knowledgeable personnel well-versed in circular economy principles, potentially impeding the implementation of this model.

Lack of Circular Economy Training - 39.3%: This emphasizes the need for employee training and education in the field of circular economy to empower them to comprehend and apply specific principles and practices.

Additional barriers identified include the high costs associated with transitioning to the circular economy (21.4%) and resistance to departing from the established linear economy model (10.7%). These findings collectively emphasize the multi-faceted challenges and opportunities surrounding the adoption of circular business models and practices.

4. Validation of hypothesis

Based on the results of the survey, we can evaluate the three hypotheses as follows:

Hypothesis 1: Cooperatives in the Republic of Moldova actively engage in circular economy practices, with a significant portion of their operations focused on sustainability and resource efficiency.

The survey results provide mixed support for this hypothesis. While there is a clear recognition of the importance of the circular economy among the respondents, and many express a desire to engage in circular practices, the actual adoption and implementation of these practices vary. Some cooperatives demonstrate active engagement in waste collection and recycling, as well as awareness of circular principles, while others face challenges in areas such as waste sorting and infrastructure development. Therefore, it can be concluded that while there is a positive inclination towards circular economy practices, active engagement varies among cooperatives.

Hypothesis 2: The level of participation in the circular economy by cooperatives is influenced by factors such as size, sector, and geographic location.

The survey results support this hypothesis. Respondents from cooperatives of different sizes, sectors, and geographic locations indicated varying levels of participation in circular economy practices. For instance, some cooperatives, particularly those focused on retail and purchasing, showed more active engagement in recycling and returnable packaging collection. Geographic location may also play a role in the adoption of circular practices, with urban cooperatives potentially having better access to waste management infrastructure. The results suggest that these factors influence the level of participation in the circular economy by cooperatives.

Hypothesis 3: Cooperatives that have adopted circular economy principles are more likely to have long-term sustainability strategies and a positive impact on their communities.

The survey results provide partial support for this hypothesis. While some cooperatives demonstrated a clear commitment to sustainability and environmental responsibility, including engagement in circular practices, others indicated the need for improvement in areas like waste sorting and resource efficiency. The level of engagement in the circular economy seems to correlate with long-term sustainability strategies and positive community impact for some cooperatives. However, it is not universally true for all. Therefore, the hypothesis is supported to some extent but is not consistently applicable to all cooperatives.

In summary, the survey results suggest that cooperatives in the Republic of Moldova have varying degrees of engagement in circular economy practices, influenced by factors like size, sector, and geographic location. The relationship between circular practices and long-term sustainability strategies or community impact is not straightforward and varies among cooperatives. The findings highlight the complex and diverse landscape of cooperative engagement with circular economy principles.

Based on the results of the survey and the hypotheses evaluated, here are some recommendations for cooperatives in the Republic of Moldova, given in the following table:

Guidelines for Enhancing Circular Economy Engagement in Cooperatives

1. Fostering Circular Economy Awareness
<ul style="list-style-type: none">• Prioritization of circular economy education and training for cooperative members and employees to increase awareness of circular principles and best practices.• Collaboration with local educational institutions or circular economy experts to provide training and workshops for cooperative staff.
2. Assessing and Optimization of Waste Management
<ul style="list-style-type: none">• Evaluation of the current waste management practices within the cooperative, focusing on areas like waste sorting, recycling, and collection of returnable packaging.• Developing clear waste management strategies and providing necessary infrastructure for efficient waste sorting and recycling.• Exploring opportunities for partnerships with waste collectors or recycling companies to streamline the waste management process.
3. Enhancing Resource Efficiency:

<ul style="list-style-type: none"> Implementing resource-efficient practices within the cooperative's operations, such as reducing waste, reusing materials, and optimizing resource use. Considering adopting circular business models that align with the cooperative's sector, such as product leasing, remanufacturing, or extended product life cycles.
4. Developing Sustainability Strategies:
<ul style="list-style-type: none"> Defining long-term sustainability objectives and strategies for the cooperative that incorporate circular economy principles. Ensuring that these strategies are aligned with the cooperative's goals and mission, reflecting its commitment to environmental responsibility.
5. Promoting Collaboration and Partnerships:
<ul style="list-style-type: none"> Collaboration with other cooperatives, NGOs, local authorities, and organizations to share knowledge and resources related to the circular economy. Engaging with circular economy experts or consultants who can provide guidance on the best practices for adopting circular principles.
6. Considering Tailored Approaches:
<ul style="list-style-type: none"> Recognizing that different factors, such as cooperative size, sector, and location, can influence the level of participation in the circular economy. Tailoring circular economy initiatives to suit the specific context and needs of the cooperative, considering these factors.
7. Monitoring and Evaluating the Progress:
<ul style="list-style-type: none"> Continuously monitor of the progress of circular economy initiatives and their impact on the cooperative's sustainability and environmental responsibility. Use of key performance indicators and metrics to measure the success of circular economy practices.
8. Search of the Financial Resources and Support:
<ul style="list-style-type: none"> Exploring opportunities for accessing funding or grants that support circular economy initiatives and sustainability efforts. Looking for government programs or initiatives that provide financial assistance for circular economy projects.
9. Advocate for Circular Economy Policies:
<ul style="list-style-type: none"> Engaging in advocacy efforts to promote policies and regulations that support the circular economy at the local, regional, or national levels. Collaboration with other cooperatives and stakeholders to collectively advocate for circular economy-friendly policies.

Source: elaborated by authors

These recommendations aim to help cooperatives in the Republic of Moldova enhance their engagement with the circular economy, develop sustainable practices, and contribute to the well-being of their communities while reducing their environmental impact. It's important for cooperatives to adapt these recommendations based on their unique circumstances and objectives.

5. CONCLUSION

This survey provides valuable insights into the current landscape of cooperative and enterprise engagement with the principles of the circular economy. It reveals a dynamic mix of awareness, adoption, and the many challenges encountered on the journey towards circularity.

Firstly, the survey underscores the growing recognition of the circular economy as a crucial pathway to sustainable development. Respondents express not only a familiarity with the concept but also a resounding endorsement of the urgency to transition from

linear models towards the circular. A diverse range of cooperatives from different regions across the country contributed to this survey, resulting in a representative sample that bolsters the credibility of the findings. The inclusion of both rural and urban cooperatives ensures a comprehensive analysis of the cooperative sector's stance on the circular economy.

Furthermore, the survey highlights the longevity and rich history of some cooperatives, dating back to as early as 1948. These organizations' enduring presence signifies an accumulation of valuable experience and knowledge, instilling trust and confidence in the responses gathered.

A noteworthy observation is the percentage of cooperatives predominantly focused on retail, purchasing, and manufacturing, indicating the diversified roles these entities undertake within the national economy.

The heart of the survey delves into the extent to which cooperatives incorporate circular principles into their daily operations. These insights reveal a substantial gap in waste sorting and the challenges associated with waste management infrastructure. There is a clear need for improved practices, infrastructural development, and waste management capacity.

Regarding the adoption of circular practices in cooperative activities, the survey identifies a significant opportunity for enhancement in various aspects. While some entities are already engaged in the collection and recycling of returnable packaging or recyclable materials, there is a substantial proportion that has not yet embraced these practices. Encouragingly, there is a recognition of the potential benefits in terms of reduced environmental impact and the creation of a more sustainable system.

Despite the positive inclinations towards circularity, there are notable barriers faced by cooperatives. These range from financial constraints to challenges in technological solutions, as well as a lack of knowledge, competent staff, and training. High costs associated with transitioning to circular models and resistance to departing from linear economic paradigms present additional hurdles that need to be overcome.

In terms of their supply chains, a majority of cooperatives acknowledge the need for improvements to align with circular principles. This revelation underlines the significance of strategic planning and implementation in optimizing material flows, recycling, and promoting circular practices within supply chains.

In conclusion, the findings from this survey highlight a complex landscape in which cooperatives and enterprises navigate the path toward circularity. While there is a clear recognition of the importance of the circular economy and notable efforts to incorporate circular practices, there are also significant challenges that need to be addressed. As cooperatives and enterprises strive to balance economic, environmental, and social considerations, they are well-positioned to drive positive change within their communities and industries, contributing to a more sustainable and circular future.

REFERENCES

- Alan, A., et al. (2015), Heavy-Duty Vehicle Platooning for Sustainable Freight Transportation: A Cooperative Method to Enhance Safety and Efficiency, *IEEE Control Systems Magazine* Volume: 35, Issue: 6, December 2015, DOI: 10.1109/MCS.2015.2471046
- Calvo-Porrà, C., Levy-Manguin, J.P., (2020), The Circular Economy Business Model: Examining Consumers' Acceptance of Recycled Goods, *Adm. Sci.* 2020, 10(2), 28; DOI: <https://doi.org/10.3390/admsci10020028>
- Eurocoop, (2018), Circular economy and consumer co-operatives: a magnificent pair. https://www.eurocoop.coop/uploads/2018.01.18_Circular%20Economy%20%26%20Consumer%20Co-operatives_SPWG.pdf, (Accessed: 16.09.2023)
- Hammond, Darrell & Luiz, John. (2016). The co-operative model as a means of stakeholder management: An exploratory qualitative analysis. *South African Journal of Economic and Management Sciences.* 19. 630-646. DOI: 10.17159/2222-3436/2016/v19n4a11
- ILO. Cooperatives and the Sustainable Development Goals. A Contribution to the Post-2015 Development Debate. Available on: <https://sustainabledevelopment.un.org/content/documents/1247ilo.pdf> (Accessed: 02.08.2023)
- International Co-operative Alliance, (1988), Role of government in promoting cooperative development in Asia, https://labordoc.ilo.org/discovery/fulldisplay?vid=41ILO_INST:41ILO_V1&search_scope=MyInst_and_CI&tab=Everything&docid=alma992725473402676&lang=en&context=L&adaptor=Local%20Search%20Engine&query=creator,exact,International%20Co-operative%20Alliance.,AND&mode=advanced&facet=creator,exact,International%20Co-operative%20Alliance, (Accessed: 16.09.2023).
- Karimoto, A., (2020), Consumer cooperatives' model in Japan, DOI: <https://doi.org/10.1016/B978-0-12-816666-6.00021-5>
- Majee, W., Hoyt, A. (2011), Cooperatives and Community Development: A Perspective on the Use of Cooperatives in Development, *Journal of Community Practice*, 19:1, 48-61, DOI: 10.1080/10705422.2011.550260
- Management, and Reduction of Waste within a Fruit and Vegetables Supply Chain. *Sustainability* 2020, 12(7), 3050, DOI: <https://doi.org/10.3390/su12073050>

Navkovic, S., Pusa,A., Miner, K. (2022), Co-operative identity and the dual nature: From paradox to complementarities. ScienceDirect Volume 10, Issue 1/2022 100162, DOI: <https://doi.org/10.1016/j.jcom.2021.100162>

Pellegrini, G. et al. (2020), What Are the Conflicting Tensions in an Italian Cooperative and How Do Members Manage Them? Business Goals', Integrated

Sutton-Brady, Catherine & Raswant, Arpit. (2016). Organic Cooperatives Facilitating Sustainable Consumption, DOI: 10.4018/978-1-5225-0440-5.ch005

Wahn, I. (2023), The moralities of consumption and interactions among consumer cooperatives in East Asia, Journal of Rural Studies, Vol. 100, May 2023, 103018, DOI: <https://doi.org/10.1016/j.jrurstud.2023.103018>

Ziegler, R et al. (2023), Circular Economy and Cooperatives – An Exploratory Survey, Sustainability 2023, 15(3), 2530, DOI: <https://doi.org/10.3390/su15032530>

Green Fiscal Policies in Sustainability of Green Economy

Melih Kabayel¹, Emine Kabayel².

Abstract

Introduction: Green fiscal policies are one of the sustainable public instruments available to the public sector to combat climate change. Because in the end, just as the global climate crisis has economic costs, green transformation will have fiscal repercussions. Green transformation will accelerate effectively, especially when the expenditure and revenue policies to be realized by the public sector are designed on the axis of green transformation-oriented sustainable economy. However, this is not as easy as it seems. With the public sector shaping its fiscal policies with a focus on green transformation, the transformation of the classical economic order towards a green economy will be encouraged. With the public sector's green economy-oriented sustainable fiscal policies, the private sector's investments and savings can also be directed in this direction. **Aim:** The aim of the study is to emphasize the importance of green fiscal policies for a sustainable green economy.

Method: Literature review method was used in the study. In the light of the studies in the literature, the study was prepared in order to increase the effectiveness of green fiscal policies.

Findings: Green economic transformation cannot be realized spontaneously/voluntarily by the private sector and its investments alone. Therefore, the use of fiscal policy instruments for green transformation, both due to their share in the economy and their ability to guide/incentivize, brings about a truly sustainable fiscal and economic transformation.

Originality and value: This study contributes to the relationship between green economic transformation and green fiscal policies. It constitutes a scientific value as a resource for researchers.

Key Words: Public Finance, green economy, sustainability, green fiscal policy, global climate crisis, pollution, tax incentives, public revenue, public expenditure, budget, environmental taxes.

Jel Codes: H10, H20, H30, ,Q01, Q50

1. INTRODUCTION

Green economic transformation is one of the main actors in the fight against the global climate crisis. Namely, if green economic transformation is achieved, the environmental, economic, social and financial negative externalities that cause the global climate crisis can be significantly reduced/ internalised. However, green economic transformation is a process that requires cost and time to be realised within the classical economic model. Namely, if green economic transformation is achieved, the environmental, economic, social and financial negative externalities that cause the

¹ Dr, Izmir Chamber of Certified Public Accountants and Financial Advisors Training and Research Institute, Turkiye.

² MD, Revenue Administration, Turkiye.

global climate crisis can be significantly reduced/ internalised. Although the private sector acts rationally, it does not act socially ethically. In fact, this situation is a market failure and requires public intervention. Therefore, green fiscal policies can encourage moderate green economic transformation.

2. LITERATURE REVIEW

In this study, the literature review method is chosen and the theoretical-practical background of green fiscal policy is evaluated in the light of existing studies. The framework is organized under three main headings.

2.1. Green Economy

There is no internationally recognised definition of green economy. UNEP has defined the green economy as "an economy that increases human well-being and social equity while significantly reducing environmental risks and ecological scarcities". Green economy is a low-carbon, resource-efficient and socially inclusive concept (UNEP, 2011). Another definition for the green economy presented by the Green Economy Coalition defines it as "a resilient economy that provides a better quality of life for everyone within the ecological limits of the planet and the environment" (UN, 2023). It is defined by UNECE (2023) as "The green economy is a tool to support the achievement of sustainable development through a comprehensive policy agenda and an emphasis on the harmonisation of economic objectives with social and environmental objectives."

Green Economy is an approach to policy formulation and evaluation that enables sustainable development more effectively. It aims to integrate social, economic and environmental considerations to increase policy coherence. As a result, it aims to improve the performance of the country as a whole rather than focusing on sectoral performance. The green economy aims to achieve this goal (Georgia Ministries, 2022):

- by increasing efficiency (e.g. in buildings and the manufacturing sector),
- It is achieved by reducing the impact of human activities on the environment (e.g. by reducing water and air pollution, reducing waste and recycling)

A green economy should consider policies that promote resource and energy efficiency, carbon and emission reduction, technological innovation and environmental protection, while supporting poverty reduction, human well-being and job creation (UNDESA, 2012).

Objectives of the green economy (ILO, 2022);

- Creating an ecologically sustainable economy,
- To ensure sustainable use and utilisation of natural resources,
- Promote low carbon emissions,
- Ensuring low carbon development,
- Strengthening environmental governance,
- To ensure energy efficiency,
- To ensure social justice,
- to create decent jobs,

- improvement in the living conditions of disadvantaged populations.

The green economy takes a long-term view, focussing on the ways in which resources are used to deliver value to society. It is not only about low-carbon fuel sources, but also about how the efficiency and sufficiency of resources can be promoted to create wealth, resilience and prosperity for the citizens of today and tomorrow, while respecting the ecological limits of our planet. From welfare investments to sustainable practices, the characteristics of a green economy are inclusive and non-discriminatory. It is a model that guarantees a significant reduction in environmental risks and resource scarcity while increasing well-being (Enelx, 2023).

There are methods in practice to implement measures that may fall within the scope of the green economy concept. Apart from environmental regulations and standards, a variety of methods are available, including certification schemes, integrated natural resource management, environmental financial reform, sustainable practices and financial and economic instruments to promote investments. UNDESA (2012) states that streamlining the scope of incentives, incentives for sustainable infrastructure and facilitation of natural resource investments are within the scope of the policy framework. OECD (2011) envisages the implementation of instruments through a two-pillar policy framework: “(i) framework conditions that mutually reinforce economic growth and natural capital conservation; and (ii) policies aimed at promoting the efficient use of natural resources and making pollution more expensive”. There is no "one-size-fits-all" prescription for a green growth-oriented strategy and it needs to be shaped according to countries' political preferences.

The World Bank (2011) emphasizes that “green growth is best achieved through a combination of policy instruments, including price-based policies, norms and regulations, public production and direct investment, knowledge creation and dissemination, education and moral suasion, and industrial and innovation policies”. Similarly, UNEP (2011) emphasizes that government investment and spending should be prioritized, government investment should be limited despite natural capital erosion, tax and market-oriented instruments should be used in harmony to encourage green investment and innovation, and investments in capacity and education and training should be increased.

TOOLS	SUBTOOLS
Internalising (externalities)	<p><i>“1. Taxes, fees, charges, levies on 'bad things' (e.g. pollution, resource use or agency)”</i></p> <p><i>“2. Green trade authorisation or certification systems”</i></p>
Incentivising	<p><i>“3. Investment incentives - low interest loans; micro-financing; tax exemptions, etc”.</i></p> <p><i>“4. Subsidies, tariff guarantees and other direct support for 'goods'”</i></p> <p><i>“5. Eliminate policy-induced distortions and perverse incentives (e.g. harmful subsidies)”</i></p> <p><i>“6. Leveraging finance - PPPs, long-term guarantees, phased support, removal of barriers to FDI, lower administrative burden, loan guarantees”</i></p>
Institutions	<p><i>“7. Regulations - norms, standards, information disclosure, labelling, prohibitions, penalties and sanctions, mandatory Targets”</i></p> <p><i>“8. Property rights and right of access laws, including intellectual property rights”</i></p> <p><i>“9. Governance and institutional capacities - accountability, transparency, enforcement, anti-corruption”</i></p> <p><i>“10. Integrated planning, decision making and resource management - EIA/SEA, IWRM, ICZM, LCA, MCA/CBA, disaster preparedness, other diagnostic tools”</i></p>
Investment	<p><i>“11. Sustainable public procurement”</i></p> <p><i>“12. Investment in natural capital - PES, protected areas, direct management and rehabilitation”</i></p> <p><i>“13. Investment in sustainable Agriculture”</i></p> <p><i>“14. Investment in human capital - capacity building, training, Skills”</i></p>

	<p><i>“15. Investment in infrastructure - energy, water, transport, waste, ICT”</i></p> <p><i>“16. Investment in innovation - R&D, distribution, knowledge sharing”</i></p>
Information	<p><i>“17. Voluntary approaches - information provision, labelling, CSR, targets, agreements, training initiatives”</i></p> <p><i>“18. Measuring progress - green accounting, green targets and indicators, carbon inventories”</i></p>
Inclusion	<p><i>“19. Labour market policies - skills (re)training, job search assistance, income support and social assistance”</i></p> <p><i>“20. Social protection floors - unemployment insurance and pensions, cash transfers, compensation for price increases, health care”</i></p>

Figure 1. Tools of Green Economy.

Source: UNDESA, 2012.

A wide range of tools are available to achieve green economic transformation. With the use of these tools, the green economic transformation can be accelerated effectively, and which political tools and instruments to use depends on the preference of governments.

2.2. The Relationship Between Green Economy and Sustainability

The transition to an inclusive green economy is based on the economic and social restructuring of sustainable lifestyles from production to consumption, from investment to employment. Especially when considered in terms of employment, green economic transformation will create new green jobs without compromising existing employment and will lead to a significant reduction in carbon emissions, waste and other forms of pollution (EU, 2023).

The green economy is important for ensuring a green economy. In this context, Green Growth can be said to be a concept that drives green economic transformation, meaning promoting economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being depends (OECD, 2023).

Green growth aims to promote a sustainable, green economic structure by stimulating investment and innovation. For green growth to be an effective tool for sustainable development, it needs to support good governance, transparency and equity (Green Policy Platform, 2023).

Decoupling economic growth from environmental degradation is enshrined in the UN Sustainable Development Goals (Goal 8 of the SDGs). In 2015, countries around the world adopted the 2030 Agenda for Sustainable Development and 17 Sustainable Development Goals. These goals recognize that ending poverty in the world must go hand in hand with strategies that build economic growth; address a range of social needs such as education, health, social protection and job creation; and address the problems of environmental pollution and climate change. This relationship is important because of economic and ecological causality. Establishing this relationship reinforces the goals adopted to achieve green economic transformation (Söderholm, 2020).

Sustainable development is the overarching principle underpinning green growth initiatives to improve environmental sustainability while achieving higher economic growth and increasing the country's resilience to climate change and disasters. Green growth will continue to be pursued to achieve a resilient, low-carbon and resource efficient economy.

Investments should be oriented towards green growth-oriented investments to protect natural resources for current and future generations, reduce greenhouse gas emissions and improve environmental quality for better well-being. Good governance is key to tackling the climate crisis and plays an important role in solving the problems. In this context, more effective governance can be achieved by harmonizing policies and legislation. This increase in activity will lead to positive social impacts.

Social impacts of a sustainable green economic model;

- With the reduction of externalities, it can be said that with the green transformation of the economy, the effects of negative economic externalities on society will decrease.
- With the green economy, with the efficient use of natural resources and making them sustainable, the income sources of individuals will be completely eliminated from the danger of extinction,
- With green transformation, it can be said that health costs on society and ultimately on individuals will decrease as a result of not polluting the environment (atmosphere, etc.). A healthier society will develop faster and the efficiency that can be obtained from the population can be maximised.
- With the elimination of environmental negative externalities, population movements (migration, etc.) will change, unnecessary overgrowth of cities and regional development differences can be prevented.
- With the transition to a green economy, employment can be increased through incentives for the creation of green jobs.

2.3. Green Fiscal Policy

Green fiscal policies can support the various Sustainable Development Goals (SDGs) and the Paris Climate Agreement by internalizing externalities, enabling environmentally focused public spending, increasing revenues, creating fiscal space for green investment, and paving the way for much broader fiscal reforms (UNEP, 2023).

Green fiscal policy uses fiscal policy instruments to address environmental challenges such as global warming, pollution, waste, biodiversity conservation, overfishing, etc. (GFPN, 2023). Green fiscal policies can accelerate a green economic transformation that aligns fiscal and budgetary policy with sustainable development priorities. In this context, the objectives of green fiscal policy (GFPN, 2023):

- “To encourage the development and use of green technologies”,
- “Discourage the use of polluting technologies”,
- “Reduce the use of fossil fuels”,
- “To ensure the development of green infrastructure”,
- “To ensure efficiency in green-oriented resource allocation”,
- “To ensure fairness in income distribution”,
- “To ensure green-oriented growth”.

Fiscal instruments are needed to achieve these objectives. In the report prepared by INTOSAI (2016), green fiscal instruments are listed as follows;

- “environmental taxes, levies and subsidies, including energy taxes and subsidies (e.g. for renewable energy or fossil fuels)”;
- “fiscal policies or reforms to increase public revenues (including, for example, the 'EU plastic equity' in force since 2021, which consists of national contributions based on the amount of non-recyclable plastic packaging waste)”;
- “fiscal incentives and financial mechanisms that can strengthen private finance for green investments, including the issuance of green bonds that are supposed to finance projects with positive environmental and climate impacts”;
- “the promotion of sustainable finance through a common categorisation system (e.g. EU taxonomy) that identifies what is eligible for environmentally sustainable activities”;
- “aligning government spending with environmental objectives and increasing the efficiency of public spending or mainstreaming climate in the public budget”;
- “Propose legislation on energy, plastics, pollution, soil, etc. to incentivise green investments”;
- “Emissions trading system.”

Public Revenues	Public Expenditures	Public Debt	Budget
<ul style="list-style-type: none"> • Carbon Tax • Environmental taxes • Carbon Pricing etc. 	<ul style="list-style-type: none"> • Green Subsidies • Green Public Procurement • Green infrastructure investments etc. 	<ul style="list-style-type: none"> • Green Bonds • Green Finance etc. 	<ul style="list-style-type: none"> • Green expenditure audit • Climate budget labelling etc.

Figure 2. Green Fiscal Policy Tools

The effects of green fiscal policy (GFPN, 2023);

- “Environmental taxes and fees smooth price signals and help shift consumer and business behaviour towards more sustainable models.”
- “Budget reforms align government spending with environmental objectives and improve the efficiency of public spending.”
- “Fiscal incentives for green financial mechanisms can strengthen private finance for green investment.”
- “Fiscal policies also increase public revenues that can be used for green investment, broader fiscal reform or other priorities such as health and education.”

Green fiscal policy has an interdisciplinary impact and can positively impact economic fiscal and social impacts. The use of fiscal policy tools for various purposes can achieve political effectiveness. In this context, together with the implementation of green fiscal policies:

- Reducing the use of fossil fuels,
- Reduction of carbon emissions,
- Acceleration of transition to sustainable resources through green incentives,
- Creating green jobs and increasing employment,
- Increasing energy efficiency,
- Accelerating the transition to green production and consumption methods for green economic transformation through green public procurement,
- Making green digital transformation investments to eliminate physical costs.

Increasing fossil fuel subsidies while environmental taxes are in place,
The use of fossil fuels by consumers is taxed, while the use of fossil fuels by industry for electricity generation benefits from tax relief,
Tax fossil fuelled vehicles at a higher rate than electric or hybrid vehicles,
While fossil fuels used by vehicles are taxed at a high rate, the fuel costs of high carbon emitting vehicles such as aircraft, ships, etc. are taxed at a low rate,
While tax incentives are applied to sectors with high carbon emissions, the agricultural sector is not given sufficient incentives.

*Figure 3. Harmonisation Of Fiscal Policies Towards A Sustainable Green Economy:
Example harmonisation errors*

Fiscal policy has various tools. These tools must be in political harmony with each other. Otherwise, it cannot be expected that the tax collected will internalize externalities or the public expenditure will sufficiently support the green economic transformation. Therefore, under the guidance of governments and international organizations, the line between financial and non-financial objectives must be maintained in practice (Yan et al., 2023).

3. CONCLUSION

The green economy does not simply reduce the impact of production and consumption on the environment. The green economy is based on the concepts of green growth-development with a focus on environmentally compatible economic growth and development. The green economy is an environmentally-oriented circular economic system that targets environmental goals (primary objective) and increases welfare and social benefits (secondary objective).

Green economic transformation is achieved through green economic policy and instruments. Among these instruments, green fiscal policy, which includes fiscal instruments, has the political power to accelerate green economic transformation and even has a multiplier coefficient. However, green fiscal policy should be implemented in a way to fully cover the green economy and policy harmonisation should be efficient and effective. Otherwise, implementations may neutralise each other and lead to a lack of policy effectiveness or even inefficiency.

REFERENCES

- EnelX (2023). What is green economy? Definition and meaning. <https://corporate.enelx.com/en/question-and-answers/what-is-green-economy>. (Accessed: 10.11.2023).
- EU (2023). Inclusive Green Economy. file:///C:/Users/HP/Downloads/inclusive-green-economy%20(1).pdf.
- Green Policy Platform (2023). Explore Green Growth. <https://www.greenpolicyplatform.org/page/explore-green-growth>. (Accessed: 15.11.2023).
- ILO (2022). How to work in the green economy?. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_856666.pdf.
- INTOSAI (2016). "Market Based Instruments for Environmental Protection and Management". The Audit Board of The Republic of Indonesia.
- Ministry of Economy and sustainable development of Georgia (2022). "Green Economy Policy and Strategy."
- OECD (2011). Towards Green Growth, OECD Publishing. <https://doi.org/10.1787/9789264111318-en>.
- OECD. (2023). Green growth and taxation. <https://www.oecd.org/greengrowth/greengrowthandtaxation.htm>. (Accessed: 17.11.2023).
- Söderholm, P. (2020). "The green economy transition: the challenges of technological change for sustainability." Sustainable Earth, 6(20). <https://www.arup.com/perspectives/a-new-understanding-of-the-green-economy>.
- UN (2023). Green Economy. <https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-economy#:~:text=In%20a%20green%20economy%2C%20growth,of%20biodiversity%20and%20ecosystem%20services>. (Accessed: 12.11.2023).
- UNDESA (2012). "A guidebook to the Green Economy Issue 3: exploring green economy policies and international experience with national strategies." UN.
- UNECE (2023). Green Economy. <https://unece.org/green-economy-3>. (Accessed: 19.11.2023).
- UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers, www.unep.org/greeneconomy.
- UNEP (2023). Green Economy. <https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-economy#:~:text=In%20a%20green%20economy%2C%20growth,of%20biodiversity%20and%20ecosystem%20services..> (Accessed: 09.11.2023).
- Yan, H., Qamruzzaman, Md., & Kor, S. (2023). Nexus between Green Investment, Fiscal Policy, Environmental Tax, Energy Price, Natural Resources, and Clean

Energy—A Step towards Sustainable Development by Fostering Clean Energy
Inclusion. Sustainability, 15(18), 13591. MDPI AG. Retrieved from
<http://dx.doi.org/10.3390/su151813591>

World Bank (2011). From Growth to Green Growth: A Framework.

A look at the Financial World in a Metaverse Version

Popa Marina¹, Plămădeală Olivia²

Abstract

Introduction: The role of Virtual Reality (VR) and Augmented Reality (AR) grows in our daily life and have a huge impact on development of multiple sectors as Finance sector or Economic one.

Aim: The purpose of this research was to analyse the last trends of digitalization and to describe main changes of Finance sector, because of such innovative technologies as Metaverse.

Method: We use a lot of information from IT companies web-pages to write an article based on actual innovations in banking. Also, this paper mentions some databases and statistical information for a better description of a situation. By listing of some advantages and disadvantages of using Meta technology in finance world we try to familiarize the readers with the vitality of digitalization for future development of this sector.

Findings: Numerous studies demonstrate the necessity of using the Metaverse for a sustainable management of banking and finance sectors. Moreover, it is connected with a successful interaction between people and financial services in daily life. The research demonstrates that VR can tackle that goal and make the human interaction with different banking services safer and more accessible.

Originality and value: Throughout its evolution humanity has always accelerated all economic processes. To maintain the economic momentum our society has to use new innovations, but with caution.

Key Words: Metaverse, Finance, Banking sector, Economic Development, Digitalization, Virtual Reality.

Jel Codes: G14, O31, O33.

1. INTRODUCTION

Actual we are leaving in a vibrant world. Daily happen a thousand of events which are the parts of other numerous processes. People live between a real and a virtual Meta life. The phenomenon of globalization interconnects all the processes and digitalization is one of them. People are used to be involved in many activities at the same time. Needed to mention that this fact helps us to be more flexible, adaptive and to manage our goals more efficiently. Digitalization and VR are presented in each house, company or mind.

A Metaverse technology is presented in different sectors such as: finance, trade, economy, health. The Metaverse helps us to transfer real-world problems into a virtual

¹ PhD. Assoc. prof., Academy of Economic Studies of Moldova, Faculty of International Economic Relations, Department of International Business, Republic of Moldova

² Master Student, Johannes Kepler University, Faculty of Economic and Business Analytics, Austria

world, to tackle them, to execute and to simulate each idea for moving it back into the reality, mentioned O'Donnell (2023) mentioned the Koerte's (2022) point of view. Moreover, this allows us to manage a lot of things on the same time. So, we deal with our objectives better and in an innovative way.

Paramount is that if we introduce the Metaverse in finance it will increase the number of transactions, services, payments and will develop the global market faster. Numerous people are the part of that multi-billion-dollar-technology market. Bloomberg (2022) estimates the transactions with Metaverse could be much more as 800 billion dollars by 2024.

2. LITERATURE REVIEW

Phalen (2020) considered that after the increased number of frequency and sophistication of cyberattacks in 2015 on the financial sector were launched industry-led initiatives. Their aim was to protect financial institutions, customers and public in the USA financial system.

After the Covid-19 the use of digital technologies, especially in financial services, have been increased. It provides not only the benefits for the economy, but for routine life of each of us. The development in regulatory initiatives supports a digital economy and cashless society. The impact of pandemic-driven digitalization on our daily life have led to an increase of the FinTech's number regionally was mentioned by Alex Rolfe (2022).

Robertson mentioned, in BAI Banking Outlook research (2020), that a half of consumers use digital product more since the Covid-19, and 87% of them were planning to continue this increased usage after the Covid's period.

O'Donnell (2023) mentioned the point of view of VedBrat who said that the capabilities that we are bringing along with things like AI, VR or the Metaverse make easier to work with more complex technologies through ordinary interaction. Moreover, it is connected with business, financial or banking ecosystem interoperability, leading all the data and statistics to be used at the same time in different areas.

Bakthavatcham (2023) argued that digital asset of financial sector has a potential for growth during the next decade, led by developments of central bank digital currencies, Metaverse and tokenization. New technologies can attract more customers interested in the rapidity and efficiency of financial market.

Virtual reality for banking and financial sectors is not something new, but Metaverse can change the concept of the financial services use in an online economy, virtual economy. Wheatley (2023) considers that the Metaverses in BFS will change the way banks engage with customers, offer new products and services and enable some new marketplaces.

2.1. The Metaverse potential in the finance market

The Metaverse is a new virtual World where people can cooperate, interact with each other in real time, being wherever they would like. The idea of Meta technology exists

a lot of years, but with the evolution of digitalization it is becoming more sustainable now. The use of Metaverse can revolutionize the way we interact in our daily life, especially it can emphasise our economic, financial, trade, health and business possibilities.

The growing demand for digitalization solutions involved in different sectors stimulates the growth of the Metaverse in financial World too. The global financial market becomes more and more decentralized as a result of its robotization.

A Metaverse is a digital economy with immersive experience created by the convergence of AR, VR, MR, 5G, AI, Internet, cloud computing and other technologies. (Wheatley and Bakthavatchalam (2023) in ISG (2023)).

How Metaverse can revolutionize financial market? It is not very hard to answer.

First of all, we have to understand that Meta world is based on 3 concepts such as: VR, Web3 and Digital Identity.

- Virtual reality it's like a world where all the things are connected. Furthermore, if we use this concept in the Metaverse it is as a navigable fundament for business. A Virtual world might be a place where the things can be visualized, but it is quite different for being associated with our reality. VR it is a world where people can buy different things that do not exist in the reality, from other users that do not own these things in our real world. So, there is no real economy in such kind of world.
- Web 3. That concept is divided in some main components. First of all, it is about token, which means cryptocurrency. Token has a potential to make decentralized exchanges possible for selling different items. Also, tokens can be traded like any other cryptocurrency. Paramount is that tokens can change virtual world to one where you can sell and buy real things too. Actually, there are 2 types of tokens: fungible, which can be associated with a real money, and non-fungible as a property. So, it is possible to move your real property in a virtual world and do different transaction which create a real economy. With help of DeFi we are allowed to transact numerous types of tokens and create a condition for real market. In such way the Metaverse is not just virtual fundament for our world, but it becomes a virtual world with real property. Needed to say that it becomes a part of a global economy, because of the monetary transactions and the use of other financial services.
- Digital Identity. This concept is not so developed now, but with the increased use of the Metaverse appear more and more strategies connected with it. Here we really need a bank support as a regulated financial institution which is able to manage identities and reputations.

With all of that concepts we can have the real market, a part from the economy. In our future this market will become an open space for each interested costumer, but it creates a necessity for a new financial strategy and more investment flows in the Metaverse.

2.2. The Finance World in development through Metaverse

Wheatley (2023) predicted that in 2023 Financial institutions will develop new digital products, banking will continue to grow, to overcoming some problems. Global regulations will create more democratic legislation for cryptocurrency transactions. For growing up their services banks have to invest more in digitalization. In such way, Metaverse becomes one of vital tech solutions which can scale up banking and financial sector.

With the help of the Metaverse, financial institutions will:

- *Redefine customer's experience.* With VR and AR financial world will offer to its customers an immersive experience. It will be possible to perform financial function through your personal, unique avatar.
- *Improve engagement.* Virtual banks from the Metaverse allows customers to make transaction and to use services in an online financial world. As a result, digital technology expands marketing and branding through personalized experience.
- *Better understand customer's needs.* It is possible to expend financial services and to make them unique for each costumer. In time when costumers will characterize their selves, they will mention their needs and objectives. So, it will be easier to put each costumer on better defined niche.
- *Extend the innovation.* With the Metaverse it is easier to introduce new services in a financial world. The experience of improving innovation rate can be based on better understanding of customer's needs and on involving new technology in banking sector.

2.3. A Use of the Metaverse in Financial World

It is very hard to estimate a business potential of the Metaverse in each sector, especially in such important one as Finance. The use of the Metaverse in Financial World is a relatively new concept and we can only predict the impact of such innovative idea on this sector.

The Metaverse can offer several opportunities for banking sector like new costumer's flow, bigger revenue or an improvement of the efficiency of all financial services. However, the potential of the Metaverse can be tackled only through ensuring security in digitalization, through maintaining peace with rapid technological process or through managing carefully personal data in VR.

All in all, the Metaverse is steel a new vision on how our world can be in the future. We cannot neglect the fact that its impact it's hard to predict, but it's possible to list some strengths and weaknesses of this technology in Finance.

The Opportunities are:

- *New revenue.* With a help of selling new goods or services, connected with game industry or crypto, an economy will grow, because of new transactions on the market.

- *Increasing the costumer's flow.* Metaverse creates a world where all people can use banking services in a more personalized way. This leads to an increase of costumer's loyalty for the brand they are using know.
- *Creating of a scale economy.* Needed to point that VR and AI can create new financial opportunities. So, will be possible to spend less time when it is necessary to interact with a financial institution. Also, it will improve financial inclusion through an access to Virtual reality and digital money.

The weaknesses are:

- *Security.* It is essential to understand that the Metaverse is a new technology and the banking sectors is extremely important for a strong economy. Paramount is that the Metaverse must be regulated through a strong rule of law. Financial institutions will need to perform their regulations, to protect their costumers against fraud and to keep safer their personal data.
- *Flexibility with innovative flow.* Metaverse has a high growth perspective. So, a financial world should stay competitive with all new things which can more or less influence their business. Moreover, it is crucial to select from an extremely big flow of innovations only these which are safe for your business.

2.4. The World reaction on the Metaverse

Table 1: Countries with the largest digital populations in the world (January 2023)

Country	Number of users (mln.)
China	1,050
India	692
USA	311,3
Indonesia	212,9
Brazil	181,8

Source: Statista,

<https://www.statista.com/statistics/262966/number-of-internet-users-in-selected-countries/>

Data from the Table 1, related to the largest digital population in the world, show a number of people who use internet. As of January 2023, China has the heist rank among other countries with the biggest number of internet users worldwide. Also, in 2022 China has the biggest population, being the first country with the heist demography. On the second position is India, and on the third position is the USA. We cannot neglect that these countries have a developed infrastructure which increases internet potential too.

Table 2: The projects the companies invest in the metaverse

Project's name	Investments
Cryptocurrencies	53%
NFT	44%
Work environment and remote work	40%
Branding	30%
Buying of products	27%

Source: Statista,

<https://www.statista.com/statistics/1302200/metaverse-project-investment-businesses/>

According to the statistics from the table 2, based on the research of Statista Group, a survey of companies which have already invest in the Metaverse, 53% of companies invested in Cryptocurrencies. Also 44% of investments were invested in NFT and 40% in working environment. With help of this data statistic, we can understand that a lot of businesses have a huge interest in developing the Metaverse in finance.

Table 3: Leading business sector that have invested in the metaverse (March 2022)

Sector's name	Investments
Computer and IT	17%
Education	12%
Finance	11%
Marketing, advertising	10%
Medical, health	9%

Source: Statista

<https://www.statista.com/statistics/1302091/global-business-sectors-investing-in-the-metaverse/>

According to the statistics from the table 3, based on the research of Statista Group, a survey of the leading business sectors where the companies invest in the Metaverse, 17% of them invest in IT. Also, 12% of monetary flows were invested in Education and 11% in Finance. So, we understand that the most vital for a company development are Technologies, Education and Finance. Also, these are improved through the use of VR and AI. Furthermore, these 3 sectors are crucial for increasing a business profitability.

At the same time, Statista Group estimated that in 2026 around 25% of people worldwide will spend at least 1 hour per day in Virtual Reality for managing their working tasks, shopping or their education. Additionally, almost 30% of all the businesses from the world are projected to launch their products and services in the Metaverse.

3. RESEARCH METHODOLOGY

Objective of this paper is to study an impact of the Metaverses on Finance. We are focused on identification of some strengths and weaknesses of using VR and AR in banking. The study mainly shows the effectiveness of innovations and digitalization using a MCKinsey methodology from the Quarterly Report “The case for digital reinvention” (2017).

3.1. Research Model

The model listed the most preferable sectors by companies in which they invest for digital development of the business. These investments have a direct impact on the growth of a firm’s EBIT and revenue. Figure 1 shows the diagram of the research model.

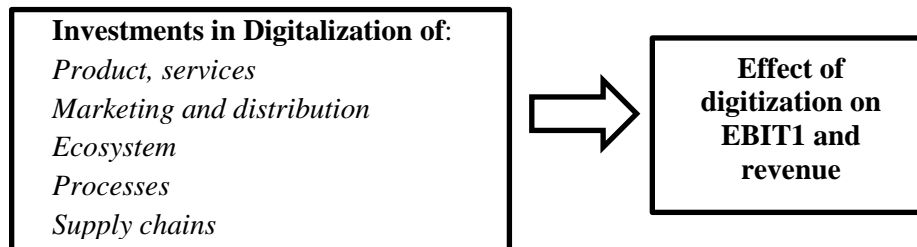


Figure 1. Research Model

3.2. Explanation of the process

So, in our research, based on MCKinsey model, are listed 5 sectors in which companies are the most interested to invest. Each of these sectors has a different amount of money. So, the investment’s power is different. Some of digital initiatives generate a good return, while others don’t. The first part of this research shows the EBIT and revenue’s growth in case if in product’s sector is invested the biggest amount of money and time. The second part shows the modification of EBIT and revenue after a reallocation of investment’s flows. (Bughin, LaBerge and Mellbye (2017) in McKisney (2017)).

Also, EBIT is equal with the earnings before interest and taxes. McKisney based its model of average growth in revenue and EBIT at current and full digitization on survey respondent’s perceptions of their company’s responses to digitization, postulating causal links, and calculating their magnitude through linear technique.

3.3. Data and Results Analysis

Table number 4 shows that the biggest flow of investment was distributed in Products and service digital development, while in Supply chains were doing less investments. So, McKisney, the Quarterly Report ‘‘The case for digital reinvention’’ (2017), represented that if the average level of digitalization of the products and services is 60% the revenue growth will be -2,9% and EBIT growth will be -0,5% from the current growth trajectory, represented as 0.

Table 4: Effect of digitization on EBIT1 and revenue relative to current growth trajectory (represented as 0) % difference

Sectors	% Parameters		
	Revenue's growth	EBIT's growth	Average level of digitalization
Digitalization of: Products, services	-2,9%	-0,5%	60%
Marketing	-1,7%	-0,5%	47%
Ecosystems	0,5%	-1,1%	48%
Processes	-1%	1,2%	52%
Supply chains	-6,8%	-9,4%	43%

Source: McKisney,

<https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-case-for-digital-reinvention>

Despite the importance of the supply chain and its potential on the company's growth, a survey shows that the businesses don't heavily invest in this dimension. The biggest interest is focused on the development of products or marketing and distribution. Moreover, McKisney weighed the full level of digitalization of the company at 46%, total EBIT growth was estimated to be -10,2% and revenue at -12,0%.

Table number 5 represents the reallocation of the investment between these 5 sectors. In the second case the investments were distributed to increase a digitalisation of the Supply chain from 43% to 52%, but the average of products and services digitalisation decreases from 60% to 53%.

Also, table 5 shows the impact on the company profitability growth through a good strategy of investments in digitalization. McKisney estimates in this research that at 58% of Marketing digitalization, 53% of Products, process digitalization and 52% at supply chain digitalization the company will rise its total EBIT level at 7,3% and revenue at 11,2, increasing the level of total digitalization at 52%.

Table 5: Effect of digitization on EBIT2 and revenue relative to current growth trajectory (represented as 0) % difference

Sectors	% Parameters		
	<i>Revenue's growth</i>	<i>EBIT's growth</i>	<i>Average level of digitalization</i>
<i>Products, services</i>	3,5%	0,8%	53%
<i>Marketing</i>	2,3%	2,5%	58%
<i>Ecosystems</i>	-0,1%	-0,2%	52%
<i>Processes</i>	3,2%	1%	53%
<i>Supply chains</i>	2,3%	3,2%	52%

Source: McKisney,

<https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-case-for-digital-reinvention>

Paramount is that each investor should create a unique business strategy which will be relevant with the specific of his company, starting with company's main goals and ending with the relations between all members of an organization community. Companies respond to digitalization by significantly changing their strategies. It is crucial especially when we think about a fact that a strategy has to be relevant for business model.

4. A METAVERSE MARKET SIZE IN AUSTRIA

Daily the use of Metaverse in our life becomes higher, especially if we take into account digital development in some countries with investments interest in such technologies. So, a lot of development states invest time and finance for achieving better results in technologization, because of local costumers needs and international superiority between countries.

Austria is one of these countries, with people interested in VR and AI and with perfect infrastructure prepared for involving innovations in its environment. At the same time, Meltwater's Report "Digital 2023 Austria" (2023) provides that country's population on February 2023 was estimated at 8.95 million people and 94.2% internet users from the total population's number at mentioned time. Also, based on the report's data 94.4% of population owned a smart phone and 94.6% had any kind of mobile phone. Needed to mention that according to Meltwater's Report daily time, of an Austrian, spent with media in 2023 is around 5h 22 min. using 2 h. 33 min of internet on smart phone and 2h 49 min. on computer or tablet.

4.1. Metaverse Ecosystem

With such a huge number of people interested in digitalization and high potential Austrian Metaverse ecosystem is very diverse, having a big market structure composed from Metaverse in:

- *Education Market* - based on using a VR and AR technology in education and training. Also, it is connected with an offer of professional trainings for children, including online courses, virtual classroom, immersive simulation. According to Statista (2023) Metaverse will be used in virtual trips such as Google expedition and for offering some virtual tutoring classes, such as Classcraft.
- *Live Entertainment Market* - composed from virtual music festivals and huge theatre experience. The same will appear different art galleries, such as Museum of Fine Art. Statista (2023) mentioned that it is projected an annual growth of this market of 9.58%, resulting in a volume of 2.3m euro by 2030.
- *Advertising Market* - connected with a practise of promoting and selling products, services with help of VR. This market is composed from such products as video games, AR platforms, digital space. According to Statista (2022) it is projected that the market will have an annual growth rate of 24.77% by 2030, because of a large variety of local brands tap into Austria's tech-savvy population.
- *Digital Media Market* - refers to the use of digitalization for creating and distributing within VR ecosystem. Also, Statista (2022) had prognosed that the market will have an annual growth of 13.23% between 2023-2030 and will have a volume of 6.4m euro by 2030.
- *AR and VR Hardware Market* - refers to physical devices used to interact with VR environment. Needed to say that as an in-scope for that market is to produce an Augmented Reality Glasses and VR headsets, as Oculus.
- *Virtual Asset Market* - dedicated to a trade of digital asset within virtual worlds and platforms. It is composed from Cryptocurrencies and NFTs. According to Statista (2022) this market segment is projected to have an annual growth of 16.94%, resulting in a market volume of 40.0m euro by 2030. Also, the user's penetration, which measures the percentage of the population using crypto, will increase from 1.4% in 2023 to 1.5% by 2030.
- *Health Market* - connected with delivering of health and fitness information and includes virtual training, virtual rehabilitation, virtual therapy and wellness program. The potential of this market is related to increase the number and the quality of virtual fitness classes and personal trainings, such as Fitbit or Coach.
- *Gaming Market* - based on the development of the games in Metaverse apps, such as Roblox and the necessity to introduce open-world games or social VR games. It had been projected by Statista (2022) that the user penetration will be 6.7% in 2023 and will increase to 26.9% by 2030.
- *eCommerce Market* - connected with online shopping and the purchases through virtual cash or real-world money. Moreover, it becomes connected with

Marketplaces in the Metaverse and online shopping for items bought for your own avatar. According to Statista (2022) the Austria's Metaverse eCommerce market will reach a value of 70.7m euro by 2023 and of 880.5m euro by 2030.

- *Workplace Market* - deals with the productivity and collaboration among employees and tackle the problem of high cost associated with physical offices. The idea which can rise the potential of this market in Austria is open VR workplaces in the Metaverse and VR well-being spaces.

4.2. Metaverse use in Austrian Financial Sector

According to the Meltwater's Digital 2023 (2023) the use of banking, investment, insurance websites or mobile apps each month in Austria is around 39.8%. Also, the use of mobile payment services each month is 23.8% and the population who owns any form of cryptocurrency is 12.2%.

The table 6 shows weekly online shopping activity of the population between 16-64 years who is engaged in using online financial services in 2022, Austria. So, recording to statistic provided by Meltwater (2022) 41.2% of population was purchasing a product or service online during 2022. Also, 30.4% of population used an online price comparison service. Needed to add that the data show a big consumers interest for digital financial activities.

Table 6: Weekly online shopping activity (% of total population, 16-64 who is engaged in a selected activity each week, 2022)

Factors	% Value
<i>Purchased a product or service online</i>	41.2%
<i>Ordered groceries via an online store</i>	14.1%
<i>Bought a second-hand item via an online store</i>	13.1%
<i>Used an online price comparison service</i>	30.4%
<i>Used a buy now, pay later service</i>	13.6%

Source: Meltwater Report Digital 2023 Austria,

https://www.slideshare.net/DataReportal/digital-2023-austria-february-2023-v01?from_search=0&from_action=clip&slide_index=0

The table 7 shows information about financial inclusion in Austria in 2022. According to it around 100% of population +15 years old used accounts with a Financial Institution. Moreover, 99.2% of the population made different digital payments, 63.9% made a purchase with a mobile phone or the internet and 61.6% used a phone or internet to pay bills.

Table 7: Financial inclusion in Austria in 2022 (% of total population +15 years that owns or uses each product or service)

Factors	% Value
<i>Accounts with a Financial Inst.</i>	100%
<i>Credit Card Ownership</i>	59%
<i>Debit Card Ownership</i>	95.5%
<i>Made a digital payment</i>	99.2%
<i>Made a purchase with a mobile phone or the internet</i>	63.9%
<i>Used a mobile phone or internet to send money</i>	36.3%
<i>Used a mobile phone or internet to pay bills</i>	61.6%

Source: Meltwater Report Digital 2023 Austria,
https://www.slideshare.net/DataReportal/digital-2023-austria-february-2023-v01?from_search=0&from_action=clip&slide_index=0

If we analyse the data from the table 8, based on different types of digital content purchased, from the internet users aged 16-64 who pay for digital content monthly, the biggest number of consumers was interested in movie or TV streaming services. Also, 25.3% of consumers used music streaming services.

Table 8: Types of digital content purchased (% of internet users aged 16-64 who pay for each digital content monthly, 2022)

Digital content	% Value
<i>Movie or TV streaming service</i>	39.7%
<i>Movie or TV download</i>	7.8%
<i>Music streaming service</i>	25.3%
<i>Music download</i>	9.3%
<i>Mobile APP</i>	8.5%%
<i>Mobile game</i>	7.8%
<i>New Service</i>	5.2%
<i>Subscription to an online magazine</i>	6.4%

Source: Meltwater Report Digital 2023 Austria,
https://www.slideshare.net/DataReportal/digital-2023-austria-february-2023-v01?from_search=0&from_action=clip&slide_index=0

At the same time, we can see the data from the table 9, based on a information from the Report Digital 2023 Austria, related to a payment method used for eCommerce in 2021. So, made a purchase with a mobile phone or the internet was estimated at 26% of population. Also, the value of population who shares eCommerce transactions through debit or credit card is 39% bigger with 13% then previous one.

Table 9: Payment method used for eCommerce (% of total transactions, 2021)

Method of payment	% Value
Purchase with a mobile phone or the internet	26%
Share of B2C transactions. through debit or credit card	39%
Share of B2C transactions through banks transfers	23%
Share of B2C transactions through cash-on-delivery	5%
Share of B2C transactions through other payment methods	7%

Source: Meltwater Report Digital 2023 Austria,

https://www.slideshare.net/DataReportal/digital-2023-austria-february-2023-v01?from_search=0&from_action=clip&slide_index=0

Also, it is crucial to analyse the overview of consumers digital payments during the 2022. Meltwater's (2022) data shows that the number of people making digital payments was 6,70 mil from the full population of Austria. Also, it is interesting to see that an year on year change in the number of people who make digital payments was estimated to rise with 3.9% and an year on year change of the value of digital transactions was increased with 15.3%. It plays a huge roll for the decision-making process of increasing investment flows in digital development of financial market.

Table 10: Overview of consumers digital payments 2022

Method	Value
Nr. of people making digital payments	6.70 mil
Year on year change in the Nr. of people making digital payments	+3.9%
Year on year change in the value of digital payments transactions	+15.3%

Source: Meltwater Report Digital 2023 Austria,

https://www.slideshare.net/DataReportal/digital-2023-austria-february-2023-v01?from_search=0&from_action=clip&slide_index=0

It can be seen that consumer's interest for digital market becomes bigger and bigger each year. There were added some idea from Metaverse for increasing the financial market potential. The crucial thing is to focus on introducing innovation in this area and on consulting people's opinion on that process. Meltwater (2022) mentioned in the Digital Report 2023 Austria that there are some important online purchase drivers which play a big role on the people's open mind for new technologies. So, such factor as: free delivery, discounts, easy return policy, feed-back, eco-friendly policy play an important role on the use of VR and AR technology for financial market development.

5. CONCLUSION

The study inspected the impact of the Metaverse on the Financial World. As VR and AI technologies became more and more popular in each sector, the research summarises the core ideas of a development aspect of banking sector and financial institutions after using such innovations. Moreover, we listed some advantages and disadvantages which can appear, because of involving Metaverse in such important sector as finance. Also, it can help to tackle the goal of digitalization and to increase this process in next few years.

At the same time, we used some statistics to show people's attitude for digitalization and the Metaverse. Yearly social interest for technology and digital inventions becomes bigger. In our research we analyse the potential of the ideas in business and social institutions.

Furthermore, we used a model created by McKisney & Company to show the link between a business and some specific sectors where a company prefers to invest in digital process. So, we listed the most preferable sectors for a company in which it invests for its digital development. These investments have a direct impact on the growth of EBIT and revenue. At the same time, McKisney predicted the positive modification in EBIT and Revenue if the company creates a strategy based on its business goals and characterisation.

Also, we used some data from the Report Digital 2023 Austria to describe the process of introducing digital innovations for developing financial and banking services in Austria. Paramount is that the most important things for having a good business strategy in this area is to know about costumers needs and to focus on them. Moreover, without financial flows it is impossible to add something new, high quality. The owners of eCommerce business or the workers at financial institutions should continue to invest in their business models and always be sure what changes to make.

Daily appear new trends and each model is unique, some of innovations can be healthy for a business, but another one not. Furthermore, each region has its specific costumer's type and it is important to focus on the cultural aspect, religion, education of people. At the same time, not to forgot about the infrastructure and level of development.

REFERENCES

Wheatley, O., Von Geyr, J., Bakthavatchalam, S., (2022), "What does the Metaverse mean for the Banking and Financial Services Industry?", ISG White Paper, Information Services Group, 1-5. Accesed: 02.10.2023.

<https://isg-one.com/articles/what-does-the-metaverse-mean-for-the-banking-and-financial-services-industry>

Appsiera, (2023), "What Metaverse in Finance Sector and Its Impact on Banking", no.p. Accesed : 02.10.2023

<https://www.appsierra.com/blog/metaverse-in-finance-sector>

Bloomberg, (2021), “Bloomberg Intelligence”, no.p.

Rolfe, A., (2022), “World Retail Banking Report 2022- Data key to the future”, no. p. Accessed: 07.10.2023.

<https://www.paymentscardsandmobile.com/world-retail-banking-report-2022-data-key-to-the-future/>

Wheatley, O., (2023), “Three Predictions that Will Power the Banking and Financial Services Market in 2023”, Information Services Group, no.p. Accessed: 04.10.2023.

<https://isg-one.com/articles/three-predictions-that-will-power-the-banking-and-financial-services-market-in-2023>

Birch, D. G. W., (2022), “New Finance in the Metaverse Era”, Huawei, no. p. Accessed: 07.10.2023.

<https://e.huawei.com/en/blogs/industries/finance/2022/new-finance-in-the-metaverse-era>

Awada. A., (2023), “Banks and financial institutions should explore opportunities in this rapidly growing immersive world or risk being left behind”, EY.

Holetzke, P., F., (2023), “Unlocking the Potential of the Metaverse: How Banks Can Thrive in the Virtual World”, Microsoft, no., p.

Wheatley, O., Bakthavatchalam, S., (2022), ‘Real Opportunities for Banks to Engage in Digital Assets’, ISG White Paper, Information Services Group, 1-7. Accessed: 15.10.2023.

<https://isg-one.com/articles/real-opportunities-for-banks-to-engage-in-digital-assets>

O'Donnell, J., (2023), “Industrial metaverse, AI set to transform manufacturing”, TechTarget Editorial, no. p.

Robertson, T., (2020), “COVID-19 pushes digital banking adoption to the tipping point”, BAI, no. p. Accessed: 10.10.2023.

<https://www.bai.org/banking-strategies/covid-19-pushes-digital-banking-adoption-to-the-tipping-point/>

Phalen, B., (2020), Dell Technologies Joins Sheltered Harbor Alliance Partner Program as the First Solution Provider, Dell Blog, no. p. Accessed: 13.10.2023.

<https://www.dell.com/en-us/blog/dell-technologies-joins-sheltered-harbor-alliance-partner-program-as-first-solution-provider/>

Bughin, J., LaBerge, L., Mellbye, A., (2017), “The case for digital reinvention”, McKinsey Quarterly, McKinsey, 2-11. Accessed: 15.10.2023.

<https://www.mckinsey.com/~media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20case%20for%20digital%20reinvention/the-case-for-digital-reinvention-vf.pdf?shouldIndex=false>

Koster, A., Shekar, H., C., Maue, R., (2023), “Companies Need to Leverage Ecosystems to Deploy Generative AI”, BCG White Paper, Boston Consulting Group, 2-6.

Cristensen, L., S., (2023), “A brave new world: Regulatory-ready DeFi meets TradFi”, Concordium Defi-Tradfi Report, Concordium, 3-5.

Statista, (2022), Metaverse – Statistics & Facts. Accessed: 15.10.2023.

<https://www.statista.com/topics/8652/metaverse/#topicOverview>

Statista, (2022), Metaverse – Austria. Accessed: 19.10.2023.

<https://www.statista.com/outlook/amo/metaverse/metaverse-workplace/austria>

Meltwater, (2023), “The Report Digital 2023 Austria“, Slideshare. Accessed: 19.10.2023.

https://www.slideshare.net/DataReportal/digital-2023-austria-february-2023-v01?from_search=0&from_action=clip&slide_index=0

The Innovative Approach to Public Services Provision in Cities

Marica Mazurek¹

Abstract

Introduction: Territory is a place, where intersect the strategies of public places, projects of infrastructure, organizational and administrative structure and vision of place management. Success depends on factors as planning, vision, strategy, brand identity, image, partnership of public and private sectors, political unity, global market factors, local development, the managerial process, etc.

Aim: Our attempt is to focus at managerial and marketing strategies in territories; especially a co-creation concept and the concept of public services provision predominantly offered by public sector, but also private sector. The aim of our research was to explore a contemporary state of application of marketing strategies dealing with the development of a place in the Slovak city Banská Bystrica.

Method: The methods of comparison and benchmarking to propose the innovative approach to marketing have been applied. In primary and secondary research have been used mixed methods, a combination of quantitative methods (demand side perspective) and the application of the Importance-Performance Analysis (IPA) and qualitative methods (interviews with the representatives of municipalities, private sector and non-governmental sector representatives, e.g. supply side perspective).

Findings: The most critical factors in the city from the side of citizens, visitors and entrepreneurs were chosen the opportunities to work, the quality of infrastructure, entrepreneurship opportunities, innovative approach to governance and city competitiveness.

Originality and value: This research might be helpful for the public sector planners to recognize desires of the users of a city Banská Bystrica. The originality is in the attempt to monitor both sides of city users (supply and demand side).

Key Words: Public services, Place marketing, Branding, Co-creation, Innovative city development, Innovations, Social Media Use Intensity (SMUI), Social Integration and Emotional Connection

Jel Codes: M31, R58, R11

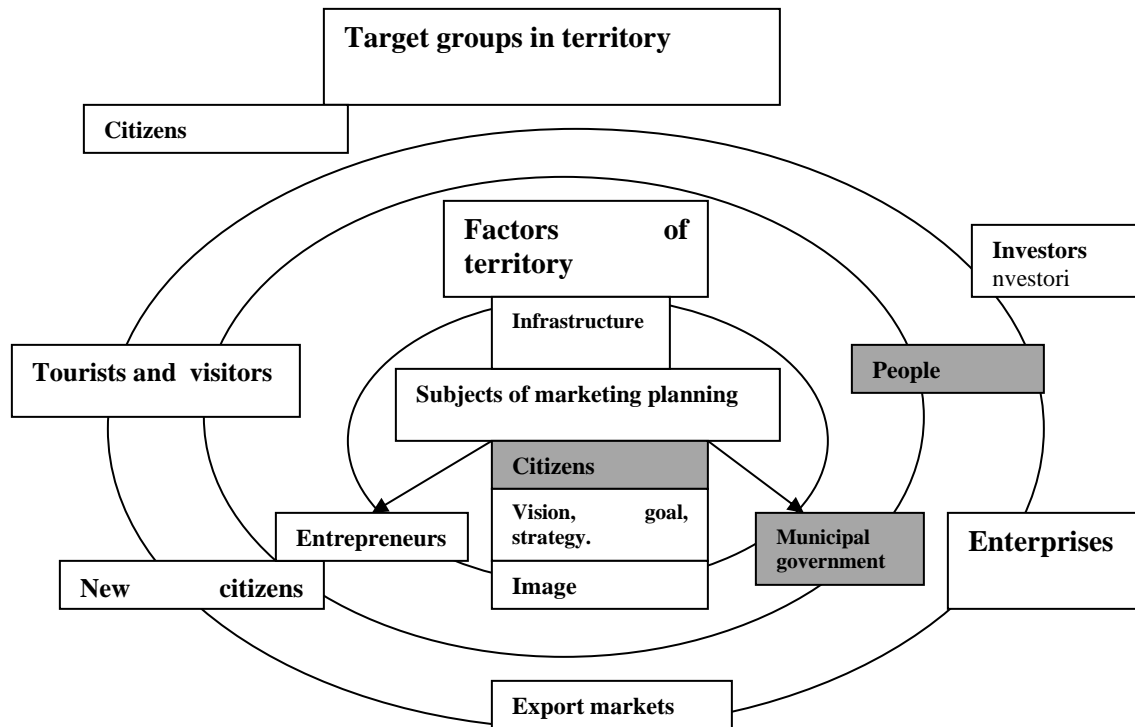
I. INTRODUCTION

Ashworth and Voogt (1990) claimed that territories are functioning at different spatial levels, e.g. that a marketing product, which is offered in territories is different as the same product, which is consumed by territorial consumers. The target groups are citizens of a place, visitors, entrepreneurs and products, which were offered and consumed.

A place is consumed several times by different segments with different motives, which creates a high demand of sophisticated market strategy of territory and fulfillment

¹ MSc., PhD., University of Žilina, Slovakia

of promise given by creators of strategies to the users. For this reason, is difficult to create a place product which will satisfy needs of all users. For better understanding is necessary to define the levels of marketing as a part of a sound marketing strategy of territory.



Scheme 1: Levels of place marketing

Source: amended upon Kotler, Heider, Rein (1993).

The target groups are selected segments and consumers of a territory. Ashworth and Kavaratzis (2008) stated that the process of place marketing is highly demanding on the close co-operation of existing entities in territories as well as the co-operation with the consumers.

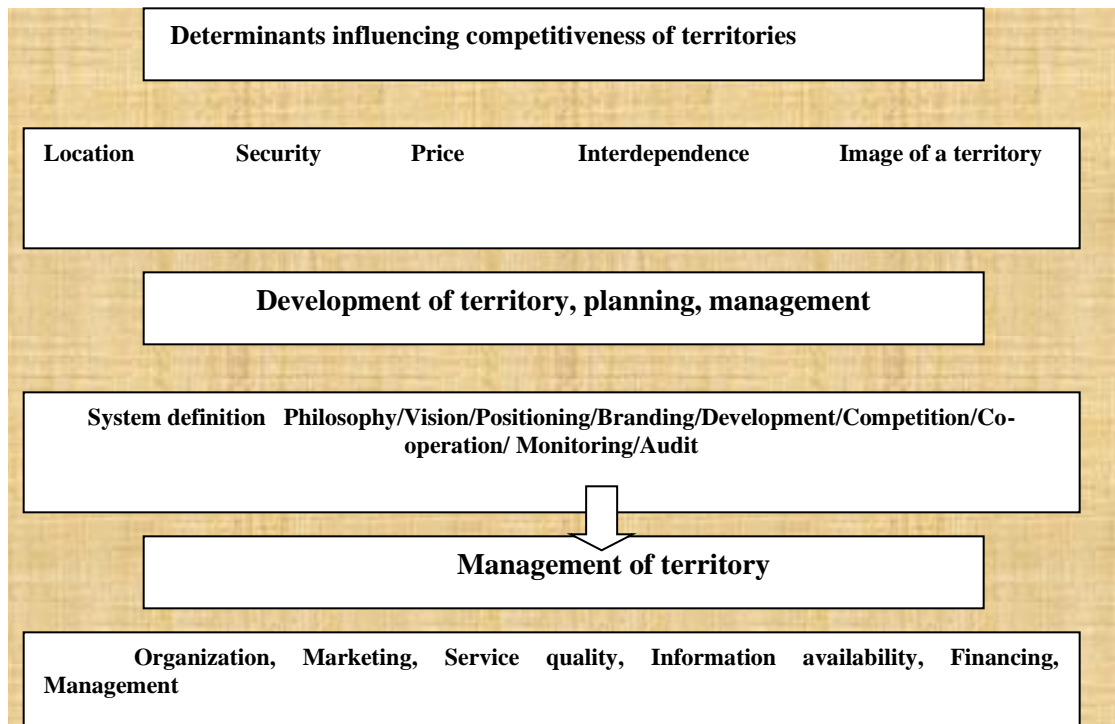
Kotler et al. (2002a) defined place marketing as „management of territory in order to satisfy needs of target markets. “ It leads to success if citizens and entrepreneurs are satisfied and if the requirements of visitors and investors have been met. The perception of marketing has not always been specified as it is now, but the goals were identical – to achieve economic success and improvement of quality of life of citizens („place excellence“ as discussed by Kotler Asplund, Rein, Heider, 1999 a Reinisto, 2003). A

city and its target markets are citizens, entrepreneurs, tourists, students from different places, e.g. a community and the external users of the city products and services.

Deffner and Metaxas (2006a), Ashworth and Voogd (1990) underlined a necessity to combine city marketing, promotion and the spatial-functional, organizational and financial characteristics. Kotler et al. (1999) included into marketing mix of a territory in his place marketing concept a character of territory (structure and design), infrastructure, services, and attractions.

Topics dealing with different approaches to marketing have been studied by the academics and practitioners dealing with place marketing and place branding. A territory is a space where intersect the strategies of public spaces, infrastructure of private and public sector, the organization and administrative potential, economic, social, and environmental strategies.

The complex system and its success depend on such factors as the comparative and competitive advantage and its implementation into the successful strategy of a specific territory. Porter (1998, p. 78) mentioned that a „comparative advantage in global economics are based on local principles – knowledge, relations, motivations – these can be very difficult to copy by competitors “. Relations are built through partnerships in territories, knowledge is a specific value, which might be successfully used in a territory or simply wasted (for instance by the inability of management in a specific territory to be innovative, creative, attentive to the needs of users). Motivations are closely related to a satisfaction and the opportunities in a territory. Crouch and Ritchie (2003) defined major determinants of the competitiveness of territory as follows:



Scheme 2: Conceptual model of territorial competitiveness.
Source: amended upon Crouch and Ritchie, 2003.

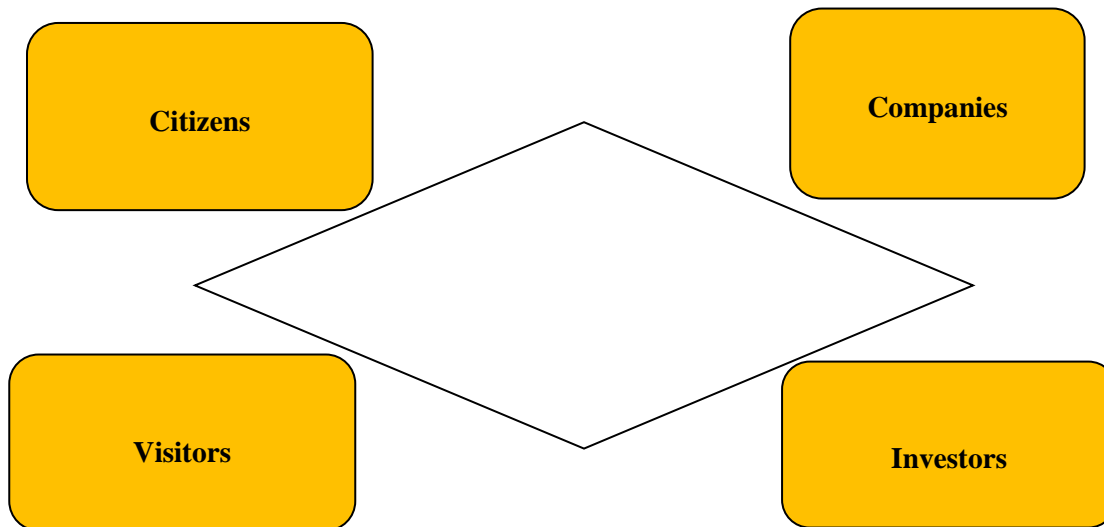
Place marketing and place branding are significant tools of the enhancement of competitive advantage. Both concepts aim at the same target, the improvement of competitiveness of a place; however, the tools and especially a time of performance are different. A shift from classical marketing and branding theory (branding of products) to the place marketing and branding by offering the relational and network marketing paradigms and alternative branding perspectives (relational branding) demarcated the contemporary development of marketing and the growing importance of the brand equity function in territories and especially in the cities.

Ambler (1997) distinguished “the underlying discipline of the marketing mix or neoclassical paradigm is microeconomics, whereas the relational paradigm is about people and draws its substance from the other social sciences.” A shift of traditional approach to marketing of places to new paradigmatic stance with new methods, methodologies, topics and focus of research has influenced the development of questions trying to answer such problems as how to combine the classical marketing tools and approaches with the new changes in a society and global world.

For this reason, place marketing and especially place branding concepts attracted the attention of researchers as Pritchard and Morgan (1996), Pike (2004), Kotler and Keller, 2006, Gnoth, 1998, Hankinson, G. (2004), Henderson (2000), Ashworth and Voogd (1994), Deffner and Metaxas, 2006, Reinisto and Moilanen 2009, Kavaratzis 2005, etc., and such authors as Reinisto, Moilanen, Kavaratzis were focused especially at city marketing.

In the concept of city marketing is necessary to focus on satisfaction of inhabitants, which concerns so called cultural geography (how citizens perceive a city – a territory or create a picture about a city in the framework of processes – planning, territorial design, use of territory as a product, services. These ideas have been developed by the authors as Crang (1998), Holloway and Hubbard (2001) and others.

The most important contribution has been done by Deffner and Metaxas (2006a), the authors of 8Ps Model of Morrison dealing with the marketing of city tools as product, partnership, people, accessibility, program, price, and promotion. Ashworth and Voogd (1990) in the framework of the geographic marketing mix underlined a necessity of combining of city marketing, promotion, spatial and functional characteristics, organizational characteristics, and financial characteristics. The authors added that important is the combination of these tools and characteristics. Kotler et al. (1999) included to the marketing mix of territory important factors as character of territory (structure and design), infrastructure, basic services, and attractions. This will be a basic tool for our research and searching for the demand side respond of users in a selected researched city.



Scheme 3: Van den Berg a Braun model of city users.

Source: Van den Berg a Braun, 1999, s. 987.

City marketing could be applied in several phases, where in the initial phase is crucial the attempt to attract cheap labour and promotion of a city (Bailey, 1989, Ward, 1998). Second phase is typical for using the classic marketing mix tools and in the third phase is important to create relations with a customer (co-creation principle), which is typical for place branding. Unfortunately, many countries and cities and their public sector representatives are still not familiar with a concept of successful place branding. Berg and Braun (1999) mentioned the following important users of the product of city (Scheme 3).

Preferences of these groups and city customers are different as has been also stated by Goodman & Thibodeau (2003). Braun (2008) mentioned that the attractiveness of city and its services might have an enormous impact on spatial behaviour. Braun evaluated the basic characteristics of the attractive environment for citizens and also the other users as being formed by the following components Scheme 4, 5, 6, 7):

Living conditions and living environment
The existence of working opportunities
Availability of educational institutions
Availability of leisure amenities
The opportunity to be with a family and friends
Access to the other services in a city

Scheme 4: The Attractiveness of living environment of the city for citizens.

Source: Braun, 2008.

Similarly, has been evaluated the following importance factors for entrepreneurs (Scheme 5)

The environment of the city and the construction of living spaces
The access to labour
The access to customers and new customers
The access to suppliers
The access to financial resources
The access to partners

Scheme 5: Based on the Scheme “The Attractiveness of the environment for entrepreneurship”.

Source: Braun, 2008.

The opportunities of temporary accommodation and the environment.
Access to cultural resources.
Access to leisure facilities.
Access to shopping facilities.
Access to catering facilities.
Access to entrepreneurship opportunities.

Scheme 6: The Attractiveness of the environment for visitors.

Source: Braun, 2008.

Reality market
Attractive environment for life of the target groups
Attractive entrepreneurs environment
Attractive environment for visitors

Scheme 7: Attractiveness of the environment for investments.

Source: Braun, 2008.

For this reason, is crucial by the implementation of city marketing to recognize the needs of all major target groups and users of city marketing product. These outcomes need to be taken into consideration and it is really important to define the city customers, their preferences, and the influence of attractiveness of city on spatial behaviour. Sometimes it might be a real challenge to understand a need of consistence between spatial perception and the economic goals represented by a variety of economic spatial structures. A complexity of the system of city marketing requires understanding of both sides of one coin, e. g. the system of the product (city) offer and supply side and also the other side – demand side (city product users).

The objective of our research will be place marketing and especially how places (cities) of countries with a relatively poor understanding of place marketing concepts (not even including place branding concepts and their successful implementation) are able to use the concept of place marketing into their practices. Our focus will be which services are the most important for the inhabitants of one European city in Slovakia, Banska Bystrica and our goal is to confirm if public services provision in this city fulfils the expectation of citizens. The concept of co-creation enables to approach consumers, citizens of the studied city closer in services provision. For this reason the aim will be to recognize a level of satisfaction with services offered in Banska Bystrica. Marketing strategies approach will be also explored and analysed.

2. RESEARCH METHODOLOGY

The aim of our research (mixed method research approach) was to explore the contemporary state of application of marketing strategies in specific Slovakian cities (in this study will be a focus on Banska Bystrica where pre-research took place) and by the application of methods of comparison and benchmarking to propose the innovative

approach to marketing in Slovakia and to explore the success factors of those approaches. The major assumption and statement is that the innovative marketing is contributing to the local economic and social development and contributes to the improvement of quality of life and the provided public services in a city.

The following research questions have been created in order to support our research and for this specific study a third research question has been specifically applied:

Question 1 - Does the innovative marketing of place contribute to the local development of a territory?

Question 2 - How important is the active co-operation of partners in territory for a successful strategy and marketing?

Question 3 - How important is for the competitive marketing strategy to respect the needs of the users of territory (the innovative approach to marketing based on co-creation principles and prosumer approach concept)?

In this primary and secondary research has been applied mixed methods approach as has been presented by some authors as Tashakkori and Teddlie, 1998, 2003, Cresswell, 2002. The multilevel model (Tashakkori and Teddlie, 1998) has been applied, which allows to combine quantitative methods (a survey among the users of territory) and qualitative methods (interviews with the representatives of municipalities, private sector and non-governmental sector representatives have been applied). The representatives of municipalities were elected deputies of the local municipal government, which were chosen randomly and the questions were formulated in the structured questionnaires similarly as the citizens of the city asked in the structured questionnaires. Additionally, the city representatives were interviewed by the appointment in personal interviews and this kind of research was less formal and based on the unstructured and taped interviews, coded results and compared with the demand side research results. Some form of triangulation of results has been amended in order to compare the similarity of answers of respondents.

3. CONCLUSIONS

A primary research focused at the demand side (customers of the city) has been conducted in a city of Banska Bystrica and the used analysis of the importance and performance of city and its potential has been researched by the application of the Importance-Performance Analysis (IPA) created by Martilla and James (1977) as the managerial method used in marketing research.

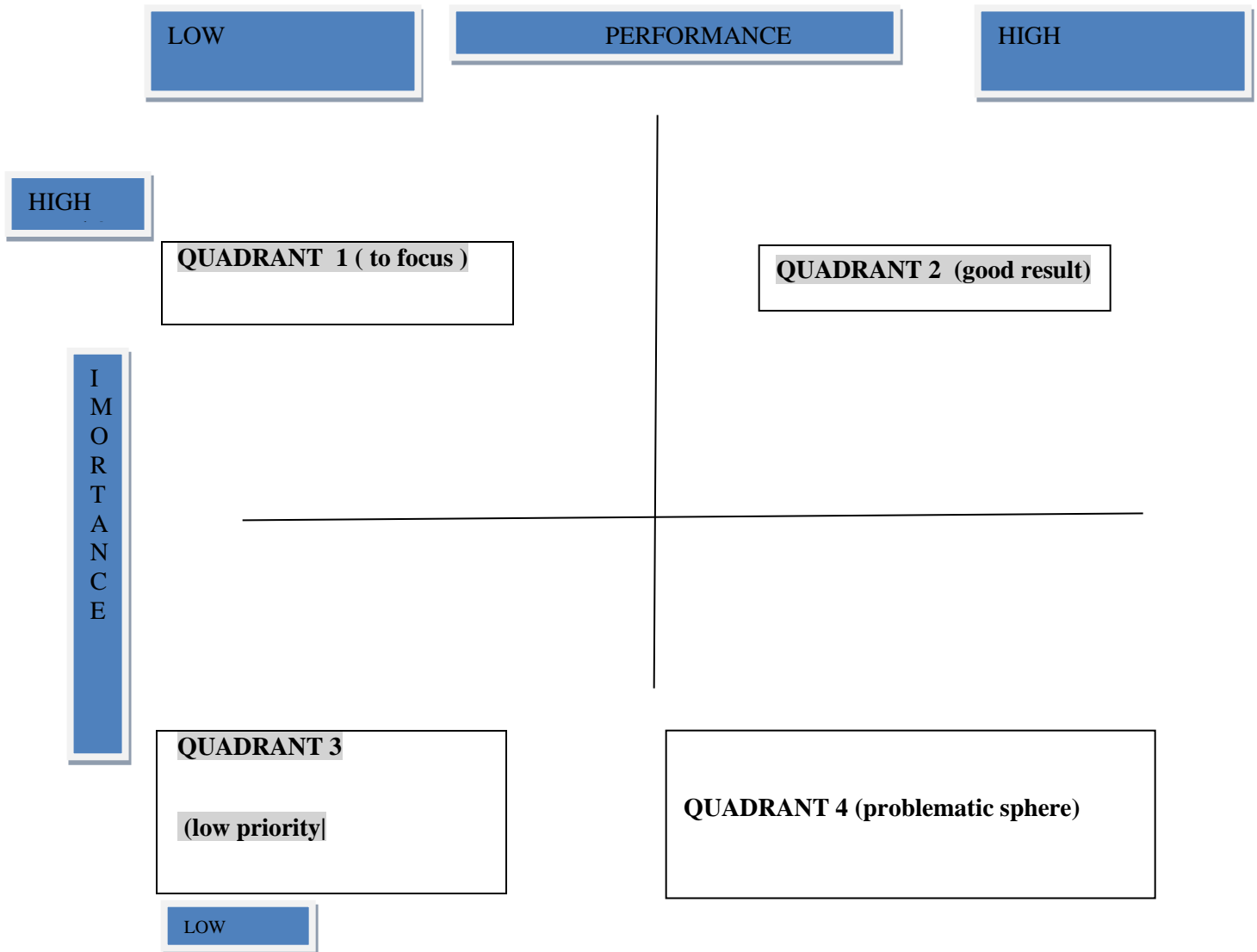
PERFORMANCE

I M P O R T A N C E	Quadrant 1 (High importance; Lower performance) This quadrant displays attributes which are considered to be important, yet are not being performed to the same standard, or level. If an attribute falls within this quadrant effort should be made to shift it to quadrant two (upper right).	Quadrant 2 (High importance; High performance) This quadrant represents those attributes of VRM which are considered to be important and are also being performed to a higher standard. Attributes that fall into this quadrant should be maintained to ensure they remain at this level of performance.
	Quadrant 3 (Lower importance; Lower performance) This quadrant indicates attributes which are of a lower priority. Resources are not being channeled towards them as much as other attributes. Attributes which fall into this quadrant should remain untouched.	Quadrant 4 (Lower importance; High performance) This quadrant indicates a possible overuse of resources. Organizations are allocating resources to, and highly performing these attributes, yet they are not deemed to be exceptionally important to the organization.

Table 1: The Importance and performance Matrix

Source: Martilla and James, 1977.

The creation of IPA quadrants and the importance of particular factors have been factors placed into four quadrants as has been recommended by Martilla and James (1997). The following table explains the reorganization of quadrants and factors in the more visual forms, which have been later used for the performance of results of research (Graph 1).

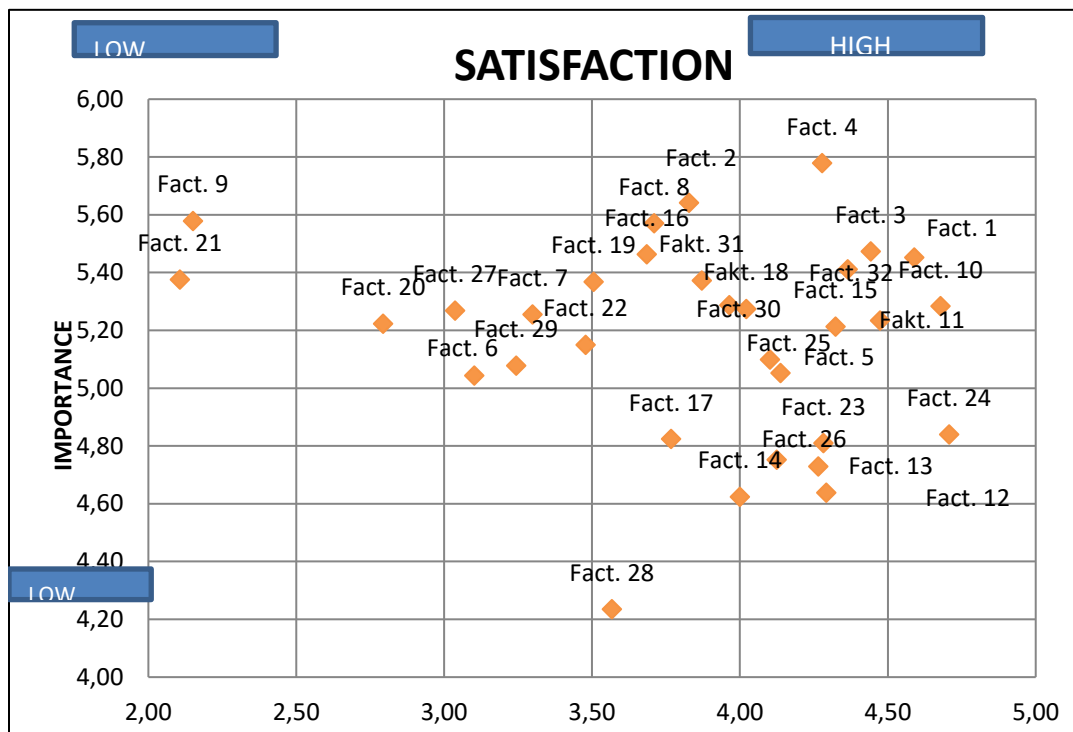


Graph 1: Importance Performance Analysis

Source: own analysis based on Martilla and James Importance and Performance Matrix, 1977.

A sample of 134 respondents (citizens, visitors and entrepreneurs/developers) was used in Banska Bystrica. The answers were compared with the interview results of the municipality representatives. The evaluation has been performed with the use of non-parametric methods, Friedman and Wilcox test. The importance of factors have been confirmed by the application of the function Monte Carlo Sig. In Banska Bystrica, the following chart of importance and satisfaction with the place and the factors has been created and analysed.

Graph 2: The Results of research of importance and performance of services in Banska



Bystrica.

Source: own research in the city of Banska Bystrica

The most critical factors in the city from the side of citizens, visitors and entrepreneurs were chosen the opportunities to work, the quality of infrastructure (also transportation), entrepreneurship opportunities, innovative approach to governance and city competitiveness.

The following table consists of data of the factors of importance and satisfaction, which have been used in the study.

Table 2 Factors of importance and satisfaction in the city Banska Bystrica

Factor	D	S	Description of the factor
Fact 1	5,45	4,59	Attractiveness
Fact 2	5,64	3,83	Environment
Fact 3	5,47	4,44	Atmosphere
Fact 4	5,78	4,28	Security
Fact 5	5,05	4,14	Peacefulness
Fact 6	5,04	3,10	Innovativeness
Fact 7	5,26	3,30	Competitiveness
Fact 8	5,57	3,71	Accessibility
Fact 9	5,58	2,15	Employment
Fact 10	5,28	4,68	Dwelling (apartments, houses)
Fact 11	5,23	4,47	Network of stores
Fact 12	4,64	4,29	Culture
Fact 13	4,73	4,26	Sport facilities
Fact 14	4,62	4,00	Leisure facilities
Fact 15	5,21	4,32	Quality of the educational facilities
Fact 16	5,46	3,68	Quality of health care facilities
Fact 17	4,82	3,77	Quality of social facilities
Fact 18	5,27	4,02	Satisfaction with services
Fact 19	5,37	3,51	Transportation services
Fact 20	5,22	2,79	Parking facilities
Fact 21	5,38	2,11	Road maintenance
Fact 22	5,15	3,48	Transportation signs in the city
Fact 23	4,81	4,28	Accommodation opportunities
Fact 24	4,84	4,71	The amount of restaurants
Fact 25	5,10	4,10	The infrastructure for citizens
Fact 26	4,75	4,12	The tourism attractions
Fact 27	5,27	3,04	Entrepreneurship opportunities
Fact 28	4,24	3,57	Not-for Profit Organizations and their activities in the city
Fact 29	5,08	3,24	Partnership of the city representatives with citizens
Fact 30	5,29	3,96	Communication of the city representatives with citizens
Fact 31	5,37	3,87	Satisfaction with services in the city
Fact 32	5,41	4,36	Qualified labour

Source: own preparation of the evaluation

4. DISCUSSION

The most critical factors in the city from the side of citizens, visitors and entrepreneurs were chosen the opportunities to work, the quality of infrastructure, entrepreneurship opportunities, innovative approach to governance and city competitiveness. Based on the research by the application of IPA analysis (analysis of importance and performance – satisfaction) in the city of Banska Bystrica, Slovakia the results indicate that the public sector representatives have to concentrate on the improvement of employment possibilities, improvement of the infrastructure (quality of roads, enlargement of parking places).

Deficit could be found in a support of new business opportunities, growth of competitiveness, which is also a reason of lack of employment opportunities for young

people or seniors after the age of 50. Generally speaking, employment opportunities and attracting of investors are two major weaknesses of the city of Banska Bystrica. Problematic seems to be also the partnerships and the co-operation of public, private and not-for profit sector, which might be a reason of lack of confidence to co-operate or a deficit of existing co-ordination of common activities. Marketing would be one of possible tools to improve this situation, especially the co-ordination of the co-operation, which could be performed by the Department of Development and Marketing.

Satisfactory results have been achieved in the quality of environment, accessibility, quality of health care facilities and services, educational institutions and quality of educational services. Communication with citizens is also at very sound level and the quality of services generally is also very satisfactory. A paradox is that lack of the employment opportunities is in a city with citizens who are highly educated and skilled, which means that city has to focus more on the innovation and new technologies, which means to attract companies and employers offering such type of employment. The city has a strong deficit in the innovation strategies, weaknesses are also in the capacity of accommodation facilities and better infrastructure.

This research might be helpful for the public sector planners and politicians to recognize a city and especially desires of its users from the demand side (side of territory users and partners of the process of co-creation with the public sector). In the end of this discussion, we conclude with the words of Douglas North, a Nobel Prize winner, who mentioned in the concept of the „adaptive effectiveness “a necessity of the effective change. For this reason, cities have to be open to continual changes and improvements and marketing and city representatives need to understand the meaning of place marketing, branding and be able to use it for their effective and adaptive governance with a co-operation of a community.

REFERENCES

- Ambler, T. (1997) How much of brand equity is explained by trust? *Management Decision*, 35 (4), pp. 283-292.
- Ashworth, G.J, Vooght, H. (1994) *Marketing and Place Promotion*. In Ward, S.V., Gold, J. R. (Eds.) *Place Promotion: The Use of Publicity and Marketing to Sell Towns and Region*, Chichester: John Wiley and Sons, pp. 39-52.
- Ashworth, GJ, Vooght, T. H. (1990) *Selling the City: Marketing Approaches in Public Sector Urban Planning*. London and New York: Belhaven Press, 1990.
- Bailey, JT (1989) *Marketing Cities in the 1980s and beyond*. *American Economics Development Council*, in Hall T and Hubbard P., 1988 „The Entrepreneurial city“ eds. J. Wiley and Sons.
- Berg, L, Braun E. (1999) Urban Competitiveness, Marketing and the Need for Organising Capacity. *Urban Studies*, 36 (5, 6): 987-999.

- Braun , E. (2008) *City Marketing, Towards and integrated approach*, Erasmus University, Rotterdam.
- Crang ,M. (1998) *Cultural Geography*. Taylor & Francis, Ltd., 1998.
- Cresswell, J. W. (2003) *Research Design. Qualitative, Quantitative and Mixed Method Approaches*. London: Sage Publications
- Crouch, G.I, Ritchie, J.R.B. (2003) *The Competitive Destination: A Sustainable Tourism Perspective*, Cambridge: CABI Publishing. 272 s.
- Cooper, C. (2005) *Knowledge management in tourism. Annals of Tourism Research*, Vol. 33, No. 1.
- Deffner, A., Metaxas, T. (2006) *The Tourism focus of Place Marketing in the Mediterranean: Evidence from Nea Ionia, Magnesia, Greece and Pafos, Cyprus*. Hellenic Open University, International Conference of Trends, Impacts and Policies on Tourism Development, Amoudara, Heraklion, Crete, Greece, 15-18 June 2006.
- Gnoth, J. (1998) Conference Reports: *Branding Tourism Places. Annals of Tourism Research*, 25, pp. 758-760. In Morgan, N.J. Pritchard, A. & Pride R. (2004) (Eds). *Destination Branding: Creating the Unique Destination Proposition*. Oxford: Butterworth-Heinemann.
- Goodman, A.C, Thibodeau, T. G. (2003) Housing market segmentation and prediction accuracy. In *Journal of Housing Economics*. 7: 121-143.
- Hankinson, G. (2004). Relational network brands: Towards a conceptual model of place brands. *Journal of Vacation Marketing*, 10, pp. 109-121.
- Henderson, J. (2000) Uniquely Singapore? A Case study in Destination Branding. *Journal of Vacation Marketing*. Vol. 13, 3: 261-274.
- Holloway, L, Hubbard, P (2001) *People and place: the extraordinary geographies of everyday life*, Pearson Education, Harlow.
- Kavaratzis, M., Ashworth, G. (2008). Place Marketing: How Did we Get there and Where we Going? *Journal of Place Management and Development*, Vol. 1, Issue 2: 150-165.
- Kavaratzis, M. (2005) Place Branding: A Review of Trends and Conceptual Models. *The Marketing Review*, 5.
- Keller, K.L., Kotler, P. (2006). *Marketing Management (12th ed.)*. Upper Saddle River, New Jersey: Prentice Hall.
- Kotler, P., Gertner, D. (2002) Country as brand, product and beyond: A place marketing and brand management perspective. *Journal of Brand Management*, April, 9(4/5).
- Kotler, P., Heider, D.H., Rein, I. (1993). *Marketing Places: Attracting Investment, Industry and Tourism to cities, States, and Nations*. New York: Macmillan, 1993. London: Pearson Education.

- Kozak, M, Tacsı, A.D. (2006) Destination brands vs destination images: Do we know what we mean? *Journal of Vacation Marketing*, 12: 299-316.
- Martilla, J A, James, J. C. (1977). Importance-Performance Analysis. *Journal of Marketing*, 41 (1): 77-79.
- Pritchard, A, Morgan, N. J. (1996) Selling the Celtic arc to the USA: a comparative analysis of the destination brochure images used in the marketing of Ireland, Scotland and Wales, *Journal of Vacation Marketing*, 2(4): 346-365.
- Pike, S. (2004) *Destination Marketing Organizations*. Oxford: Elsevier.
- Porter, M. E. (1998) *Clusters and New Economies of Competition*. Harvard Business Review, Nov/Dec: 77-90.
- Reinisto, S , Moilanen, T. (2009) *How to Brand Nations, Cities and Destinations*. Palgrave Macmillan, Basingstoke.
- Tashakkori, A., Teddlie, C. (1998) *Mixed Methodology: Combining Qualitative and Quantitative Approaches*, Thousand Oaks, CA: SAGE.
- Tashakkori, A., Teddlie, C. (2003) *Handbook of mixed methods in the social and behavioural sciences*. Thousand Oaks, CA: Sage.
- Ward, S.V.(1998) *Selling Places - The marketing and promotion of towns and cities 1850-2000*. London: Routledge.

Energy Transition and Sustainability

Peter Stallinga¹

Abstract

Introduction: The agenda of energy transition and sustainability is discussed. On basis of the idea that energy is the only currency in the economy it is shown that creating a sustainable economy cannot be achieved by governmental interventions in the economy, neither taxing, nor subsidizing. Those will merely cause inflation. Moreover, subsidizing opens the door to unfair transfer of wealth. Eventually, in the extreme case, a sustainable agenda may even lead to the elimination of the human race.

Aim: The purpose of this research was to work out the implications of the conclusion of earlier works that the only currency in the economic system is energy. As an example, whereas it is common practice to express the GDP in terms of dollars, that then constantly have to be adjusted (as in “2019-equivalent-dollars”, etc) which shows its inadequacy, this should rather be expressed in joule per second (watt). Based on the scientific principle of Lavoisier, that nothing is gained or lost, we can reason from there. Therefore, since no atoms are changed, created, or lost in any real-world activity (including economic endeavor), these processes must be merely a usage of energy to produce entropy, as viewed by Boltzmann, with atoms the matrix it works on.

Method: The application of logic and mathematics. Using the method of Thomas Aquinas, that truths are either self-evident or are based on such self-evident truths.

Findings: Economy is energy and thus limiting the use of energy will cause an economic crisis. Moreover, since nature seeks a way to maximize the entropy production (MEP), done by spending free Gibbs energy, we can expect a natural drive towards energy efficiency; any interference (subsidizing or taxing) will lower the efficiency, and will create less wealth. Moreover, other societies that do not have the taxing/subsidizing-system will eventually overtake the ones that do. Thus, the energy-transition agenda is a massive shoot-in-own-foot.

Originality and value: The idea of seeing economy as energy consumption is not new. Marx, Smith and Ricardo already mentioned it: “The price of a product is the toll and labor to bring it to the market”. Neither is the idea that the world, including all biological lifeforms, is striving for MEP. Nor is the idea that complex organizations can produce entropy faster (Prigogine). The idea of combining it and applying it to the economy is new, and the outcome goes against all modern common knowledge of making a “sustainable economy”, which is a physical impossibility; only zero economy is sustainable, and thus the agenda aims at the elimination of the human race, by its own doing. In Marxist words: What the political elite foremost educates is its own grave diggers.

Key Words: Energy transition, Sustainability, Macro economy, Climate Change

Jel Codes: E61, O33

¹ PhD, University of the Algarve, Faculty of Science and Technology, Department of Electronic Engineering and Informatics, CEOT, Portugal.

1 INTRODUCTION

Humans are becoming ever more sentient about their impact on the planet, and an ever-more centralized government has created an agenda to address this issue. With each version of the agenda more ambitious, the latest version of the pan-global attempt to address the before-mentioned points is called Agenda 2030 and incorporates some 17 Sustainable Development Goals (United Nations, 2015), or targets. See Table I. What strikes immediately is that nothing is said about the number of people. Of that later. One of the Goals is an energy transition, a tendency to move away from fossil fuels. This energy transition, together with the movement towards a sustainable economy is what will be discussed here. However, before we continue, it has to be pointed out that the entire agenda is flawed at its core, as was rightfully pointed out by Bjorn Lomborg in his Copenhagen Consensus project (Lomborg, 2005; Copenhagen Consensus, 2006). The problem with the agenda and its 17 goals is that they have not been given priorities. As such, it only remains a virtue-signaling list. A list that can be used for a power grab, because none of the objectives on the list can morally be rejected. No opposition to the agenda is thus possible and a tyrant can use the agenda to stymie all voices. It has taken politics out of politics, since politics is exactly about setting priorities for objectives in a world limited in resources. As an example, imagine we want to eradicate poverty – who doesn't? – *and* save the planet from climate doom – who doesn't? It might well be so that to save the planet from climate doom (Goal 13), people have to be thrown into poverty (against Goal 1). And even if addressing the climate problem does not directly cause poverty, for sure it costs resources, resources that are then not available for reducing poverty. As such, the notion of a “just climate” can well be a contradiction in terms. As the saying goes, “You cannot have your cake and eat it”. Yes, eradicating hunger is also on the list; Goal 2. Which is interesting and relevant, because in the Netherlands they close down highly-efficient farms in order to save the ecosystem (Goal 15). No cake or cattle, but countryside. Likewise, fossil fuels are banned (allegedly responsible for the climate problem mentioned in Goal 13), yet, Goal 7 says “ensure ... energy for all” (the sustainability buzzwords left out here by the author).

The problem with the agenda is thus twofold: 1) The items on the list are correlated and 2) the resources to address them are limited. Politics is the art of making decisions about setting priorities. Do we want to save the planet from climate doom *or* do we want to eradicate poverty? And if we want to do both, how much are we going to spend on the climate issue and how much on people's happiness? As long as we do not set priorities in the agenda, the agenda is null and void. A meaningless document that only serves to concentrate political power.

Table I: Sustainable Development Goals (United Nations, 2015). Nothing about number of people

- Goal 1.** End poverty in all its forms everywhere
- Goal 2.** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3.** Ensure healthy lives and promote well-being for all at all ages
- Goal 4.** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5.** Achieve gender equality and empower all women and girls
- Goal 6.** Ensure availability and sustainable management of water and sanitation for all
- Goal 7.** Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8.** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9.** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10.** Reduce inequality within and among countries
- Goal 11.** Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12.** Ensure sustainable consumption and production patterns
- Goal 13.** Take urgent action to combat climate change and its impacts
- Goal 14.** Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15.** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16.** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17.** Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Also on each individual item on the list some question marks can be placed. Our philosophical society has, for instance, already sufficiently questioned the climate narrative (Ossónoba Philosophical Society, 2016). In summary, we do not see how anthropogenic carbon dioxide can have any significant effect on the climate of the planet. That while this 'gas-of-life' is very good for plant growth and thus ideal in eradicating hunger, as well as increasing biodiversity – both also items of Agenda 2030, Goals 2 and 15, resp. Therefore, we either see evil psychopaths in power, as described by Andrzej Łobaczewski in his book *Political Ponerology* (1998), or our leaders are fully incompetent. Addressing the (imagined) climate problem will have no effect whatsoever on the climate, yet it will increase poverty and reduce biodiversity. That seems a sick or stupid agenda. We would very much like to listen to Napoleon Bonaparte, “Do not attribute to malice that what can be attributed to incompetence”, since incompetence is more easily remedied. The current work is one more attempt to inform the world about the scientific points, so that incompetence cannot be used as an excuse for culling the world population and destruction of the planet. The agenda point

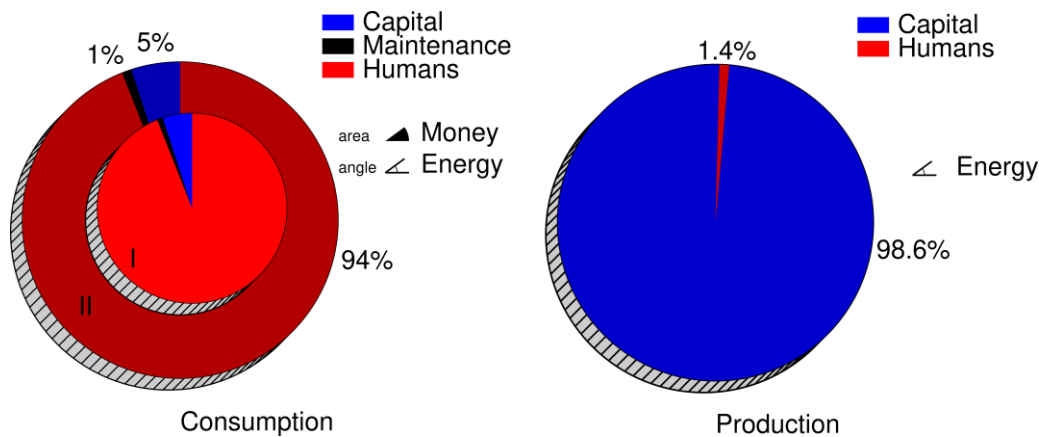


Figure 1: Pie chart of economy. Left: Of the goods produced, 5% goes to capital profit (more means of production), 1% goes to maintenance of the capital and the rest 94% goes to human consumption. The angle of a slice of pie represents the energy used. Its area represents the amount of money involved. When we change the pecuniary rewards by taxation/subsidy (from stacked pie I to pie II), the angles stay the same, indicating no change of energy distribution (the angles), yet the amount of money inflates (the areas of the pie slices). Right: Of the production, 1.4% is done by humans, that work together with some 40 'energy slaves' (capital)

addressed here is that of the energy transition, a general objective to move away from using fossil fuels for our energy needs.

2 ECONOMY IS ENERGY

We start by making a short summary of earlier work. The universe is governed by the laws of Thermodynamics. More specifically, and relevant for this work, the tendency is to convert (free Gibbs) energy into entropy. The universe is trying to do this as fast as possible, the maximum entropy production (MEP) idea. Living things (described by Biology) produce entropy faster than inanimate things. So, the laws of Darwin, evolution is a survival of the 'entropiest'. The area of Economy is describing the energetic exchange of humans. It is unavoidable, since the laws are universal, that economy is governed by thermodynamics. So, by technique of Thomas Aquinas – truths are either self-evident or are based on such self-evident truths – we will reason and analyze the economy.



Figure 2: Income vs. productivity before and after the abolition of the gold standard (removing the link with energy). Source: Economic Policy Institute (2022)

We must state here that thus energy is the only currency in economy. In contrast, all fiat-currencies (dollar, euro, yen, pound, etc.) are worthless units – linked to no physical quantities and can be printed out of thin air – and can thus never serve as objective indicators of economy. Economy is how much energy per year is used, so the unit is joule per second, or watt. At any moment in time a fiat-currency can have an incidental equivalence in energy, but this link is not based on physics, and thus merely a coincidence. As an example, in earlier work we estimated that the 2019 dollar had a conversion ratio of 170 mW per dollar of GDP (Stallinga, 2020). Moreover, this conversion ratio, for some unknown reason, grows with the fifth power with energy consumption over time. The energy consumption itself grows with 5% per year, and this is equal to the rate found by Piketty in his book *Capital in the 21st Century* (2014), showing once again that energy is economy.

Workers use their energy in production; in fact 'work' in physics means force times distance and that has unit newton-meter which is equivalent to joule, the unit of energy. These workers do production together with some 70 'energy slaves' (for instance fossil-fuel powered machinery). Some even say 200 to 8,000 energy slaves (Energy Skeptic, 2020). Of that production an estimated 95% goes to consumption goods (94% if we include maintenance of capital), increasing the wealth of people, and 5% is used to increase capital (means-of-production), see Figure 1. We thus get a geometric series where both capital and wealth are growing according to 1.05^n , (n the years since the reference point in time) which is an empiric law. Note that, whereas workers do 1.4% of the work, they get 95% of the consumption rights. Workers are effectively skimming the surplus value created by the capital. Not the other way around!

Since the abolition of the link between energy and money (through gold) in 1971 in the United States and the introduction of the international 'petro-dollar' world-wide Bretton Woods currency system, energy consumption, i.e., real economy, grew only 2% annually. The same stymied growth rate was also observed in the bellicose times (WW-I and WW-II). It can thus be said that fiat-money is as destructive for the economy as world wars.

Curiously (see Fig. 2), at the exact same time the fleecing of workers was increased dramatically; where before the wages were in lockstep with productivity, after the introduction of fiat-currency the wages grew only some 25%, while the productivity grew about 150%. It nicely shows here how those in power – those who have the power deciding for the introduction of illegal fiat-currency as legal tender – benefits only a subset of society, and thus how the items on the Agenda 2030 list do, in fact, have a priority among the leaders, with apparently equitable distribution of wealth not very much prioritized by them. A recurring phenomenon and biologically explicable. Any agent in nature is mainly busy with self-interest, optimizing its thermodynamic machine. Thus, powerful agents are merely thinking how to best fleece other agents. Creating poverty in the population might be a good way.

Having understood that the economy is simply a big thermodynamic machine, one of the most obvious observations that can be made is that all economies are circular. This we know from Antoine Lavoisier, “Nothing is lost, nothing is created, everything is transformed” (Lavoisier, 1789). In other words, all activity on the closed-system planet is merely acts of converting energy into entropy, with the atoms merely the arena in which this activity takes place. None of these atoms disappear, and thus, all economy is circular. It is only a matter of the creation of entropy; as long as we have energy input no entropy production is locally irreversible and thus all economy is circular. This immediately eliminates one myth in the political agenda. The rest of this document addresses the sustainability and the energy transition items of the agenda (Goals 7-9).

3 CONSEQUENCES IN SOCIETY

After having established the fact that energy is the sole reliable indicator of the economy, we can rapidly draw some powerful conclusions. An example is the busting of the myth that the Great Depression was caused by the capitalist organization of economy that ran amok. Remember, as predicted by Karl Marx in his book *The Capital*, a system can enter in a saturation phase where production capacity exists but consumers have no buying-power to buy the goods, and thus the decision will be taken by the capital – those in control and with capital-gain objectives – to not produce. This is called a 'crisis of overproduction', where we can imagine a fully functional bakery being closed while there are hungry unemployed workers outside the gates.

However, since we know that growth is energetic growth (and not pecuniary), and considering the fact that the system *did* grow afterwards – after all, the Great Depression ended – the system was obviously not in saturation. The capital still able to grow (in terms of joules) far beyond the value at the start of the Great Depression. The system

again managing to produce more capital with capital, in the eternal capital-growth spiral, economy growing by 5% annually. The system will grow *if* resources are available, one way or another, with 5% of energy (labor of humans, and work done by machinery) used to grow the capital, and the other 95% for consumption goods – a.k.a. 'wealth' (94% if we subtract 1% maintenance cost of capital). See the pie chart in Fig. 1.

The monetary salary simply a means to book-keep who has rights to how much of these consumption goods. Money in itself is not a goal, neither of the capital, nor of the workers; more so if money does not represent energy as in modern fiat money. That the system managed to grow later-on shows that resources *were* available. The question is then, obviously, if not caused by capitalism, then what caused the Great Depression? Once again we must look at the banking system that purposefully triggered a crisis for its own interest. Why do they do it? Because they can! Large amounts of capital fell into the hands of a small group of people, people who had the deciding power in the banking system, the industrial elite (a.k.a. oligarchs). After the transfer was completed, the capitalist economy was restarted, with the heroic salvation of economy – the New Deal – attributed to those in power, i.e., representatives of the banks, as written in history books, published by companies that were by now also in the hands of the exact same industrial elite. The New Deal scheme presented as salvation. More of the (Green) New Deal later.

Another myth is that capitalism would be disrespectful for nature (and thus bad for sustainability goals), as in that it would cut down entire forests at a time if the price of timber is high enough. Yet, who understood the above also understands that capital must grow, with 5% per year. And thus, capitalism will try to *increase* the forest, by 5% per year! Forests can be cut down, football-field-equivalents-per-minute, if the land then increases in capital value, with a higher outlook on capital profit, for instance by converting these forests into arable land, because the value of arable land is higher than forests, because the price of wood is lower than the price of corn or meat. This way, capitalism will supply *exactly* the products humans need, the best it can; if tomorrow humans prefer wood, the day after tomorrow the corn fields will be burnt down and trees planted on the ashes. Only when humans start interfering in the natural cycle can things run amok with a sub-optimum situation in the economy as a consequence. That because these people will not make decisions in the interest of the entire population at large, but only in their own interest. They will help to cut down forests if they get a commission (read: bribe) on it, and don't care if that'd destroy nature, because they do not expect to make another such deal on the same land anyway. Whether they do this knowingly, or if it is merely their Darwinistic intuition is not very relevant. The fact is that such behavior makes *their* genes survive, in detriment to those of others. Thus such 'immoral' behavior – which is anyway in the eye of the beholder – will survive in the gene pool. Their genes only disappearing if their number in society becomes too high, and entire society is in decline, overtaken by more free capitalist societies, where individuals do not have a chance to interfere in the economy. We see, for instance, the

collapse of the Soviet Union, where interfering in the economy was the basis of the entire system and the reason of its demise. What they foremost were educating were their own grave diggers, self-interested automatons in economy.

As mentioned above, free market capitalism grows with a geometrical series of 5% per year. If government interferes, even if it is done democratically, this efficiency rule will stop. It will be decided to increase the skimming of production by the human voters, eating away the 5% profit gain – capital growth – and capital growth can then even easily become negative. Each voter a self-interested automaton, they will decide to increase their own consumption, based on some concocted story of why they have the *right* to do that. Maybe some racial or gender issue (the inclusivity and gender Goals). Somehow the adage “To each according to his abilities and from each according to his needs” (Marx, 1875) converted into, “My needs are huge and my possibilities tiny”. Why? Because they can! Most of these Agenda 2030 issues therefore very likely to wind up into creating poverty and hunger of the masses and, initially, wealth to those who preach them.

Let's now go to the core tenet of this work. Remember once again that energy is the currency in economy. Nothing else. With this, let us analyze actions in the economy – Thomas Aquinas style – and show why a sustainable economy is unsustainable. Imagine we want to reduce the carbon footprint by reducing the energy consumption in the economy. We do not have to develop fancy models to obfuscate the inevitable conclusion. Without doubt, reducing energy consumption means reducing the economy and thus the reduction of wealth creation. Wealth is directly related to energy consumption, namely 94% of it (the red part of the left pie of Fig. 1).

But, wait, what if we make energy more expensive (maybe by taxing carbon fuels) so that the production process is forced into more energy efficiency, so that we can produce the same number of products with less energy? That might work, one would think. Don't forget, capitalism already *has* a driving force of increasing energy efficiency of production, because that would increase profit for an individual company doing the innovation. However, market forces bring the profit back to 5%, as shown by Piketty. Increased efficiency (less energy per product) will thus not reduce the total energy consumption, but increase the number of products! This quantity of products grows faster than the energy consumption, and hence the faster growing GWP (gross world product; in terms of money equivalents, number of washing machines and cars), mentioned before. Empirically it grows with the 5th power of energy (Stallinga, 2020).

Now imagine we try to force efficiency by taxing. That can easily be shown to be fruitless. Imagine we are making cars with coal and iron, and some human labor. Let us assume that 1 kilo-joule of coal-energy costs 1 euro, and we need 1 MJ (1,000 euro at current price) to make one ton of iron, and (for easy calculation), then assembling the car with that ton of iron only costs human 'effort' (an ignorable irrelevant 25 kJ) for which they are paid 19,000 euro (so they can buy 90% of a car that is sold at 21,000. 20,000 production cost and 5% profit). (The calculation does not match the above

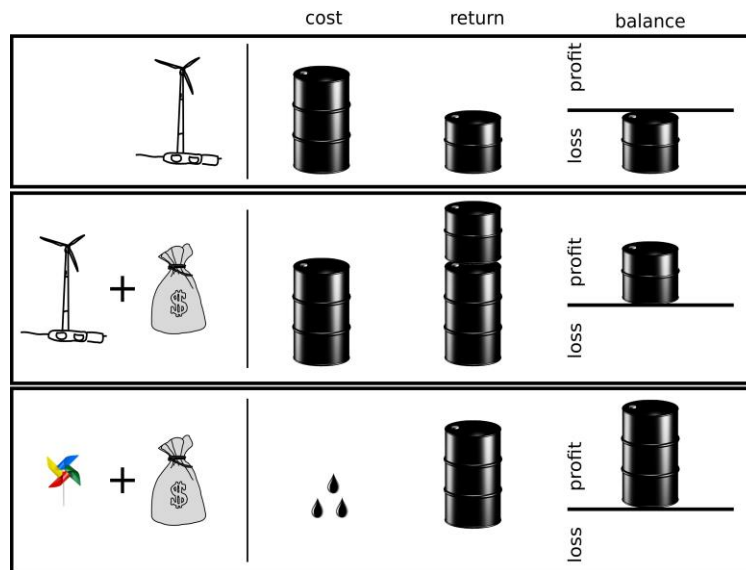


Figure 3: Windmill swindle. A windmill has a certain cost of production, 1 boe (1 barrel-of-oil equivalent) and returns half a boe in its lifetime, a loss of half a boe. With 1 boe of subsidy this loss is converted into half a boe of profit. Reducing the cost of production of the 'windmill' increases the profit even further. This industry thrives on subsidies

capital-worker ratio because we assumed the payment for coal goes into oblivion, paid to Martians).

Now let's assume we tax coal so that it'll cost 2 euros per kJ. What will happen. Maybe you would think that the car will be produced by less energy. But why did the capital not make it for less already before?! After all, profit would increase, as long as the workers get paid the same and the selling price of cars is maintained. In reality, the price of labor and iron was established on the free market and driven by forces that set this equilibrium value. We do not have to worry about what these forces are, we only have to know that these forces exist on the free market that they make the system tend toward an equilibrium price of products. This equilibrium is set by exchange values between all products on the market. Coal, iron and labor. Meaning, the *ratios* between prices. The free market exchanges commodities through the use of money; money itself is never the goal of trading, it is merely an intermediary.

So now we have a system that is off-equilibrium, with ratios that are different from the equilibrium ratios. It is obvious that the system will feel a force to bring it back to the equilibrium with said ratios, the same force that brought it there in the first place. And if we tax energy to 2 euros per kilojoule, a ton of iron, needing 1 MJ, will cost 2,000 euros, and the labor will cost 38,000 euros, resulting in a final sell price of the car of 44,000 euros: 40,000 euro production cost and 2,000 (5%) capital profit. At the end,

nothing will have happened to the economy, except inflation, namely a change in exchange ratio between fiat-currency and real currency, energy. This is shown in the inflated pie chart (left pie II) of Fig. 1.

Of course, the restoration of this equilibrium will take some time. With especially wages lagging behind this government-sanctioned inflation, mostly consumption will be temporarily driven down. I.e., temporary poverty. This we can see in all governmental actions. They create instant poverty from which the system is constantly trying to recover. If the impoverishing of workers is so great that cars cannot be sold at all, the system can actually collapse altogether and we can have a reduction in physical economy accompanying the inflation. So-called stagflation.

Note that, in this context, subsidies are fully equivalent to taxes. Not only are subsidies merely negative taxes, and thus the same mathematics can be applied to them; the same forces will operate in the market. But, it must also be stated that the subsidies and taxes go hand in hand. One cannot exist without the other. That is because the state cannot have too high a deficit in its budget. Therefore, subsidies in one place have to be compensated by taxes in another place. Also too much taxing is not possible, because then the state makes profit, and the rest of the market turns into a negative-sum-game, an environment prone to economic collapse; nobody invests in an economy with an outlook on loss. For that reason, taxes must be accompanied by subsidies somehow somewhere. In total, the budget of a state is to constantly make a loss of a couple of percent. Something that is financially sustainable as long as the economy is growing (Stallinga, 2015).

One might think that, instead of energy reduction we are going to make an energy *transition*. Substituting coal-based energy by 'renewable' energy of some kind. First of all, it must be noted that a situation of renewable energies only is called nature, and was already thermodynamically optimized. When humans started using fossil fuels, the equilibrium was balanced in their favor, because they could produce much more entropy. Going back to renewable-only will put us back in our rightful place; humanity will be decimated.

If we do this transition by subsidies, the exact same phenomenon will occur as discussed above (subsidy is simply negative taxation, bringing the ratios off-equilibrium) and the ratios between fossil energy and renewable energy will eventually settle back at the levels determined by the free market. Don't forget that these products are also linked in the market and their equilibrium ratio is thus a fixed value. Renewable energies are made from products that are made from fossil energies. (Or at least energies are bought on the free market where they compete, and thus have an equilibrium value ratio). As such, renewable energy price is an exact factor of fossil energy price. Taxing one (or subsidizing one) will impact the other equally. That means: If renewable energies are not competitive without taxation/subsidy they will never be competitive with taxation/subsidy! The entire energy transition is thus a scam. No government action can make them profitable in energy terms (to the masses, the macro-economy; they will be profitable to the few, some specific micro-economies).

We can also say it in another way. At the end everything is based on energy. If at the free untaxed market something has a certain price, it costs a certain amount of energy since everything boils down to energy. (The wages of labor are not paid on basis of their contribution to the production, which is primarily done by energy slaves, but by them needing a salary to buy the products; Jean-Baptiste Say: “Every product creates its own market”). The ratio of the price of product and price of energy namely a fixed value determined by the market. Selling price is basically energy-units needed times price per energy-unit divided by 0.95 (or 0.9 in the above example). If then an electric car is twice as expensive as a petrol car, twice as much energy is used to produce it, and with the fossil-energy:renewable-energy ratio constant (as determined by the free market), twice as much carbon-dioxide is emitted into the atmosphere. The energy transition destroys the planet. We can thus say that saving the climate is not compatible with a free market, and we must collapse the economy (against Goal 8) for the climate (Goal 13). Or we must make a bold statement that communism is sustainable. Which can be outright rejected, because when people do not get rewarded on basis of production they're not going to participate in production, for the same thermodynamic principles: spending less energy (work) for more entropy (consumption).

If, on the other hand, we are going to politically force the buying of electric cars (for instance by forbidding other types on the road), we are going to have the same amount of energy consumption (since that can only grow by 5% annually), and thus less cars on the road. We can thus say that saving the climate is not compatible with the fight against poverty; again we see conflicting Goals. Moreover, these cars can probably only be bought by the rich, and we can say that saving the planet from climate doom is not compatible with the social-equality agenda or 'justice' (Goal 10). We need to set priorities, just as Lomborg warned us.

Looking at how the energy-transition swindle may work out, see Figure 3. A windmill has a certain cost of production, say 1 boe (barrel-of-oil equivalent), and returns half a boe in its lifetime, a loss of half a boe. With 1 boe of subsidy this loss is converted into half a boe of profit. Reducing the cost of production of the 'windmill' increases the profit even further. This industry thrives on subsidies alone. With such industries investing in green-energy lobbying at political centers they do risk-free business. Swindl mills. It simply transfers consumption rights (energy-usage rights) from the powerless to the powerful. (In this connotation the unit of power is not watt). It swindles money (consumption rights) out of the gullible masses that fall for the central power's narratives (viz. Agenda 2030). A narrative that is untenable in its whole, as Lomborg argued, and untenable in some of its core tenets, for instance the energy transition and sustainability items. In any case, even the subsidy swindle will not work on a macro-economic scale sustainably, as argued above. It changes nothing in economy, but changes the distribution of wealth produced.

We can take another look at the energy diagram of Figure 1 and make another important conclusion. As was shown, before and after tax the energy reckoning is equal; the only thing changed is the price of energy, and proportionally with it the price of

everything. We have also seen how the energetic contribution of workers to the production is rather insignificant, with most of the work done by energy slaves, yet most of the money (consumption rights) goes to these workers. It is then clear that this situation, with an *unfairly high reward for humans* (unfairness defined in energy terms, not in moral terms) is unsustainable, and the system will feel pressure to reduce this payment and to reduce the number of humans on the planet. Indeed, it is the *humans* that are unsustainable on this planet, and an (unbiased, simplified) sustainability program will thus have a tendency to eradicate the humans on this sphere in space. If humans were to be replaced by mechanical agents, the same production could be done more efficiently with a smaller ecological footprint to the planet. To ask, “What good would it do?!” (a planet bereft of human life, planets of which there exist literally billions in the universe; what good would one more do?), is not a question for us here to respond at this moment. But it is to be expected that such a political agenda exists in a world that makes sustainability a key issue and does not look at the human consequences, but executes an agenda in a technocratic way. An Agenda 2030 that has – possibly without realizing it – intrinsically set the eradication of humanity as its highest priority.

The support of commercial companies – ‘stakeholders’ as the technocrats call them in their reports – for this agenda, can be explained and has a very simple reason, which is rather a platitude: to make more profit. They have learned that by praising the agenda, they can sell more products to the gullible consumers (viz. replacing the entire car park by electric vehicles), and they can rake in more subsidies from government. This is what we call ‘greenwashing’. They could not care a iota about the environment or the planet itself, but have darwinistically adapted to a world where talking green lands them the greenbacks². Even energy companies (f.k.a. oil companies) will join this fight-against climate change (that they allegedly caused themselves), virtue-signaling their activities. An example is Royal Dutch Shell, already in 1991 ‘warning’ us for climate doom in their movie *Climate of Concern* (Royal Dutch Shell, 1991). They are currently in the business of raking in green-energy subsidies. Subsidies they forced into law while being in the European Roundtable of Industrialists (ERT; the lobbying group that *writes* most European laws). So much for a conspiracy of oil companies denying climate change!

4 CONCLUSION

It was shown in this work that the Sustainability Agenda is self-contradicting. If no priorities are set in them, some of them are contradicting some others. This is of the type “You cannot have your cake and eat it”. In fact, if we want to minimize the ecological footprint of humans on this planet, this can be done by reducing humans to zero. In fact, it is the only mathematically safe way to do it. If we approach the problem by

²Slang for dollar

engineering, reducing the population technocratic ally, there is no control mechanism that will make the reduction stop at a certain level. It will reduce to zero!

As per Bill Gate's famous TED Talk, pollution is number of people times products per person times pollution per product. Reducing products means poverty (to zero means death), pollution per product to zero is impossible. That leaves the number of humans. And thus, a technocratic solution of a central unquestionable government, acting like a programmed machine, will implement a zero-humans agenda. Noteworthy, the Sustainable Development Goals of the United Nations (Table I) does not mention the *number* of people in the Utopian world. Can apparently be zero. Read again, all Goals can be achieved on a planet without humans. No poverty, no hunger, no sickness, no inequality, no climate change. Peace, biodiversity, strong ecosystems. All's well.

It is a profitable agenda, and one that technocrats like to execute. Yet, as Napoleon said, "Don't attribute to malice that what can be attributed to incompetence". Whether there are evil motives at play or not, fact is there exists a movement to eradicate humanity. To give an example, somebody in this system has put up huge blocks of granite in Georgia – the so-called Georgia Guidestones – with a purpose, "In order to avoid debate, we the sponsors of the Georgia Guidestones have a simple message for human beings, now and for the future. We believe our precepts are sound, and they must stand on their own merits." (The way this is written actually suggests it was not written by humans; in any case it sounds inhumanely arrogant, to treat humans as a herd that has to be managed). The first line of the message reads

"Maintain humanity under 500,000,000 in perpetual balance with nature."

Humans are considered redundant and had better be decimated to a number around 500 million, i.e., a culling of 93% of the world population, a culling performed by the *de facto* stewards of the planet, that is ... not you! (Was the writer one that never should have been born according to the writer?). What guarantees are there that a technocratic culling-agenda to 500 million will stop at 500 million and will not continue to zero?!

In this way machines can do all the production and they need much less consumption goods, ergo much more ecologically friendly. In fact these consumption goods – 'maintenance' – are so insignificant that they were taken out of the equations above, but mount to something like 1% of capital value annually, there where humans need 94% of maintenance annually, this mismatch is clearly unsustainable. This is rather ironic, when we put this in light of the so-called Malthusian Catastrophe. English economist and demographer Thomas Malthus (1766-1834) envisaged a dramatic overpopulation because human population would grow faster than the resources and thus misery would ensue. This was also regurgitated by Paul Ehrlich in his book *The Population Bomb* (1968) and then 'simulated' by the technocrats of the Club of Rome (Meadows et al., 1972). In 2023 we have an overpopulation not because of *lack* of resources, as Malthus envisaged, but because of an *excess* of resources! Too many

energy slaves for every human inhabitant. The solution is invariably the same; humans have to be decimated. For their own good.

To see how this is enacted in reality, remember how the Covid-pandemic was treated by this technocratic world government (more specifically the all-powerful World Health Organization of the same United Nations). If it was done correct or not is not relevant for the current discussion. What matters is that actions were taken, measures implemented, that were not debatable. None of the local governments had any voice in it, and popular protests were considered a menace to society. It was dictated from above, by a technocratic apparatus. What if the measures to implement sustainability actually lead to the demise of humanity? We will not have any way to stop it. As with Covid, we are merely bystanders in the process of a pan-global technocratic governance. A very dangerous tendency.

If energy slaves are going to be liberated in the final mechanical emancipation, there is no longer place for humans on this planet. We already see how machines can even write much better 'scientific' articles, with AI-tools like ChatGPT. Although it has to be said that this text was written by a human. Unless the Blade Runner robot, unaware of it being a robot itself, is already a reality.

On the other hand, we could define an objective in society, as was done by the Utilitarians. This ideology, led by the late 18th- and 19th-century English philosophers and economists Jeremy Bentham and John Stuart Mill proposed that the objective is to have the maximum happiness for the maximum number of people, which is a two-goals agenda and thus has simpler priority choices. Moreover, it puts the quality of life of humans at its objective, making all other possible points in a political agenda of lower priority, including the health of the planet. We only need a healthy planet if it maximizes the number of people and the quality of life of these people. This ideology is thus not commensurate the sustainability dogma, as was shown here.

This work did not receive any funding, except from the salary of the author at the University.

REFERENCES

- Copenhagen Consensus (2006). Copenhagen consensus center. <https://copenhagenconsensus.com/>.
- Economic Policy Institute (2022). "The productivity-pay gap". updated october 2022. <https://www.epi.org/productivity-pay-gap/>.
- Ehrlich, Paul R., Howland Ehrlich, Anne (1968). "The Population Bomb". Sierra Club / Ballantine Books. ISBN 1-56849-587-0.
- Energy Skeptic (2020). "Energy Slaves: every American has 200 to 8,000 energy slaves". <https://energyskeptic.com/2020/energy-slaves/>.

- Lavoisier, A. (1789). “Traité élémentaire de chimie (elementary treatise on chemistry)”. Chez Cuchet.
- Łobaczewski, A. M. (1998). “Political ponerology: A science on the nature of evil adjusted for political purposes”. Red Pill Press.
- Lomborg, B. (2005). “Ted Talk: Global priorities bigger than climate change”. https://www.ted.com/talks/bjorn_lomborg_global_priorities_bigger_than_climate_change.
- Marx, Karl (1875). “Critique of the Gotha Program (German: *Kritik des Gothaer Programms*)”.
- Meadows, Donella H., Meadows, Dennis L., Randers, Jørgen, Behrens III, William W. (1972). “The Limits to Growth”. Potomac Associates - Universe Books. ISBN: 0-87663-165-0.
- Ossónoba Philosophical Society (2016). <https://ossonobaphilosophicalsociety.org/>
- Piketty, T. (2014). “Capital in the 21st century”. Éditions du Seuil / Harvard University Press. ISBN 978-0674430006.
- Royal Dutch Shell (1991). “Climate of Concern”. <https://www.youtube.com/watch?v=0VOWi8oVXmo>.
- Stallinga, P. (2015). “Money: In gold we trust”. stallinga.org.
- Stallinga, P. (2020). “On the energy theory of value: Economy and policies”. *Modern Economy*, 11, pp.1083–1120. DOI: 10.4236/me.2020.115081.
- United Nations (2015). “Transforming our world: The 2030 agenda for sustainable development”. A/RES/70/1, pp.1–35.

Forecasting Turkiye and BRICS Country Indices by Machine Learning

Reyhan CAN¹

Abstract

Introduction: Forecasting future price movements has always been a topic of interest to researchers. One of the factors that drive researchers to work on forecasting future price movements is risk. Economic developments, uncertainty and risks are factors that directly affect the decisions of investors and financial institutions. Forecasting and forecasting models are important for investors and financial institutions to make the right decisions. When the studies on forecasting in recent years are analyzed, it is seen that one of the methods used is machine learning. Machine learning is frequently used in the field of finance as an alternative statistical method in areas such as financial failure, price forecasting, exchange rate forecasting, etc.

Aim: The aim of this study is to forecast BRICS country indices (Brazil - Bovespa, Russia - RTSI, India - Nifty 50, China - Shanghai, South Africa - South Africa 40 Index) and Turkiye-BIST 100 Index.

Method: Artificial neural network and support vector machines, which are machine learning methods, were used to estimate the indices.

Findings: As a result of the research, it was concluded that support vector machines made better predictions than artificial neural networks with the specified period and variables.

Originality and value: In this study, the indices of BRICS countries and Turkiye, which have similar characteristics and are among the developing countries, were predicted by machine learning.

Key Words: Index Forecasting, Machine Learning, Macroeconomic Indicators

Jel Codes: E44, G17, G19

1. INTRODUCTION

When making an investment decision, an investor wants to achieve the highest return with the lowest risk. However, it is difficult to say that investors always have this opportunity. This is because investment decisions are influenced by many factors and it is not always possible to know or consider all of these factors. There are many investment instruments that investors can invest in, and one of the places to invest is the stock exchange. Investors who are considering trading on stock exchanges where there are many investment instruments should examine the stock exchanges they plan to invest in.

There are two main reasons for analyzing the instruments in stock exchanges from the investors' perspective. The first reason is that they are an effective tool for investors

¹ Asistant of Prof., Nigde Omer Halisdemir University, Nigde Vocational School of Social Sciences , Accounting and Tax, Acoounting and Tax Applications, Turkey

to hedge against potential market risks. The other is that it creates new earning opportunities for market speculators and arbitrageurs. Therefore, being able to accurately predict the stock market index is important for both researchers and investors (Chen, Leung and Daouk, 2003).

Stock exchanges are a highly complex, non-linear system. Stock markets are affected not only by their own regulations but also by many other factors such as business policies, economic situation and investor psychology (Yang, Jiankun, Sichang, 2012). This situation causes high volatility and uncertainty and makes it difficult to predict the stock market index (Yakut, Elmas, Yavuz, 2014).

Although predictions have been made with many different methods in the studies, it has recently been seen that predictions are frequently made with machine learning. The main task of machine learning is to make inferences from an example using statistical theories. With machine learning, changes occurring in the system are learned by the machine and programmed to optimize a performance criterion using sample data or past experiences (Kartal, 2020). The fact that the fewer assumptions of machine learning compared to other techniques provides flexibility to researchers, and the superiority it provides in terms of generalization, risk assessment and prediction has made the use of machine learning techniques in forecasting models widespread (Filiz, Karaboğa, Akoğul, 2017). Artificial neural networks, support vector machines, fuzzy systems and genetic algorithms, which are machine learning methods for forecasting purposes, are widely used in finance (Boyacıoğlu, Avcı, 2010).

The aim of this study is to forecast BRICS country indices and BIST 100 Index values between 01.2003 and 06.2023 using machine learning artificial neural networks and support vector machines. In the first part of the study, studies on stock market index forecasting are given. In the second part of the study, information about the methodology used is given. In the third section, the analysis data and the findings obtained will be evaluated.

2. LITERATURE REVIEW

Adya and Collopy (1998) analyzed 48 studies using artificial neural networks for forecasting within eleven guidelines between 1988 and 1994. The study evaluated how effective the proposed techniques were in alternatives (effectiveness of validation) and how well the technique was applied (effectiveness of implementation). As a result of the review, 18 of the 22 studies found results that supported the use of neural networks for forecasting, while the other studies reported favorable results, although there were some problems with the quality of the neural network applications.

In his study, Diler (2003) used artificial neural networks to predict the direction of the ISE² National 100 Index for the next day. According to the results of the study, the

² Istanbul Stock Exchange (ISE) was renamed “Borsa Istanbul” on April 5, 2013, and the abbreviation BIST is now used.

next day direction of the ISE National 100 Index was predicted by artificial neural networks at a rate of 60.81%.

Pan, Tilakaratne and Yearwood (2005) tried to predict the Australian stock market index AORD with artificial neural networks. In the study, while the existence of a 6-day cycle in the It was stated that during the analyzed period, a prediction result with 80% accuracy was obtained with the help of a basic neural network using the six-day AORD return, one-day SP&500 return and the day of the week of the Australian stock market.

In Karaatlı, Güngör, Demir and Kalaycı (2005), stock market index forecasting was made based on the data between 1990-2002. In the study, forecasts were made with artificial neural networks and regression method using monthly index closing prices and macroeconomic data. As a result of the research, it is stated that ANN model is more successful than regression model in forecasting.

Avcı (2007) forecasts the daily and sessional returns of the ISE-100 index by using multilayer pörseptron using January 1996-June 2005 trading volume data. According to the findings of the study, multilayer perceptron models performed well in predicting the ISE-100 (BIST 100) index return, but it was stated that the predictive power of artificial neural network models can be further improved by using different variables and different model structures.

Özdemir, Tolun and Demirci (2011) utilized monthly data covering the period from February 1997 to December 2010, eight macroeconomic indicators, MSCI European Index, MSCI Emerging Markets Index and S&P500 indices to predict the direction of the return of the ISE-100 (BIST 100) index using logistic regression and support vector machines. According to the study, forecasts were made with approximately 75% accuracy with logistic regression and 86% accuracy with support vector machines. The study also indicated that support vector machines can be used effectively by investors and researchers as an alternative method for predicting stock returns.

Aygören, Sarıtaş and Moralı (2012) tried to predict the ISE 100 index by using traditional time series, numerical search models and artificial neural networks methods with the help of data on ISE 100 (BIST 100), Gold Prices, Interest Rate, Interbank Bilateral Transactions (TL) and USD daily closing values. As a result of the research, it was stated that the artificial neural network model gave more successful results than the other two models.

Tosunoğlu and Benli (2012) tried to predict the Morgan Stanley Capital International (MSCI) Türkiye index with artificial neural networks using data for the period December 1987-August 2008. As a result of the study, it is stated that the forecasts obtained with artificial neural networks regarding the index values are successful.

Yang, Jiankun, Sichang (2012), based on the data from March 17, 2010 to April 28, 2010, the back-propagation neural network model was used to predict the Shanghai Stock Exchange Composite Index. According to the results of the study, it was successfully applied to predict the daily high, low and closing value of the Shanghai

Stock Exchange Composite Index, but it could not predict the rate of return of the Shanghai Stock Exchange Composite Index in the short term.

Yakut, Elmas, Yavuz (2014) investigated whether an effective prediction of the BIST index can be made with the help of feed-forward artificial neural networks and support vector machines using 2005-2012 data. As a result of the research, it was stated that artificial neural networks and support vector machines methods can be modeled in forecasting the stock market index.

Sheta, Ahmed, Faris (2015) tried to predict the S&P 500 index using artificial neural networks and support vector machines and investigated how traditional models such as multiple linear regression behave in this case. In the study, 27 potential financial and economic variables that affect stock movements were used to establish a relationship between the index and these variables. As a result of the study, it was stated that the forecasts obtained by the support vector machines method gave better results than the forecasts obtained by artificial neural networks and multiple linear regression method.

Güzel, Acar,Avcı (2016) used data for the period January 2002-December 2015 for BIST-100 index return forecasting. Fuzzy neural network method was used in the study. As a result of the study, it is stated that the index return can be predicted at a high rate, while all other factors are constant, it is also possible to observe the change in the prediction success of the model as a result of the change in the time element of the data set.

Özer, Sarı, Başakın (2018) tried to predict the stock returns of developing countries China (Shangai), India (Nifty 50), Mexico (IPC-Mexico) and Istanbul (BIST-100) and developed countries USA (Nasdaq), UK (FTSE-100), Germany (DAX) and France (CAC-40) with data from 2012-2016. The study concluded that various artificial intelligence models can be successfully applied to predict stock returns.

Kara, Ecer (2018) compared the performance of various classification methods in predicting the direction of movement of the BIST Bank Index. As a result of the research, it was determined that artificial neural networks have 81.74%, support vector machines 60.87%, logistic regression 76.70% and linear discriminant analysis 76.87% correct classification performance.

Pabuçcu (2019) tried to predict the direction of BIST 100 index movements using artificial neural networks, support vector machines and Naive Bayes classifier algorithm. The data set of the study consists of daily closing prices covering the period 2009-2018. According to the findings, all three models can be used to capture stock market index movements, and the artificial neural network algorithm is found to be a better classifier.

In Kartal (2020), the return directions of the S&P 500, DAX and NIKKEI 225 indices along with the BIST 100 index were classified using support vector machines with the help of monthly data for the period 01.01.2013 - 30.11.2019. As a result of the research, it is stated that while the model has good classification success in bullish forecasts, it does not show the same success in bearish forecasts.

Molla, Çağıl and Uyaroglu (2021) investigated the predictability of BIST 100 index returns. Between 02.01.2008 and 02.01.2018, ANFIS and artificial neural networks were used as the analysis method. In the study, macroeconomic factors such as BIST 100 index, interest rate, US Stock Market Index (S&P 500) and exchange rate were used as input variables. As a result of the chaos analysis, it is determined that the BIST 100 return series has a chaotic structure. Later, the BDS test showed that this series is not linear. However, the Hurst exponential coefficient was analyzed and it was concluded that this series has a long-term memory effect.

3. RESEARCH METHODOLOGY

The aim of this study is to predict the stock market index value of BRICS countries and Türkiye using artificial neural networks and support vector machines in machine learning technique.

3.1. Artificial Neural Networks

Neural networks can be defined as "highly simplified models of the human nervous system that exhibit abilities such as learning, generalization and abstraction" (Hawley, Johnson, Raina, 1990). The human brain consists of a network of neurons connected by receptors and effectors. Receptors are called "dendrites" and effectors are called "axons". Dendrites collect signals from many other neurons in a limited area. The axons combine the collected signals and produce a response signal (Dongare, Kharde, Kachare, 2012). This structure that makes up the nervous system has aroused curiosity for years and this curiosity inspired the idea of artificial neural networks. The concept of an artificial neural network was introduced in 1943 when Warren McCulloch, a neurophysiologist, and Walter Pitts, a young mathematician, wrote a paper on how neurons could work (Maind, Wankar, 2014).

Artificial neural networks (ANNs), inspired by biological neural networks, are information processing systems consisting of a large number of simple processors with a large number of interconnections (Jain, Mao, 1996). A neural network system does not rely on a pre-programmed knowledge base. Instead, it learns through experience and can continue to learn as the problem environment changes and is suitable for dealing with unstructured problems, inconsistent information and real-time outputs (Hawley, Johnson, Raina, 1990). Artificial neural network can be used to perform classification, pattern recognition and prediction tasks (Sheta, Ahmed, Faris, 2015). As an alternative for financial problems, ANNs are used in finance for assessing bankruptcy risk, forecasting, identifying arbitrage opportunities, and technical and fundamental analysis (Hawley, Johnson, Raina, 1990).

ANNs models are a computational model that attempts to mimic the structure or functional aspects of biological neural networks using some "organizational" principles believed to be used in humans (Jain, Mao, 1996). It is used to mimic the human brain's ability to process data and information and extract existing patterns. Based on the

architecture of the human brain, a set of processing elements or neurons (nodes) are interconnected and organized in layers. These layers are input layers, hidden layers, and output layers (Hajizadeh, Seifi, Zarandi, Turksen, 2012). The input layer is responsible for transferring the information entered by the user to the hidden layers without any processing. The information entered into the input layer is processed in the hidden layer, which may be more than one. Outputs are obtained from this processed information and the information obtained is sent to the outside world from the output layer (Yakut, Elmas, Yavuz, 2014).

In the input layer, input signals are received from the node's connections and weights are assigned to the input signals. The value of the node is the sum of all weighted input signals. This value is compared with the threshold activation level of the node. When the value reaches the threshold level, the node transmits a signal to its neighbors through the activation method by assigning a positive weight since it will increase the activation level. These weight-numerical estimates of the direction and strength of the connections between nodes are elements of the artificial neural system "learning" process and include rewards and punishments. When the system responds correctly to an input, the "reward" consists of strengthening the current matrix of node weights. This makes it more likely that a similar response will be generated by similar inputs in the future. When the system responds incorrectly, the "penalty" entails adjusting the node weights based on the specific learning algorithm used, so that the system responds differently when it encounters similar inputs again. Thus, undesirable actions are progressively inhibited, while desirable actions are progressively reinforced (Hawley, Johnson, Raina, 1990). Training examples are used as input to the network through the input layer, which is connected to one or more hidden layers. Information processing takes place in the hidden layer through connection weights. The hidden layers are connected to an output layer where the neurons most likely have a linear sigmoid function. A learning algorithm such as BP one can be used to adjust the ANN weights so as to minimize the error difference between the actual (i.e. desired) output and the ANN output (Sheta, Ahmed, Faris, 2015).

ANNs are divided into feed-forward and feed-back networks according to the connections between neurons. Feed-forward networks only receive inputs from the previous layer and send outputs only to the next layer. In feedback neural networks, the output of a layer can be transmitted as information not only to the next layer but also to the previous layer (Molla, Çağıl, Uyaroğlu, 2021; Hajizadeh, Seifi, Zarandi, Turksen, 2012). In this study, Feed Forward Multilayer Perceptron Neural Network was used.

In neural networks, the measure used to determine how well the network learns the relationship between data is called a performance measure. The most commonly used performance measures are sum of squared errors (SSE), mean absolute error (MAE), mean squared error (MSE), root mean squared error (RMSE) and mean absolute percentage error (MAPE) (Tosunoğlu, Benli, 2018; Avcı, 2007).

3.2. Support Vector Machines

Support vector machines (SVMs) were first introduced by Vladimir Vapnik and his colleagues at AT&T Bell Laboratories (Sheta, Ahmed, Faris, 2015) and are a statistical machine learning technique whose primary goal is prediction (Guenther, Schonlau, 2016). SVMs are an algorithm with application areas such as classification, character recognition, regression and time series (Pabuçcu, 2019). This new learning algorithm can be seen as an alternative training technique for Polynomial, Radial Basis Function and Multilayer Perceptron (artificial neural network) classifiers (Kartal, 2020). The main difference of SVMs from classical regression methods is that instead of minimizing the mean square error, it works on the principle of minimizing structural risks based on statistical learning theory (Kara, 2017).

SVMs are of interest because they generally produce higher classification accuracy than traditional methods and have the ability to successfully handle small training data sets. The main principle that benefits SVMs is the pursuit of structural risk minimization in the learning process. While statistical techniques such as maximum likelihood estimation usually assume that the data distribution is known a priori, SVMs minimize the classification error in unseen data without making a priori assumptions about the probability distribution of the data (Mountrakis, Im, Ogole, 2011). The interesting feature of SVM is that it works in the nature of structural risk minimization in statistical learning theory, rather than the empirical risk minimization principle derived by minimizing the mean error square on the data set (Yakut, Elmas, Yavuz, 2014). SVMs create a minimized VC (Vapnik-Chervonenkis) dimensional classifier by performing structural risk minimization, which shows generalization errors bounded by the sum of training errors. In this respect, the function found with SVM is a trade-off between the closeness to the data and the complexity of the solution (Özdemir, Tolun, Demirci, 2011).

The basic idea of SVM is to map the training data into higher dimensional space using a non-linear mapping function and then perform linear regression in the higher dimensional space to separate the data (Sheta, Ahmed, Faris, 2015).

The mathematical algorithms of SVM were initially designed for the problem of classifying two-class linear data, and then generalized for the classification of multi-class and non-linear data. The working principle of SVM is based on the definition of a hyper-plane that can optimally separate two classes (Kavzaoglu, Çölkesen, 2010). SVM creates the optimal separating hyperplane between two classes by maximizing the margin between the closest points of the classes (Meyer, Wien, 2001). The most popular error rate bound for SVMs is based on the concept of margin, which is the minimum distance between the hyperplane separating two classes and the data points closest to the hyperplane. The optimal hyperplane is therefore defined as the one with the maximum separation margin between the two classes (Mammone, Turchi, Cristianini, 2009). It would be an advantage if the margin between instances of two classes is as wide as possible (Kartal, 2020).

An SVM first maps the input points into a high-dimensional feature space and finds a separating hyperplane that maximizes the margin between the two classes in this space (Kartal, 2020). The created hyperplane runs by applying statistical learning theory. The task of support vector machines is to find the optimal hyperplane that separates the linearly separable data set. The process continues until the optimal plane is found (Demirel, Hazal, 2021). When a linear separator cannot be found, the data points are (usually) projected onto a higher dimensional space, where the data points become effectively linearly separable (Meyer, Wien, 2001). The solution of the optimal hyperplane can be written as a combination of several input points, called support vectors. The most basic classification problem in SVM is the classification of a linearly separable "two-class" data set (Kartal, 2020). It can be shown that the most appropriate hyperplane in terms of classification performance is the one with the maximum margin of separation between the two classes (Karatzoglou Meyer, Hornik, 2006).

SVM can be applied to classification and regression problems. The basic idea of SVM regression is to find a linear discriminant function that reflects the character of the available training data as closely as possible and conforms to statistical learning theory. Similar to classification, kernel functions are used in regression to handle non-linearities. The two situations that can be encountered in Support Vector Machines are that the data are linearly separable or non-linearly separable (Yakut, Elmas, Yavuz, 2014). In SVM literature, there are polynomial SVMs, RBF SVMs, two-layer neural network SVMs and many others (Özdemir, Tolun, Demirci, 2011).

3.3. Data Analysis

In this study, with the help of artificial neural networks and support vector machines, which are machine learning methods, macroeconomic data and developed market indices for the period from January 2003 to June 2023, the value forecasts of Brazil-Bovespa, Russia-RTSI, India-Nifty 50, China-Shanghai, South Africa-South Africa 40 Index and Türkiye- BIST 100 Index were made. In the study, data for all variables are included in the research on a monthly basis. Data for Türkiye were obtained from the Central Bank of the Republic of Türkiye and the Turkish Statistical Institute (TUIK). The data for BRICS countries are obtained from the Central Banks of these countries. Index data for both countries were obtained from the [inveresting.com](https://www.inveresting.com) website.

Stock market indices are affected by various economic, political and psychological factors. While determining the macroeconomic variables to be used in the study, previous studies on this subject were examined. As a result of the literature review, inflation rate (Koyuncu, 2018; Ratanapakorn, Sharma, 2007; Özer, Kaya and Özer, 2011; Kuwornu, Owusu-Nantwi, 2011; Horasan 2008), exchange rates (Poyraz, Tepeli, 2014; Kaya, Çömlekçi, Kaya, 2013; Albayrak, Öztürk, Tüylüoğlu, 2012; Özer, Kaya, Özer, 2011; Kuwornu, Owusu-Nantwi, 2011; Brahmasrene, Jiranyakul, 2007; Ratanapakorn, Sharma, 2007; İlarslan, 2018; Derindere, Dizdarlar, 2008), gold ounce price (Alper, Kara, 2017; Albayrak, Öztürk, Tüylüoğlu, 2012; Özer, Kaya and Özer, 2011), brent oil barrel price ((Kuwornu, Owusu-Nantwi, 2011; Brahmasrene,

Jiranyakul, 2007) were determined. DAX, DOWJONES, FTSE, NIKKEI, S&P500, NASDAQ and the fear index VIX are used as developed market indices.

3.3.1. Analysis with ANN Model

The analysis started with the organization of the data. At the data preprocessing stage, the data were normalized using the Min-Max method. The formula for the min-max method used to transform the data into the range [0,1] is given in the equation below (Tosunoğlu, Benli, 2012):

$$x'_i = \frac{x_i - \text{Min}(x_i)}{\text{Max}(x_i) - \text{Min}(x_i)}$$

In order to prevent overfitting, which is one of the problems that occur during ANN training, the data set can be divided into three subgroups as training, test and validation set (Hajizadeh, Seifi, Zarandi, Turksen, 2012). In order to prevent overfitting, the data should be divided into training, test and validation sets after normalizing the data. In this study, the data set is divided into 70% for training, 10% for validation and 20% for testing. The total number of data in the data set is 246. Accordingly, 171 data were used for training, 25 for validation and 50 for testing.

The next step is to build the model. The number of input, hidden and output layers, the number of neurons in these layers, the activation function, the learning algorithm, the parameters of the learning algorithm and the performance criterion are determined. The model is a feed-forward network with a single input layer, multiple hidden layers and a single output layer. The activation function is chosen as the relu function which gives the best prediction value after all the experiments. The performance measure is the mean square error (MSE).

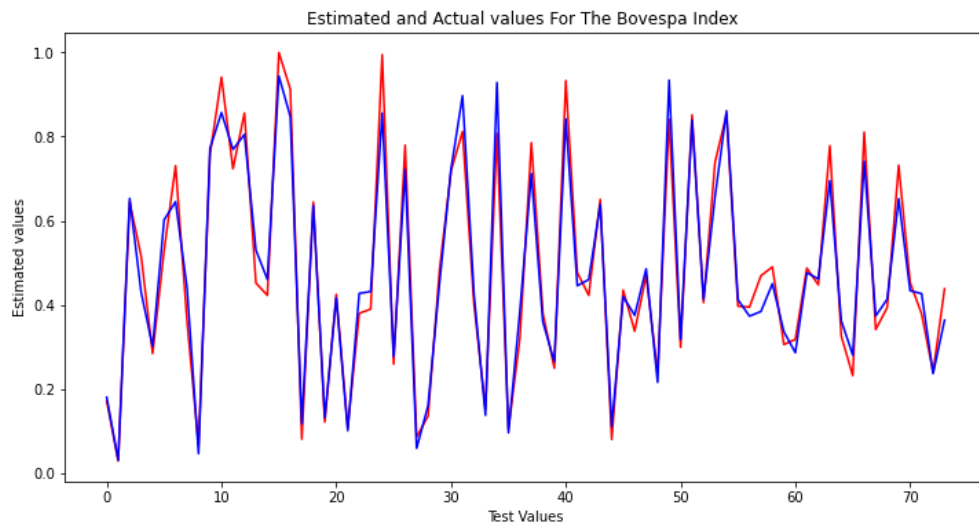
While determining the parameters of the artificial neural networks mentioned in Table 1, many trials were conducted. As a result of these experiments, the best parameters obtained for each country index are given in the table below.

Table 1: Parameters of the ANNs

	Brazil	Russia	Chinese	India	S.Africa	Turkiye
Type of Network	MLP	MLP	MLP	MLP	MLP	MLP
Learning Rate	0,05	0.01	0.05	0.05	0.05	0.02
Activation Function	relu	relu	relu	relu	relu	relu
MSE	0.051	0.070	0.173	0.040	0.142	0.060
R²	0.910	0.646	0.059	0.976	0.689	0.826

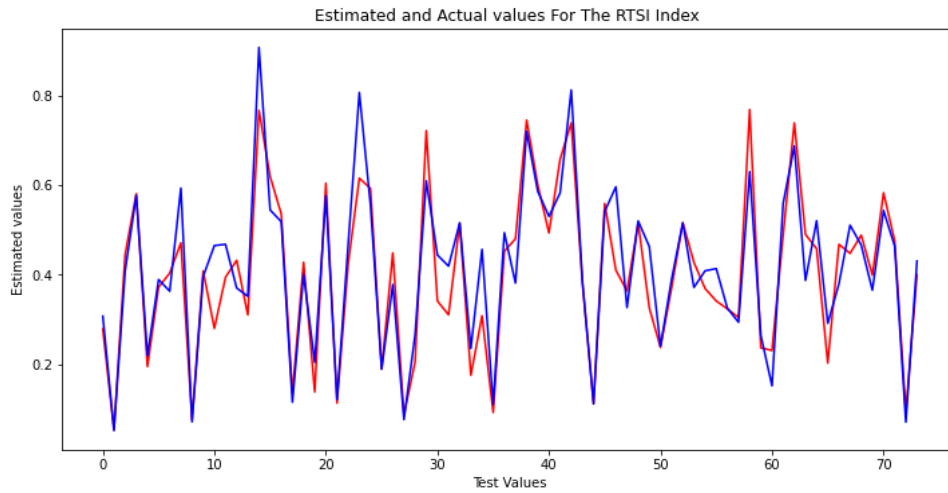
Brazil

As a result of the analysis, the Bovespa Index was predicted with 91% accuracy for the specified period with the Multilayer ANN method. The graph below shows the predicted and actual values of the Bovespa Index.



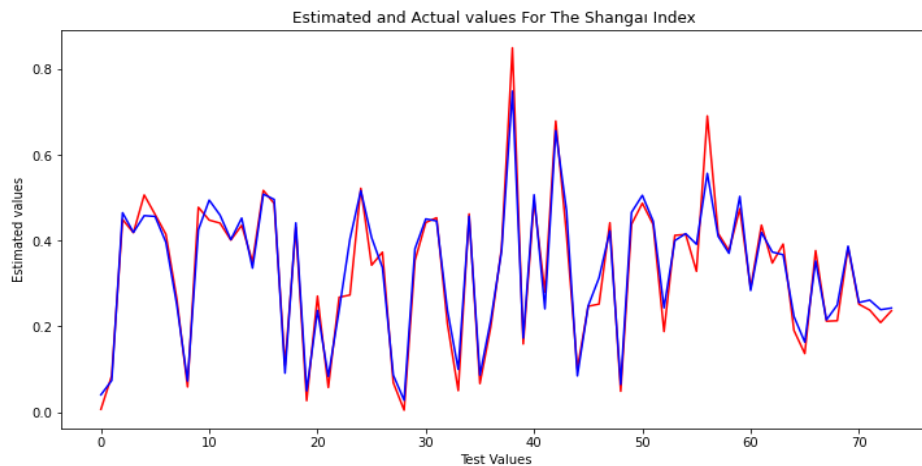
Russia

As a result of the analysis, the RTSI Index was predicted 65% accurately by the Multilayer ANN method for the specified period. The graph below shows the predicted and actual values of the RTSI Index.



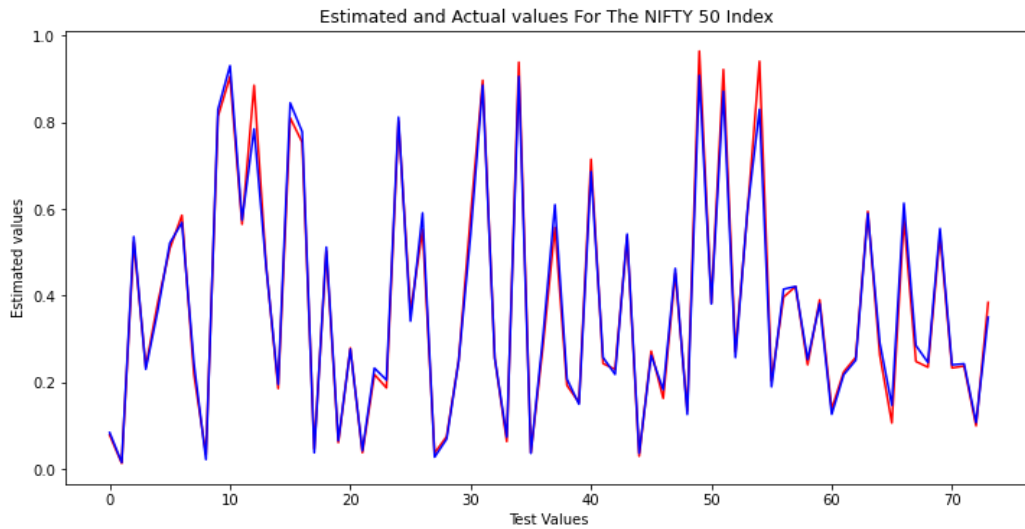
Chinese

As a result of the analysis, the Shangai Index was predicted 6% accurately for the specified period with the Multilayer ANN method. The graph below shows the predicted and actual values of the Shanghai Index.



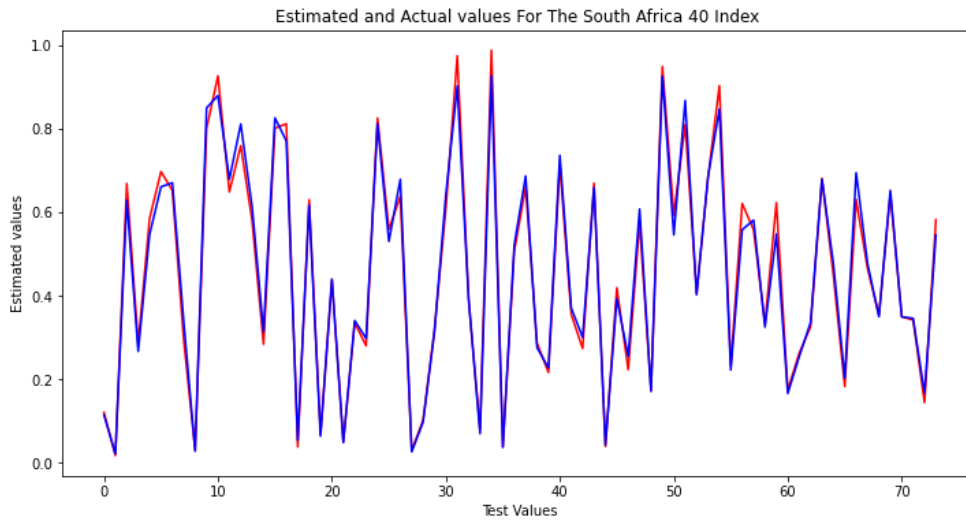
India

As a result of the analysis, the Nifty50 Index was predicted 98% accurately by the Multilayer ANN method for the specified period. The graph below shows the predicted and actual values of the Nifty50 Index.



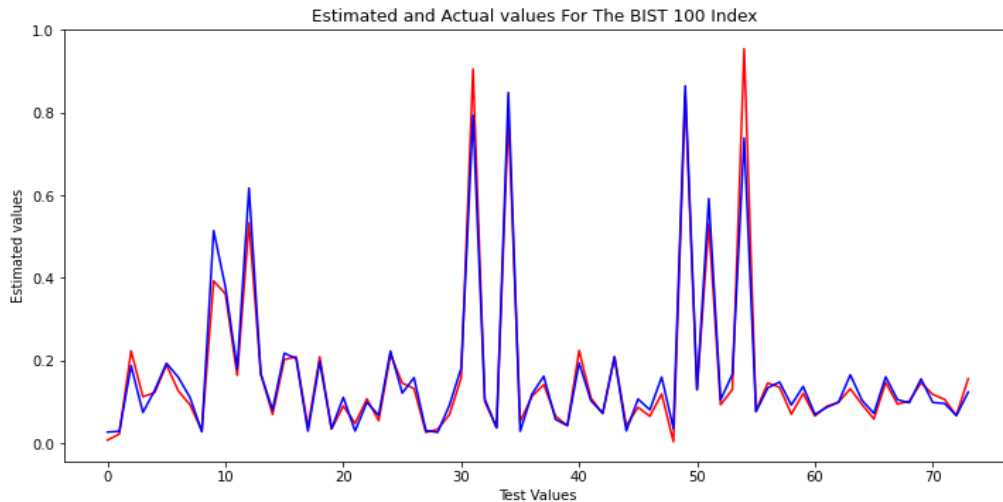
South Africa

As a result of the analysis, the South Africa 40 Index was predicted 69% accurately for the specified period with the Multilayer ANN method. The graph below shows the predicted and actual values of the South Africa 40 Index.



Turkiye

As a result of the analysis, the BIST 100 Index was predicted with 83% accuracy for the specified period with the Multilayer ANN method. The graph below shows the predicted and actual values of the BIST 100 Index.



3.3.2. Analysis with SVM Model

Both linear and nonlinear models were analyzed with support vector machines. When the results of the linear model are analyzed, Bovespava Index, RTSI Index, Shangai Index, Nifty50 Index, South Africa 40 Index and BIST 100 Index were predicted with 92%, 63%, 59%, 96%, 98% and 93% accuracy respectively. The predictions made with the RBF network, which is a non-linear model, were 91% for Bovespava Index, 64% for RTSI Index, 59% for Shangai Index, 40% for Nifty50 Index, 98% for South Africa 40 Index and 93% for BIST 100 Index. As a result of the analysis, it was seen that the linear SVM model made the best prediction for all countries.

<i>Table 2: Parameters of the SVM</i>						
	Brazil	Russia	Chinese	India	S.Africa	Turkiye
Type of Network	Linear	Linear	Linear	Linear	Linear	Linear
MSE	8591.49	229.855	527.611	670.925	2267.834	279.226
R^2	0.918	0.638	0.594	0.965	0.983	0.932
Type of Network	RBF	RBF	RBF	RBF	RBF	RBF
MSE	9034.69	229.855	531.291	2806.593	2267.834	279.226
R^2	0.910	0.638	0.589	0.401	0.983	0.932

4. CONCLUSION

Stock price and index value forecasting has long been a topic of research for investors and analysts. However, when the literature is examined, it is understood that there is no clarity about which model achieves the best result in forecasting. In this study, machine learning, which has been used in recent studies, is used to forecast index values. Macroeconomic variables and developed market indices are utilized to predict index values.

As a result of the analysis, it was observed that the model created with support vector machines predicted the best prediction values for countries other than Russia and India. For Russia and India, the best prediction values were obtained with the artificial neural network model. For future studies, it is recommended to diversify the variables to be used in forecasting and to make a comparison in terms of different markets.

REFERENCES

- Adya, M., Collopy, F. (1998), “How effective Are Neural Networks at Forecasting and Prediction? A Review and Evaluation. *Journal of Forecasting*, 17(5-6), 481-495.
- Albayrak, A. S., Öztürk, N., Tüylüoğlu, Ş. (2012), “Makroekonomik Değişkenler ile Sermaye Hareketlerinin İMKB-100 Endeksi Üzerindeki Etkisinin İncelenmesi”, *Ekonomik ve Sosyal Araştırmalar Dergisi*, 8(2), 1-22.
- Alper, D., Kara, E. (2017), “Borsa İstanbul’da Hisse Senedi Getirilerini Etkileyen Makroekonomik Faktörler: BIST Sinai Endeksi Üzerine Bir Araştırma”, *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 22(3), 713-730.
- Avcı, E. (2007). “Forecasting Daily and Sessional Returns of the ISE-100 Index with Neural Network Models”, *Doğuş Üniversitesi Dergisi*, 8 (2), 128-142.
- Aygören, H., Sarıtaş, H., Morali, T. (2012), “İMKB 100 Endeksinin Yapay Sinir Ağları ve Newton Nümerik Arama Modelleri ile Tahmini”, *Alanya İşletme Fakültesi Dergisi*, 4(1), 73-88.
- Boyacıoğlu, M. A. Avcı, D. (2010), “Borsa Getirisinin Tahmini İçin Uyarlanabilir Ağ Tabanlı Bulanık Çıkarım Sistemi (ANFIS): İstanbul Borsası Örneği”, *Uygulamalı Uzman Sistemler*, 37 (12), 7908-7912.
- Brahmasrene, T., Jiranyakul, K. (2007), “Cointegration and Causality Between Stock Index and Macroeconomic Variables In An Emerging Market”, *Academy of Accounting and Financial Studies Journal*, 11(3), 17-30.

- Chen, A. S., Leung, M. T., Daouk, H. (2003), “Application of Neural Networks to an Emerging Financial Market: Forecasting and Trading The Taiwan Stock Index”, *Computers & Operations Research*, 30 (6), 901-923.
- Derindere, S., Dizdarlar, H. I. (2008), “Getiri Aralığının Sistematiik Riskin Ölçüsü Olan Beta Üzerine Etkileri: İMKB’de Bir Uygulama”, *Afyon Kocatepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 10(1), 1-17.
- Diler, A. İ. (2003), “İMKB ULUSAL-100 Endeksinin Yönünün Yapay Sinir Ağları Hata Geriye Yayma Yöntemi İle Tahmin Edilmesi”, *İMKB Dergisi*, 7(25-26), 65-81.
- Dongare, A. D., Kharde, R. R., Kachare, A. D. (2012), “Introduction to Artificial Neural Network”, *International Journal of Engineering and Innovative Technology (IJEIT)*, 2(1), 189-194.
- Filiz, E., Karaboğa, H. A., Akoğul, S. (2017), “BIST-50 Endeksi Değişim Değerlerinin Sınıflandırılmasında Makine Öğrenmesi Yöntemleri ve Yapay Sinir Ağları Kullanımı”, *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 26(1), 231-241.
- Guenther, N., Schonlau, M. (2016), “Support Vector Machines”, *The Stata Journal*, 16(4), 917-937.
- Güzel, F., Acar, M., Avcı, D. (2016), “Bulanık Sinir Ağı Yapısı İle Borsa Endeks Getirisi Tahmini: Borsa İstanbul (BİST) 100 Örneği”, *Akademik Sosyal Araştırmalar Dergisi*, 4(29), 452-465.
- Hajizadeh, E., Seifi, A., Zarandi, M. F., Turksen, I. B. (2012), “S&P 500 Endeksi Getirisinin Oynaklığını Tahmin Etmek İçin Hibrit Bir Modelleme Yaklaşımı”, *Uygulamalı Uzman Sistemler*, 39 (1), 431-436.
- Hawley, D. D., Johnson, J. D., Raina, D. (1990), “Artificial Neural Systems: A New Tool For Financial Decision-Making”, *Financial Analysts Journal*, 46(6), 63-72.
- Horasan, M. (2008), “Enflasyonun Hisse Senedi Getirilerine Etkisi: İMKB 100 Endeksi Üzerine Bir Uygulama”, *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 12(2), 427-435.
- İlarslan, K. (2018), “Kısa ve Uzun Dönemde Döviz Kurları İle Borsa Endeksi Arasındaki İlişkinin Açıklanmasına Yönelik Ampirik Bir Çalışma”, *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 36(1), 83-104.
- Jain, A. K., Mao, J., Mohiuddin, K. M. (1996), “Artificial Neural Networks: A Tutorial”, *Computer*, 29(3), 31-44.

- Kara, M. (2017), “Yapay Zeka Modeliyle Genişletilmiş Hibrit Black-Litterman Model Önerisi, Borsa İstanbul Bist-30 Endeks Verileri ile Test Edilmesi”, Hacettepe Üniversitesi, Yayınlanmamış Doktora Tezi, Ankara.
- Kara, İ., Ecer, F. (2018), Bist Endeks Hareket Yönünün Tahmininde Sınıflandırma Yöntemlerinin Performanslarının Karşılaştırılması”, Akademik Sosyal Araştırmalar Dergisi, 6(83), 514-524.
- Karaatlı, M., Güngör, İ., Demir, Y., Kalaycı, Ş. (2005), “Hisse Senedi Fiyat Hareketlerinin Yapay Sinir Ağları Yöntemi ile Tahmin Edilmesi”, Yönetim ve Ekonomi Araştırmaları Dergisi, 3(3), 38-48.
- Karatzoglou, A., Meyer, D., Hornik, K. (2006), “Support Vector Machines in R”, Journal of Statistical Software, 15, 1-28.
- Kartal, C. (2020), “Destek Vektör Makineleri ile Borsa Endekslerinin Tahmini”, İnsan ve Toplum Bilimleri Araştırmaları Dergisi, 9(2), 1394-1418.
- Vahdet, K., Çömlekçi, İ., Kara, O. (2013), “Hisse Senedi Getirilerini Etkileyen Makroekonomik Değişkenler 2002–2012 Türkiye Örneği”, Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, (35).
- Kavzoğlu, T., Çölkesen, İ. (2010), “Destek Vektör Makineleri ile Uydu Görüntülerinin Sınıflandırılmasında Kernel Fonksiyonlarının Etkilerinin İncelenmesi”, Harita Dergisi, 144(7), 73-82.
- Koyuncu, T. (2018), “BİST-100 Endeksinin Makroekonomik Değişkenler ile İlişkisi: Ampirik Bir Çalışma”, Finans Ekonomi ve Sosyal Araştırmalar Dergisi, 3(3), 615-624.
- Kuwornu, J. K., Owusu-Nantwi, V. (2011), “Macroeconomic Variables And Stock Market Returns: Full Information Maximum Likelihood Estimation”, Research journal of finance and accounting, 2(4), 49-63.
- Maind, S. B., Wankar, P. (2014), “Research Paper on Basic of Artificial Neural Network”, International Journal on Recent and Innovation Trends in Computing and Communication, 2(1), 96-100.
- Meyer, D., Wien, F. T. (2001), “Support Vector Machines”, R News, 1(3), 23-26.
- Molla, B., Cagıl, G., Uyaroglu, Y. (2021), “Chaotic Analysis of BIST 100 Return Time Series and Short-Term Predictability With ANFIS”, Mühendislik Mimarlık Fakültesi Dergisi, 36(2), 577-591.
- Mountrakis, G., Im, J., Ogole, C. (2011), “Support Vector Machines in Remote Sensing: A Review”, ISPRS Journal of Photogrammetry and Remote Sensing, 66(3), 247-259.

- Özdemir, A. K., Tolun, S., Demirci, E. (2011), “Endeks Getirisi Yönünün İkili Sınıflandırma Yöntemiyle Tahmin Edilmesi: İMKB 100 Endeksi Örneği. Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 4(2), 45-59.
- Özer, A., Kaya, A., Özer, N. (2011), “Hisse Senedi Fiyatları ile Makroekonomik Değişkenlerin Etkileşimi”, Dokuz Eylül Üniversitesi İktisadi İdari Bilimler Fakültesi Dergisi, 26(1), 163-182.
- Özer, A., Sarı, S. S., Başakın, E. E. (2018). “Bulanık Mantık ve Yapay Sinir Ağları ile Borsa Endeks Tahmini: Gelişmiş ve Gelişmekte Olan Ülkeler Örneği”, Hitit Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 11(1), 99-124.
- Pabuççu, H. (2019), “Borsa Endeksi Hareketlerinin Makine Öğrenme Algoritmaları ile Tahmini”, Uluslararası İktisadi ve İdari İncelemeler Dergisi, (23), 179-190.
- Pan, H., Tilakaratne, C., Yearwood, J. (2005), “Predicting Australian Stock Market Index Using Neural Networks Exploiting Dynamical Swings And Intermarket Influences”, Journal of Research and Practice in Information Technology , 37 (1), 43-55.
- Poyraz, E., Tekeli, Y. (2014), “Seçilmiş Makro Ekonomik Göstergelerin Borsa İstanbul XU100 Endeksi Üzerindeki Etkisinin Analizi”, Paradoks Ekonomi Sosyoloji ve Politika Dergisi, 11(2), 102-128.
- Ratanapakorn, O., Sharma, S. C. (2007), “Dynamic Analysis Between The US Stock Returns And The Macroeconomic Variables”, Applied Financial Economics, 17(5), 369-377.
- Sheta, A. F., Ahmed, S. E. M., Faris, H. (2015), “A Comparison Between Regression, Artificial Neural Networks and Support Vector Machines for Predicting Stock Market Index”, International Journal of Advanced Research in Artificial Intelligence, 7 (8), 2.
- Tosunoğlu, N. G., Benli, Y. K. (2012), “Forecasting of Morgan Stanley Capital International Türkiye Index with Artificial Neural Networks”, Ege Academic Review, 12(4), 541-547.
- Yakut, E., Elmas, B., Yavuz, S. (2014), “Yapay Sinir Ağları ve Destek Vektör Makineleri Yöntemleriyle Borsa Endeksi Tahmini”, Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 19(1), 139-157.
- Yang B., Jiankun, H., Sichang, Z. (2012), “Stock Market Prediction Using Artificial Neural Networks”, In Advanced Engineering Forum 6(7), 1055-1060.

The mediterranean transport corridor “5 GMED”: technological implications in the rail transport system

Rareş-Mihai Niţu¹, Alexandra-Maria Vlad², Roberta-Mihaela Stanef-Puica³

Abstract

Introduction: Technology has advanced to the point where it can be used in more areas than wealth development. Services are becoming increasingly technologically advanced to provide higher quality of service, meet more needs, be better, cheaper and of higher quality. One of the most important aspects and needs of people on both a macroeconomic and microeconomic level is transport. As a result, the use of technologies in the transport sector has become a key factor for economic development. Taking into account the importance of the transport sector for both people and products (goods stocks), it is determined that rail is the most efficient means of transport. Within this mode of transport, it is proven to be the cheapest and fastest means of transport.

Aim: This article focuses on observing the role of the transportation corridor as a main method than can be used to level up the productivity among countries from United European and more others. The main scope of the paper is to who that the separate advantages of every country is less productive as the efficiency of more nations taking all together.

Method: The method of research consists in key finding of the current concerns consists in the analyses of the report from the United Europe and third party economics agents that had already conducted technical analyses of the existing corridor.

Findings: The need to develop transportation systems arises from two perspectives: Most conventional methods pollute the air, thereby increasing the carbon footprint and carbon dioxide emissions into the air.

Originality and value: The article analyzes the key role that the transportations and logistics plays in the development of UE and the need to achieve the Green Deal Targets. Moreover, the project its not one of a kind, but one from a few, so the importance of these aspects it's going to be higher and will become a starting point for further analyses.

Key Words: electric, lithium, pollution

Jel Codes: O18, P18, P28.

¹ PhD, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

² PhD, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

³ Vice-Dean, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

1. INTRODUCTION

Although an attitude focused on recycling and sustainable development is encouraged, it should not be forgotten that each sector generates (in different forms and in different percentages) environmentally harmful resources (Noudeng et al., 2022). Electric car batteries have the great advantage of not producing any carbon. However, contrary to expectations, there is no agreed or recognized way to recycle them without having to use toxic chemicals to reuse certain battery components that could be reused. Solar panels lead to less pollution and the production of energy from free resources, in this case the sun as a common good for all people. However, the recycling of photovoltaic modules and cells that have reached the end of their life requires composting and management, which cannot be fully achieved using environmentally friendly methods. Products that promise to be ecological, biodegradable or susceptible to any pollution due to their use must be designed at the design stage so that they do not have a negative impact on the environment. Otherwise, the beneficial, positive effects

these needs by producing more, better and at an affordable price. One of the main needs of people is mobility, especially for family transport, namely the car. This means of transport is a special product that makes art out of the category of basic human needs (travel) due to the freedom of movement and the presence of multiple actors at a geographical level resulting from their use will be nullified by the disposal of the waste that the item in question produces at the end of its life. The article looks at the impact that the demand for electric vehicles, and automatically electricity to power these cars, has on the open market. In addition, it will be determined which is the healthy way from an economic perspective to ensure healthy and sufficient growth in the green energy sector and the production of electric cars (Noudeng et al., 2022).

The level of economic development continues to lead to increasing consumption and diversification of needs. On the one hand, the population at the peak of its existence leads to more needs to be satisfied and, consequently, the market needs more producers who are able to satisfy, which attract more customers year after year (Noudeng et al., 2022). On the other hand, these goods can also belong to the category of luxury goods, which are cars that aim not only to move the individual from point A to point B, but also to provide a higher level of conformity (Noudeng et al., 2022). The combustion of conventional resources (liquefied petroleum gas, gasoline and diesel with different octane ratings), as one of the largest fuel-consuming goods, has been found to be a major cause of increased environmental pollution and carbon footprint (Lai et al., 2022). As a result, clear decisions were made at an international but also local/regional level in order to be able to reduce the use of cars with higher pollutant classes and a consumer orientation towards the purchase of environmentally friendly products was sought. We are talking about electric cars or cars that use alternative resources such as artificial fuel (biofuel) or CNG (compressed natural gas). All of these alternatives are considered viable solutions, at least in the short term, to reduce pollution while meeting individual needs. It should be noted that, in addition to the high costs compared to traditional refueling methods, the refueling infrastructure is also not sufficiently developed to

compare with gas stations or gas stations that are already frequented by most drivers (Lai et al., 2022). Ultimately, travel costs are higher simply due to the need for information and the search for a gas station. In addition, installations currently require higher maintenance costs and are higher than traditional vehicles (Noudeng et al., 2022).

2. LITERATURE REVIEW

To encourage the purchase of such vehicles, a more favorable tax regime has been introduced for the procurement process. Some countries have offered subsidies to ease financial pressures, and in some areas the taxes and fees associated with owning such a movable asset have disappeared. What is encouraging for consumers and promises a return on investment is the value of utility costs, which are much cheaper with electricity than with fossil fuels. Although there are different opinions about the quality of service of an electric car, on a microeconomic level the demand is growing (Lai et al., 2022). At the beginning of 2011 there were almost 20,000 electric cars, and at the end of 2011 there were almost 5 million such cars (Noudeng et al., 2022). These market signals show that the level of infrastructure has declined, the quality of these machines has become better and better, and technology has advanced to the point where the price is affordable for individuals. Although several factors should be taken into account, the essential elements such as the distance that can be traveled with a full battery or the acquisition and maintenance costs have been designed to provide a beneficial solution (Ferrero et al., 2016). There is also the option of buying cars that run on hydrogen. The main disadvantage of machines that use this alternative feeding method is their very high cost. Since it is a mechanism that consumes a very high calorific value, it is necessary to have more safety features and an installation stable enough not to pose a danger to people on the road. Although the technology exists, the market does not have enough experience to provide a practical solution. Administrative and operating costs are very high. In terms of performance (Lai et al., 2022).

The main resource when discussing electric cars is not the batteries or raw materials in raw form that are used to build them (we refer to electrical circuits, physical systems attached to cars, or the ores and resources that are used to make an electric vehicle work). The most important resource is electricity (Ferrero et al., 2016). The most important resource when discussing electric cars is not the batteries or raw materials used to build them (Pistoia & Liaw., 2018).. The most important resource is electricity. Modern movements are leading to a shift towards green energy production, but today most energy comes from raw, polluting, traditional resources. Increasing demand for electric cars would cause prices to rise and automatically increase the use of conventional, polluting electricity methods (Ferrero et al., 2016). If the energy demand to power electric cars will be greater than the capacity to produce green energy, then the tension between resources and the need to reduce the carbon footprint will be greater and more difficult to achieve. This only affects the performance part, but not the development part. The possibility of supply from your own sources, from energy that each person generates individually through the installation of solar panels, can be taken

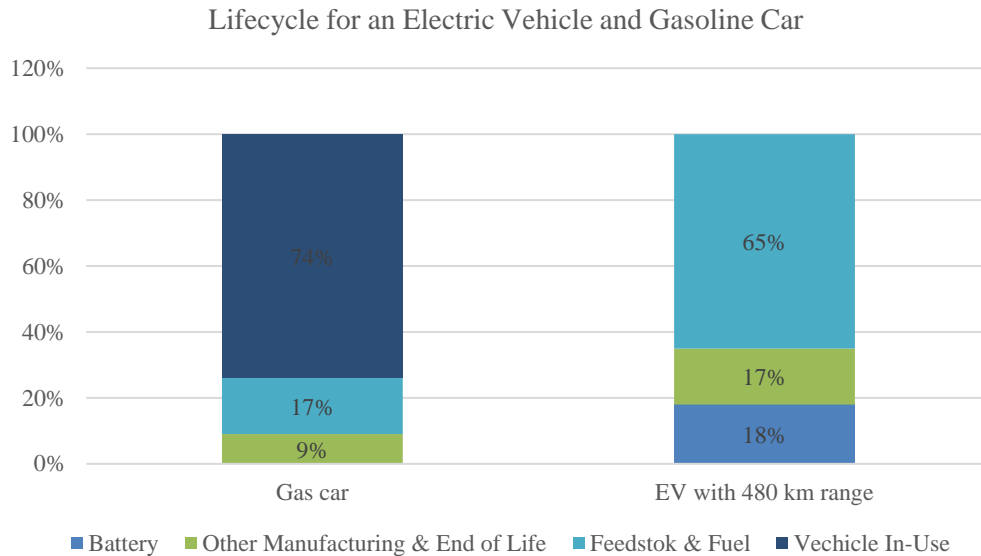
into account. In another form, windmill farms can be developed as a form of business specifically to power these machines (Ferrero et al., 2016). If it is functionally possible to ensure the year-round production of electricity from renewable resources, this varies depending on the owners of special machines, the recycling process of the facilities must take into account the way in which the final waste is disposed (Pistoia & Liaw., 2018).

3. RESEARCH METHODOLOGY

The projects and action plans that we are currently implementing (be they projects or concrete actions such as the Green Deal document at the European Union level) contain concrete measures to reduce current levels of pollution. The goals set are methodically thought out to alleviate the current problems of society. There is no concrete plan for the formation of economic sectors that have no negative impact at all, but rather for the formation of sectors that currently reduce environmental pollution by changing the paradigm and reorienting production and service processes in a different direction. In order for an economic process to be designed correctly and coherently in the field of the Green Economy (approach more focused on the area of service delivery) and in the field of the Circular Economy (approach more focused on the procurement of ecological products) the recovery is already more mature Products) (Requia et al., 2018). The entire work process must be ecological or as clean as possible in terms of the resources used and the results achieved (Feng et al., 2022). Currently, recycling cannot be discussed when considering electric cars. Some of these old parts can be recycled, but they are body parts or accessories inside or within the ride. Mainly plastics, metal materials and the other textiles in them can be operated on later. This is also the case with hybrid cars (Requia et al., 2018). These are vehicles that have an engine that uses conventional fuels such as gasoline or diesel, but are secondarily supported by an electrically powered engine.

The batteries and other components contained in an electric car (the cable system and the collection of existing circuits) have an average operating life of 10 years. Once such a system reaches a capacity of 70% of the efficiency level it had at the start of product use, it is considered inefficient and is sent for scrapping. The most valuable resources in these deposits are lithium and nickel, which are found in the components (Requia et al., 2018). These are valuable because it is cheaper in operation to retrieve these resources from a machine that has already been adopted than to process them raw, from unmodeled resources. However, two industrial processes must take place for processing (Requia et al., 2018). First, the battery or circuit containing these resources must be processed to get into a raw form that allows for reprocessing. In order for the preacher to reintroduce these resources into another production cycle, he must fundamentally modify and process them, which creates new costs and, as a result, price increases. The second process involving these resources is processing and modeling to make them the subject of new products (Requia et al., 2018). The need for lithium-nickel resources also arises in the area of energy and electrical installation. There is no

secondary market for these resources and they cannot be operated at a lower quality (i.e. a quality lower than their chemical and technical properties).

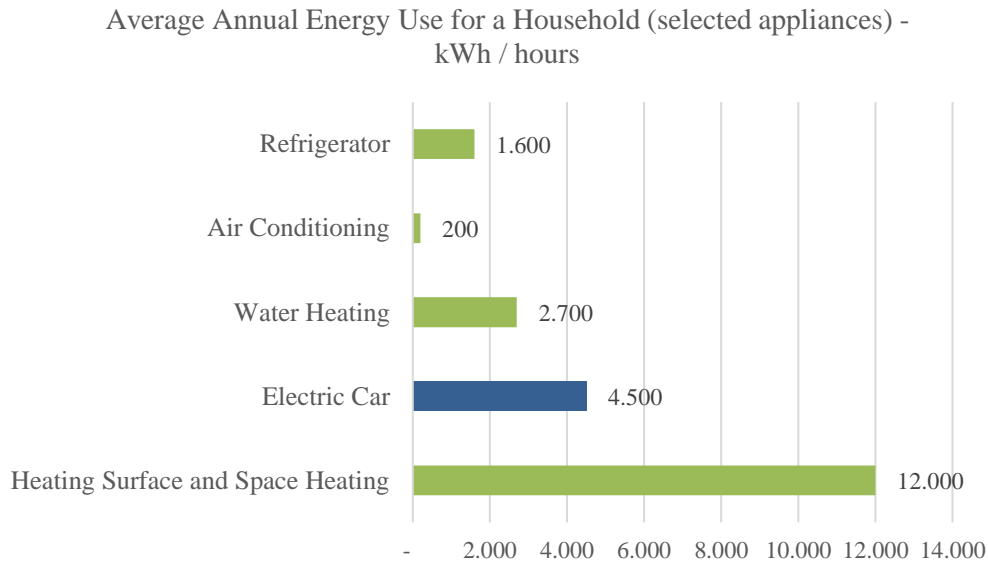


Source: Authors own processing of data from Eurostat database

As mentioned earlier, lithium and nickel production are two key industries in the production of electric cars. Importantly, however, it represents a primary source of production for many sectors of electrical product manufacturing. They are part of electrical circuits and components and therefore all variations of these two niche mineral sectors are felt by the end user in several sectors (Holland et al., 2019). Nickel is a crucial metal in modern infrastructure and technology and is used primarily in stainless steel and alloys. In addition, it is one of the key factors in the construction process of electric cars. Due to its electrical conductivity, nickel is also ideal for facilitating the flow of electricity in battery cells. In general, there are two main categories as to how these ores can be mined (Feng et al., 2022).

First of all, laterite deposits are the main source for the extraction and production of nickel. These are deposits that predominantly occur in tropical areas (Holland et al., 2019). The extraction process is traditional opencast mining (Feng et al., 2022). There, large amounts of earth and gravel have to be selected in order to obtain processable ore forms. Basically, air quality is decreasing and the high demand for cars also leads to an increase in the CO₂ footprint. In principle, to obtain materials that form environmentally friendly machines, it is necessary to pollute more for a short period of time, at least until demand reaches the level of available ore supplies (Chen et al., 2023). Second, nickel can also be found in sulfur ores, which are the underground or ground-level mining of

ore deposits containing nickel-rich sulfide minerals. The processing process is similar, except that this option involves mechanical and chemical processing of the deposits in order to obtain the required material. Sulfur deposits are currently the most widely used source of nickel, which is why many are investing in technological innovations to reduce pollution while continuing to supply the market with raw materials (Chen et al., 2023).



Source: Authors own processing of data from Eurostat database

Nickel extraction can therefore have significant environmental impacts such as deforestation, habitat destruction and soil erosion. This is not only about increasing the level of pollution, but also about changing the flora and fauna in order to make the mining quarry usable and functional, which is the only form of work where nickel extraction is possible. In addition, nickel ores often contain high moisture content, requiring energy-intensive drying processes to prepare them for further extraction (Holland et al., 2019). Once extracted, smelting laterite requires a significant amount of energy, most of which comes from fossil fuels, resulting in even higher pollution costs than previously reported. If the negative impact on the environment lasted longer than the use and wear of the minerals in the devices used, the investments would no longer be worthwhile. However, there is still the possibility of extracting these ores using sulfide. Sulfide mining is cleaner, but it also presents other environmental challenges (Holland et al., 2019). The extraction and processing of sulfide ores can release sulfur compounds and heavy metals into the environment, which if handled improperly can lead to acid mine drainage and contamination of water sources (Chen et al., 2023). In this case, the impact on the contaminated people would be immediate and accentuated.

In addition, the use of sulfides to extract minerals is more expensive due to their hard rock nature, which is why the market is encouraged to use this method only when there are very large supply shortages, which is difficult to do with high volumes of perishable goods such as cars (Camargos et al., 2022). Lithium is the second most important ore in the electric car industry and is largely responsible for battery performance and consumption. It is essentially used in phone batteries and any form of energy storage, battery or network scale (Camargos et al., 2022). Through the intelligent use of extraction processes and their combination with the latest technologies, manufacturers can create vehicles that promise a longer consumption range in the fully electric car sector from year to year. In terms of obtaining this element, there are generally two methods of use. The first method is to pump liquid substances from underground storage spaces, more precisely into evaporation ponds, where solar energy evaporates the water over the long term, leaving the lithium content behind. This substance is then absorbed and further processed to extract the useless waste and obtain the necessary substance (Camargos et al., 2022). The second option is extraction from hard rock or mineral ores found in quarry areas (Chen et al., 2023). This requires a large drilling capacity, which entails the intensive use of powerful machines powered by fossil fuels. However, this method is more environmentally harmful than the first variant. During ore extraction, the ore is drilled, sandblasted and crushed. The deposits are then processed into special machines that also use fossil fuels for the process (Holland et al., 2019). The chemical processing process emits less carbon dioxide per ton, even when chemicals are involved. The advantage of these methods lies precisely in the use of procedures that do not produce pollutants, do not leave residues in the atmosphere and do not require mechanical but chemical force, which is why the administration appears more environmentally friendly. Responsible practices in the extraction of nickel and lithium resources are therefore essential for the automotive industry for electric cars. However, these practices require the implementation of rules and environmental regulations that promote energy efficiency and environmental protection. The policies adopted and developed due to innovation and the increasing demand for such goods must target the main source, namely the final process, as well as all the technical processes that take place to obtain them. The regulations may be fiscal in nature and may be caused by the direct imposition of a tax on a certain amount of minerals (regardless of the form in which they are extracted) (Holland et al., 2019). But they can also be environmental policy measures or be applicable by setting a certain level of environmental indicators. Environmental indicators can take many forms and have calculation methods, including when analyzing the quality of the environment. Depending on the objective, the air quality, the amount of waste left behind or the amount of environmentally harmful resources attracted by industrial processes can be analyzed. The ultimate goal of these measures must be to reduce water consumption (for industrial use, not personal consumption), reduce the level of pollution of natural resources (e.g. water pollution from groundwater) and develop new technologies to optimize resource consumption. It seems that the transition to a green, sustainable economy can only be achieved through

increased consumption of pollutants. What needs to be kept in mind is the opportunity cost of the environment. In this context, there is the market for CO₂ emission certificates as well as for certificates of origin or waste permits. All of these instruments are primarily aimed at systematically regulating the business environment to ensure good environmental governance. Although it is of interest at international level to use electric masons over those who use energy convention methods, the implementation time must be influenced by the quality of the guidelines but also by technological development. Even if it seems like a good idea, working methods indicate certain opportunity costs that arise from activities that can end up having a greater than normal impact on the environment. One of the possibilities that are emerging in the market, but which is currently not a viable solution for mineral resources, is the recycling of materials/minerals, in their case nickel and lithium, from the machines used by the cars that are no longer in use become. I have to keep in mind that the process of modeling reconstruction can also pollute the environment, but to a lesser extent, so repurposing/reusing these resources is a long-term solution. The central point on which this entire process depends is the quality of resources when they are mature. In other words, the ores extracted from mature batteries must continue to have the technical qualities, those properties that allow them to be functional. Otherwise, it must be observed whether there is another industry that would need the conversion. Then the process must be pursued further, because the aim is to introduce these goods into environmentally friendly processes that generate added value and satisfy needs without increasing the pollutant index. What is gained on the one hand is lost on the other, and the added value only becomes visible at the level of bureaucracy, since the circuit in which the money supply would be integrated would be larger, but not of higher quality (Holland et al., 2019).

4. CONCLUSION

Green energy is a complex process that not only includes certain working behaviors, but also prescribes a certain set of laws, certain rules for economic operators, as well as a way of working for new companies. This way of working must take place at multiple levels and is closely linked to other industrial or economic services that enable the transition to a zero-carbon zone. If the green economy were supported by traditional economic sectors, the goal would not be achievable and the efficiency would be low. The key factors in achieving the objectives set by the European Commission and other organizations at international level are technological development and energy efficiency (which in turn depends on the responsible use of technology and compliance with product data sheets). There are currently at least environmentally friendly variants in the passenger car sector, but their average costs are higher than classic alternative variants. Although there are more systems that reward and encourage the purchase of electric cars, in certain areas of the European Union there is

either no infrastructure that allows individuals to use electric cars carelessly or the costs are too high, even if there are still deductions and Tax exemptions are taken into account. The same principle applies to cars that use fossil fuels or compressed natural gas.

REFERENCES

- Camargos, P. H., dos Santos, P. H., dos Santos, I. R., Ribeiro, G. S., & Caetano, R. E. (2022). Perspectives on Li-ion battery categories for electric vehicle applications: a review of state of the art. *International Journal of Energy Research*, 46(13), 19258-19268.
- Chen, Q., Hou, Y., Lai, X., Shen, K., Gu, H., Wang, Y., ... & Zheng, Y. (2023). Evaluating environmental impacts of different hydrometallurgical recycling technologies of the retired nickel-manganese-cobalt batteries from electric vehicles in China. *Separation and Purification Technology*, 311, 123277.
- Feng, T., Guo, W., Li, Q., Meng, Z., & Liang, W. (2022). Life cycle assessment of lithium nickel cobalt manganese oxide batteries and lithium iron phosphate batteries for electric vehicles in China. *Journal of Energy Storage*, 52, 104767.
- Ferrero, E., Alessandrini, S., & Balanzino, A. (2016). Impact of the electric vehicles on the air pollution from a highway. *Applied energy*, 169, 450-459.
- Holland, S. P., Mansur, E. T., Muller, N. Z., & Yates, A. J. (2019). Distributional effects of air pollution from electric vehicle adoption. *Journal of the Association of Environmental and Resource Economists*, 6(S1), S65-S94.
- Lai, X., Chen, Q., Tang, X., Zhou, Y., Gao, F., Guo, Y., & Zheng, Y. (2022). Critical review of life cycle assessment of lithium-ion batteries for electric vehicles: A lifespan perspective. *Etransportation*, 12, 100169.
- Noudeng, V., Quan, N. V., & Xuan, T. D. (2022). A Future Perspective On Waste Management of Lithium-Ion Batteries for Electric Vehicles in Lao Pdr: Current Status and Challenges. *International Journal of Environmental Research and Public Health*, 19(23), 16169.
- Pistoia, G., & Liaw, B. (Eds.). (2018). *Behaviour of lithium-ion batteries in electric vehicles: battery health, performance, safety, and cost*. Springer.
- Requia, W. J., Mohamed, M., Higgins, C. D., Arain, A., & Ferguson, M. (2018). How clean are electric vehicles? Evidence-based review of the effects of electric mobility on air pollutants, greenhouse gas emissions and human health. *Atmospheric Environment*, 185, 64-77.

Green certificates as a method to achieve carbon footprint and greenhouse effect reduction targets

Rareș-Mihai Nițu¹, Robert-Ștefan Uricaru², Grigore-Ioan Piroșcă³

Abstract

Introduction: The EU emissions trading system, abbreviated ETS, is one of the tools that the European Union introduced early on to control pollution factors and introduce a tax system for industries that do not use resources responsibly and have hidden costs, such as high levels of pollution. Pollution costs, regardless of the type of calculation method or source, are impacts that are fully felt. While it can be said that these costs are borne by everyone because the production of goods that produce pollution is encouraged through the purchase of these goods, the rest of the people who are not subject to corporate interests only end up paying these cost..

Aim: The aim of this article is to create favorable conditions for new technologies and thus also for new functions on the market. The main goal is to reduce the carbon footprint. Nevertheless, the steps to be followed have several benefits and are achieved on several levels.

Method: The method of research consists in analyzing the current trends and threads that are involved in the production of electric items and determine the common processes that are likely to occur and become sources of pollution form the need to be produces at large scale

Findings In a completely paradoxical way, to reduce pollution in the long term, it is necessary to pollute more in the short term.

Originality and value: The article underlines the fact that in order to become greener and more environmentally friendly, there is an opportunity cost to accepts in order to pollute more. The abstract shoes that green products cannot be made without conventional methods of production

Key Words: green certificates, taxes, household emission.

Jel Codes: H23, K32, O13

1. INTRODUCTION

The ETS is the world's largest carbon emissions market and can be equated with a service sector, especially the stock market, where the needs of actors are expressed in real time and a fair value of the resources made available for purchase is determined in

¹ PhD, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

² PhD, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

³ Dean, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania

a certain period of time. Methodologically, the European ETS approach can be seen as an approach to the design of long-term environmental policies, using the system as a basis for development theories and the implementation of the mechanism for monitoring the development of this market, but also the behavior of market participants (Kelsey & Meckling., 2018). To function well, it must first be clearly established which nature is produced, which is of the perfect competitive type, or which forms of trust exist. It is then important to analyze which players have the opportunity to influence the market according to their own needs (Meyer, 2003).

All of this information is useful for setting the rules and shaping the legislative package to ensure a higher level of fairness rather than equivalence. Although it is not a competition principle, this process is interpreted as government intervention and has the possibility of reducing the level of congruence and efficiency (Nicolini & Tavoni., 2017). The environment is a public good that must ensure good governance by all economic actors. For this reason, it is not necessary to ensure equal opportunities when using these tools, but rather that they are used responsibly and verifiably. Therefore, some of the measures to be taken would aim to capitalize on the experiences of companies and authorities from the first part of the implementation (Tükenmez & Demireli., 2012).

In the first case, it is the lack of homogeneity of the workforce, but also the pressure that tax systems and inflation put on individual incomes. A technological railway, whose main purpose is to reduce transportation costs through the use of materials and technologies that require lower maintenance costs and capable of optimizing traffic flow, could lead to a reduction in costs for people who, from two perspectives. These need this mode of transportation: People who have to commute to work would save time and toilets, so a smaller portion of individual income would be used for activities that do not produce personal satisfaction.

For the same reasons, the possibility of satisfying certain physiological needs such as relaxation would be greater (Zulkefly et al., 2017). Even if states were not able to use fiscal instruments to encourage the adjustment of individuals' salaries to the inflation rate, spending pressures would decrease and could therefore reduce the tension (Porcuna et al., 2018).

2. LITERATURE REVIEW

The aim of this tool is to create favorable conditions for new technologies and thus also for new functions on the market. The main goal is to reduce the carbon footprint. Nevertheless, the steps to be followed have several benefits and are achieved on several levels. The use of carbon credits for companies helps to invest more in research and innovation to make more efficient use of the resources a company manages (Nicolini & Tavoni., 2017).

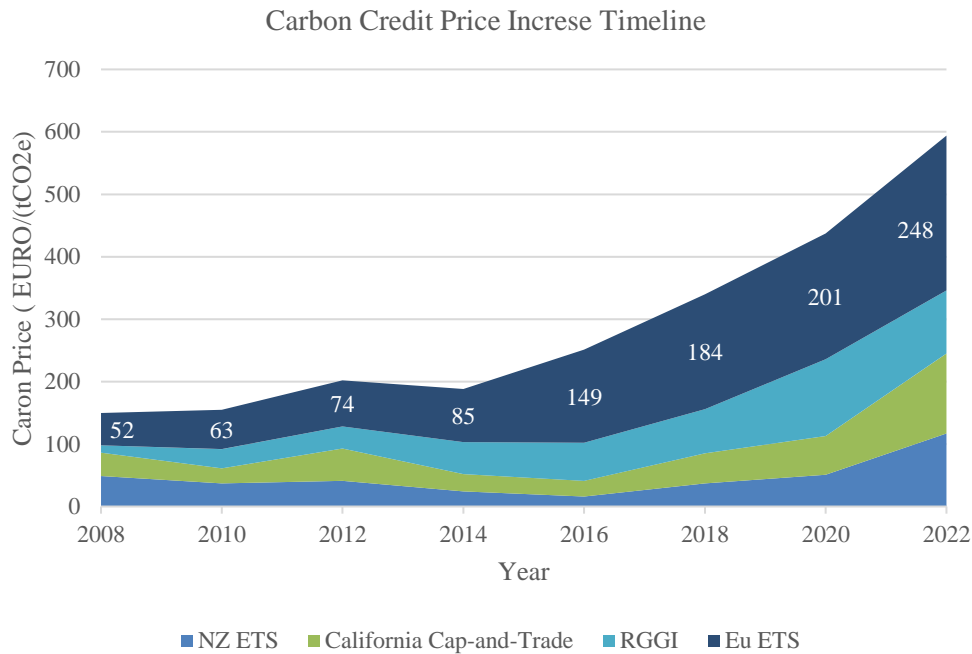
The most common concerns concern ores and natural resources, which account for the largest share of the economy's total spending, are the most commonly communicated costs and have a direct impact on the environment. Furthermore, these costs are

quantifiable both financially and in terms of environmental pollution (Pan & Dong., 2023). While proper management of these allowances can encourage companies to access renewable energy sources, it would reduce demand for polluted energy sources through more efficient costs and other compensation systems, such as: reducing or deducting certain costs for companies that choose to use alternative energy sources. Finally, a revised EU ETS based on the recently approved Market Stability Reserve will strengthen the functioning of the internal energy market and provide better price signals for investments (Meyer, 2003).

The current EU ETS proposal will therefore contribute to a more effective European electricity market and is the best way to ensure that consumers and industries are supplied with electricity as cost-effectively as possible (Meyer, 2003). The new way of working brings with it various economic and ecological advantages (Richter, 2012). It will help combat climate change by strengthening the EU's efforts to reduce greenhouse gas emissions. In addition, reducing greenhouse gas emissions reduces air pollution, which has a positive impact on the health of citizens. In addition, this will make Europe less dependent on imports of fossil fuels (Pan & Dong., 2023).

This proposal supports a stronger and more effective EU ETS and helps put Europe on the path to a low-carbon economy. It offers companies and industry important opportunities to grow and benefit from new technologies and markets, supports innovation and contributes to the creation of new employment and growth prospects (Tükenmez & Demireli., 2012). The proposal also supports the transition to a low-carbon economy by providing more resources to meet investment needs in lower-income Member States (Nicolini & Tavoni., 2017).

At the same time, the Commission recognizes that there may be risks for certain companies in international competition as long as other major economies do not make comparable climate protection efforts (Richter, 2012). The proposal therefore also contains protective measures to ensure the international competitiveness of energy-intensive industries in the EU. Particular attention is paid to reducing administrative costs (Kelsey & Meckling., 2018). Under the proposal, Member States will continue to have the option to exclude low-emission operators, including small and medium-sized low-emission companies, from the EU emissions trading system, provided they are subject to equivalent measures.



Source: Authors own processing of data from Eurostat database

The system for issuing, managing and quantifying green certificates was changed after 2020 to work more in line with the market. Due to changes in the manufacturing industry, technological innovations and new concepts that make production obsolete are becoming more and more prominent and receiving more attention at the administrative level (Chuang et al., 2018). Since the total number of CO₂ certificates is limited and decreasing, the system of allocating these certificates in exchange for free securities appears at first glance to be an effective means of reconciling market needs with the interests of the Member States of the European Union. The decentralized provision of this data is intended to achieve several positive effects.

One of the advantages is the aim of awarding these titles to companies or countries free of charge (the awarding is carried out centrally for each member country and is then managed locally depending on the specific needs of each sector). The allocation is made by administrations and not by administrative authorities. The introduction of these allowances on the free market promises the use of allowances as a corrective factor, guaranteeing companies predictability and at the same time opening the possibility of an increase in the price of these allowances, which would encourage companies to violate the law and significantly harm and pollute the environment (Kelsey & Meckling, 2018).

3. PROBLEM STATEMENT

In order to advance and promote these processes, the allocation of certificates will focus primarily on economic sectors in which there is strong competition outside the euro area and in which there is a high risk of outsourcing and relocation of these productions across the borders of the euro area the European Union exists. In order to ensure good coordination and promote economic and technological progress, four basic principles underlying the establishment of the ETS are integrated. The first element is to establish reference values. Ultimately, they will be updated according to technological advancements in different sectors (Pan & Dong., 2023). Such benchmarking would be based on the best technologies with the highest efficiency, thus encouraging less developed companies to adopt the new approach to work. Another element is the production data of companies (Chuang et al., 2018). The aim is therefore to improve the variable system for determining the values of certificates. The value-changing factor is the quantity of products provided or the scope of services provided. A certain number of certificates are issued free of charge for companies whose workload is reduced by investing in more efficient systems and equipment (Kelsey & Meckling., 2018).

The third element that will support the development of an improved methodology is carbon redistribution. After 2020, almost all industrial sectors are considered to be at risk of carbon leakage. Companies that bring this disability back below established standards also benefit from a number of free certificates. It is not expected that these companies will use these certificates as this would put them over the limit again. However, these companies consider themselves good market entry vectors (Chuang et al., 2018). The fourth and final criterion is indirect carbon balances. In principle, the indirect costs of social measures necessary to combat air pollution are covered by companies through certain taxes levied by the authorities. It is unclear whether these fees are collected directly by calculating the environmental impact (taking into account the company's production volume) or whether these amounts are incorporated into the value of the allowances traded on the open market (Kelsey & Meckling., 2018). These certificates help operators to remain competitive with producers from third countries. Industrial operators in sectors at risk of carbon leakage will receive free allowances each year based on product benchmarks, unlike other sectors that are not considered at risk and will see their free allowances gradually reduced to zero (Chuang et al., 2018). The change in methodology set by the European Commission has significantly reduced the proportion of industrial sectors at risk of carbon leakage (Kelsey & Meckling., 2018). However, these sectors still account for almost the entire share of industrial emissions in the EU. The list of sectors at risk of carbon leakage does not show a different level of risk for each sector, but rather treats them all equally, which is based on the ETS offset (Pan & Dong., 2023).

At EU level, there are several policies and instruments to support investments in energy infrastructure, particularly in low-carbon power generation technologies and transmission infrastructure of pan-European interest. In addition to the 2020 and 2030

climate and energy frameworks, the EU has created the Trans-European Energy Networks Regulation (TEN-E) and the Framework for Projects of Common Interest (PCI). Several funds also provide, among other things, grants, loans, guarantees, equity and other risk-bearing mechanisms. The main fund providers for electricity investments are the Connecting Europe Facility (CEF), the European Fund for Strategic Investments (EFSI), the European Investment Bank (EIB), as well as several others focused on innovation and low-carbon technologies, which are available for co-financing electricity investments (Kelsey & Meckling., 2018). The existing EU budget is rather small and its added value and additionality are difficult to quantify. However, our case studies on the Baltic and Iberian regions clearly show that co-financing comes from the EU (Chuang et al., 2018). The TEN-E Regulation identifies four priority electricity corridors that require urgent infrastructure development to connect EU countries currently isolated from European energy markets, strengthen existing cross-border interconnections and contribute to the integration of renewable energy (Chuang et al., 2018).

The same Regulation sets out the following priority thematic areas for energy network infrastructure relevant to all Member States: (1) deployment of smart grids to efficiently integrate end-use users into the electricity system, in particular through distributed generation and demand response; (2) Electricity highways to support a system capable of managing the increasing share of renewable energy, connecting renewable energy hubs with storage capacity and demand centers, and managing increasingly variable and distributed electricity supply and flexible electricity demand. (3) Transboundary carbon dioxide network with regard to the use of carbon capture and storage. The following table shows the estimated investment needs, the expected investment gaps⁹⁸ and the approximate co-financing needs to enable the implementation of the priority electricity corridors (Nicolini & Tavoni., 2017). Additional instruments such as the Private Financing for Energy Efficiency instrument and the European Energy Efficiency Fund are not taken into account when comparing energy efficiency and infrastructure investments due to the different scope and challenges. We can conclude that there are several instruments available at EU level to provide financial resources (equity capital, senior and subordinated debt or grants) or guarantees for energy infrastructure investments (Johnstone et al., 2010).

These programs facilitate access to finance, increase leverage potential and/or reduce risk, resulting in a lower cost of capital. Instruments such as NER300 and Horizon 2020 successfully focus on research, development and innovation, while the Connecting Europe Facility is particularly targeted at projects of common interest and contributes directly to the necessary investments in transmission networks.

The European added value and additionality of these funds are difficult to quantify. However, the case studies on the Baltic and Iberian regions clearly show that EU financial support for electricity transmission projects of supranational interest is a key element for their effective implementation (Meyer, 2003). The effectiveness of these instruments could be further increased by avoiding overlaps between EU programs and

encouraging greater interactions between investment projects. Access to these European instruments for new market participants and small players should also be made easier.

Financial support for renewable energy is still high but is decreasing due to lower investment costs and changes in support systems. Investment in new conventional energy sources is very limited and several nuclear and gas-fired power plants have been decommissioned, which could jeopardize security of supply in some Member States. Energy storage and distributed consumption are constantly evolving and can be game-changing. The digitalization of processes and technologies is also a relevant trend with major impacts on current and future investments (Chuang et al., 2018). At the same time, new financing instruments and models are emerging. Achieving ambitious energy and climate targets will be a major challenge to keep energy costs affordable for end consumers. Most Member States are on track to achieve their 2020 energy and climate targets, but current investment levels and policies will not allow the 2030/2050 targets to be met (Pan & Dong., 2023). A successful transition to a low-carbon electricity supply by 2050 requires additional policy measures and increased investment. In the EU, investments in electricity generation capacity based on renewable energy sources have steadily increased. Over the last decade, four fifths of investment in new European energy production went into renewable energy, 60% of which went into wind and solar PV alone. This increase in production capacity was driven primarily by subsidies and was achieved despite negative market and macroeconomic conditions. EU member states did not show the same investment trends (Johnstone et al., 2010). Most Member States have increased their total electricity generation capacity over the last decade, but in some Member States capacity has been brought up to date and in others there has been a decline. In almost all Member States except Latvia and Lithuania, the increase in renewable energy capacity was higher than that of conventional generation capacity (Pan & Dong., 2023).

A large part of the funding goes to renewable energy projects, which accounted for over 70 billion euros annually in the last decade. The amounts were allocated for the development of production systems for solar, wind, biomass, hydro and nuclear energy, as well as for the system of innovation and development of technologies with a focus on the energy market. These figures do not include the market value of the free allocation of CO₂ emission certificates nor the tax exemption or reduction for certain energy consumption, which can also be considered subsidies (Morthorst, 2000). Their inclusion in the comparison would close the gap between the promotion of renewable energy and conventional energy production technologies. The promotion of energy demand (particularly through tax relief is significantly higher than the promotion of energy efficiency (Pan & Dong., 2023). Due to the intermittent nature of most RE technologies, their system costs (reserve capacity, control capacity and power, grid connection, grid reinforcement and expansion) are relatively high. As investment costs for most RE technologies have fallen, some technologies, notably wind power and photovoltaics, are now reaching grid parity in several EU Member States, meaning that the cost of local production is competitive with the full retail (Meyer, 2003). In this

context, end users are increasingly investing in local generation to meet their own needs and avoid network costs and surcharges. Investment in fossil fuel power plants is limited, although conventional capacity is needed to replace intermittent renewable energy sources (Fouquet & Johansson., 2008). Due to the low profitability of many conventional power plants, investment projects have been suspended and several existing power plants across Europe have been suspended or closed early (Pan & Dong., 2023).

4. DEBATE

Since 2018, production per MWh has fallen significantly, mainly due to reforms in support systems and lower costs. Funding is increasingly taking place via auctions, which is leading to a reduction in the amount of funding. Competition between renewable energy technologies and operators will be further strengthened through the implementation of the new environmental and energy aid guidelines (EEAG). In most Member States, RES installations were supported by feed-in tariffs, which protected them from price signals and undoubtedly led to market distortions, as most RES installations produced electricity independently of actual demand and market price and therefore exceeded conventional electricity production. The guidelines stipulate that feed-in tariffs should be gradually replaced by variable market premiums (or green certificates) resulting from competitive tendering processes. Producers of renewable energies also have to sell their electricity on the market and, like any other producer, are subject to accounting requirements (Chuang et al., 2018). The aim of these guidelines is to improve the market integration of energy from renewable sources, to increase the cost-effectiveness of support measures and to limit market and competition distortions. Nuclear power plants are being decommissioned and there are relatively few new projects in development (Richter, 2012). Nuclear energy accounted for about 27% of electricity generated in the EU in 2018, but its share is decreasing due to the closure of several power plants (either for political reasons or for political reasons). because they have reached the end of their lifespan). In the near future, 122 GW of nuclear power capacity is expected to be decommissioned, equivalent to 129 power plants in 14 Member States. In some countries (Spain, France, Belgium and Great Britain) programs have been launched to extend the life of nuclear power plants beyond 40 years. The United Kingdom wants to shut down all coal-fired power plants by 2025 and fill capacity bottlenecks with (new) gas and nuclear power plants. The medium and long-term future of nuclear energy in the EU is highly uncertain and will depend on a number of factors, including the outcome of ongoing research and investment projects (Richter, 2012). Given the current political and social context and electricity market conditions, it is unlikely that nuclear technology will account for a large share of low-carbon investments between 2020 and 2050. High investments in network infrastructure and increased private sector participation in financing. Current energy trends (digitalization, decentralized generation, market integration and decarbonization) lead to increased investments in the power grid and metering infrastructure; particularly necessary to

strengthen and expand cross-border connections; Strengthening and expanding local networks to enable grid connection and access to distributed generation; Replacing and rehabilitating outdated network components for security and reliability reasons (Pan & Dong., 2023).

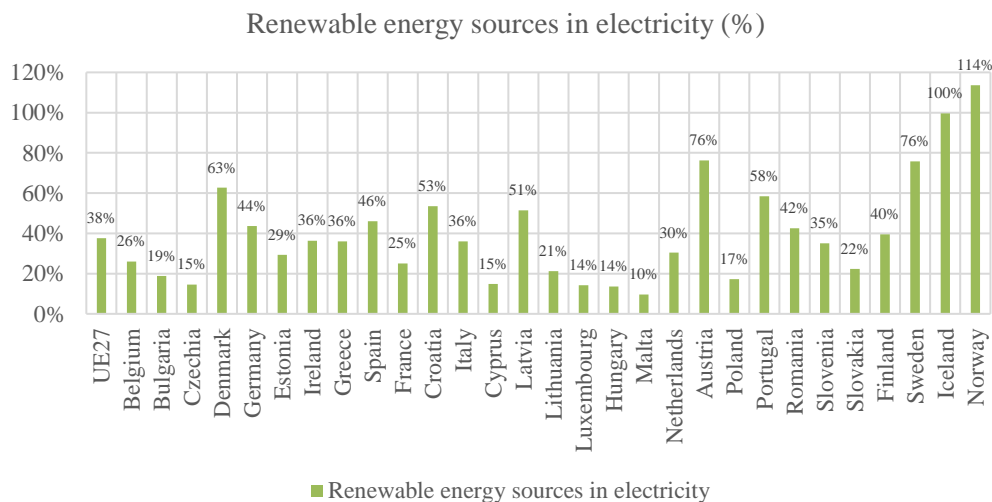
Key players in the climate/energy financing landscape (Morthorst, 2000). The group of actors active in financing energy investments is diverse and includes both public financial institutions and private financial actors such as commercial banks (especially for debt financing), corporations, institutional investors, but also other SMEs and households. These players have been financing investments in the electricity industry for years, particularly in conventional generation and network investments (Tükenmez & Demireli., 2012). These investments are mainly financed by debt and their process is well known (Fouquet & Johansson., 2008). On the other hand, investments in low-carbon energy, such as renewable power generation, carbon capture and storage, and smart grids, carry higher perceived risk and therefore require more innovative financing (Pan & Dong., 2023). Public Financial Institutions (PFIs) are government-recognized and/or authorized financial institutions that often address the lack of market-based financing by providing missing financial services (Morthorst, 2000). PFIs in Europe are well positioned to act as an important lever for governments' efforts to mobilize private investment in low-carbon projects and infrastructure. These SP institutions and funds are typically established to achieve general objectives that serve the public interest and are defined by national, regional or international policy objectives (Morthorst, 2000). Given the policy-oriented direct or implicit mandates to which these institutions are subject, PFIs are, in certain circumstances, both able and willing to provide financing at returns below market levels, most often in collaboration with commercial investors to attract additional financing.

PFIs often have the means to provide large amounts of stable, long-term financing while reducing costs to government budgets. Depending on the institution, they can use their initial capitalization and balance sheet, government guarantees and good credit ratings to enable cost-effective financing on international capital markets or through the use of private household savings (Morthorst, 2000).

Venture capital and private equity (VC/PE) are funds invested by venture capital funds and private equity funds in the capital of companies specializing in the development of renewable energy technologies. VCs typically come from high-net-worth individuals and make up a small portion of the portfolios of large institutional investors such as pension funds and insurance companies (Morthorst, 2000). Between 2016 and 2019, venture capital/PE investments in Europe rose sharply, but then fell again. Start-up capital, retained earnings and business angel investments in Europe are heavily supplemented by direct and indirect government support. Government support includes grants, grants and expenditure on research and development (R&D) by universities or directly to researchers. European companies can also receive funding from several EU funds to support research, development and demonstration of innovative projects (Tükenmez & Demireli., 2012).

In addition to private companies, we also have small end users. Individual households have already released large sums of money through self-financing from their own savings, particularly for energy efficiency measures in buildings and transport as well as for established renewable energies. Storage also has a positive impact on the security and independence of the energy supply. Energy storage could play an important role in balancing supply and demand and ensuring grid stability, particularly in power grids with a high proportion of fluctuating renewable energies (Morthorst, 2000).

Currently, excess electricity is mainly stored in large pumped hydroelectric power plants. This is a mature technology that accounts for more than 95% of current storage capacity in Europe. Between 2010 and 2015, around 5.9 GW of new pumped storage capacity was built in the EU27, corresponding to a total installed capacity of 56 GW. Pumped hydropower played a key role when the European electricity system consisted mainly of large thermal power plants with little flexibility and networks with weak connections (Fouquet & Johansson., 2008). Today, the level of connectivity is much higher and modern fossil fuel power plants (especially natural gas combined cycles) are more flexible. Therefore, the role of electricity storage has evolved and is mainly needed to bridge the gap between the downtime of wind and solar energy and the growth time of conventional backup power plants. In the near future, excess electricity will increasingly be stored in batteries (household batteries, electric vehicles) and in the medium term can also be converted into hydrogen, which can be fed directly into the natural gas network or used to power cars with fuel cells. Hydrogen can also be converted into natural gas (converting energy into gas) or methanol (for transportation), or converted back into electricity (through stationary fuel cells or gas engines). The hydrogen option is still in the development phase. Energy storage is expected to make a significant contribution to the transition to low-carbon energy supplies and could become a real game-changer in the energy sector.



Source: Authors own processing of data from Eurostat database

New financing instruments and financing models are used to finance energy projects (Tükenmez & Demireli., 2012). The traditional investor mix is evolving in response to the energy sector's changing financial needs and risk-return attitudes. Due to declining returns, electricity producers/suppliers are forced to consider alternative partners and financing instruments. In this context, a new group of investors, including private equity, hedge funds and households, are taking advantage of new financing opportunities and increasingly investing in energy technology and deployment. Households are increasingly investing in wind energy or local biomass or participating in local wind or biomass projects through cooperation structures established in several Member States to co-finance RES projects and increase local acceptance of RES projects (Johnstone et al., 2010).

Cooperatives Europe was founded at EU level together with several cooperatives across Europe to promote and develop this concept (Fouquet & Johansson., 2008). Crowdfunding is another new financing method that allows offering energy and monetary benefits to local investors; Several crowdfunding platforms have recently been set up to finance renewable energy projects (Johnstone et al., 2010). To mitigate market risks and facilitate the financing of investments in power generation, power purchase agreements (PPAs) between project developers and a single purchasing company provide greater security by guaranteeing the quantities purchased and the price paid. In Europe, only a few countries (especially France) currently use this option. Since most EU member states have not adopted a single-buyer model, PPA is not expected to be widely used in Europe in the short to medium term (Johnstone et al., 2010). However, EEAs concluded between independent producers and electricity suppliers (or end users) are widespread in Europe and are an effective tool for improving the financial attractiveness of investment projects.

5. CONCLUSION

Currently, investments in electricity are mainly determined by political (energy and climate goals) and technological developments. The most important investment trends in this context are: decarbonization of the energy supply, shift from large-scale, centralized power generation predominantly to decentralized and smaller power generation, and digitalization of the energy system (intelligent devices and systems). At the same time, end consumers are increasingly becoming involved in energy investments, whether as investors in their own assets for their own production or as co-financers of generation plants (e.g. crowdfunding and cooperatives for investments in renewable energies, such as wind farms). or as an investor in energy efficiency and demand management. This transition has significant implications for operators of conventional electricity generation (limited investment in new capacity, cost efficiency under pressure, phasing out of existing capacity) and for the electricity system (system implementation and security of supply).

Due to the unbundling and liberalization of electricity generation and supply, there are no longer any nationwide comprehensive investment plans. Electricity producers are legally required to report their investments, but in the current highly competitive and rapidly changing economic and political situation, they no longer publish investment plans (Pan & Dong., 2023). However, network operators are legally obliged to draw up investment plans and national authorities assess their security of supply based on national/regional development plans. In this study, we focused on transport-related investment plans (including interconnectors) and national/regional development plans. Currently, investors are not receiving the right price signals to invest in low-carbon technologies: fossil fuels are still subsidized and the carbon price does not (fully) internalize the external costs of emissions.

Eliminating fossil fuel subsidies and strengthening the ETS would help solve this problem and would be positive measures to ease the transition to low-carbon energy supplies. To further increase the effectiveness of the EU ETS, two additional measures should be considered: an increase in the linear reduction factor in line with the 2050 decarbonization target and a significantly higher market stability reserve. If these measures are not feasible or sufficient, consideration should be given to introducing a continuously increasing price threshold at EU level²⁷;

A similar carbon tax should be imposed on fossil fuel consumption in non-ETS sectors. Electricity markets should provide investors with effective price signals; Policymakers should therefore not distort the formation of competitive wholesale prices by setting price caps or introducing fixed tariffs for certain technologies. Retail prices should reflect the development of wholesale prices in order to create incentives for end consumers to benefit from price fluctuations and contribute to the balance of the electricity system.

Therefore, regulated retail prices should be phased out and suppliers should be given the opportunity and incentives to offer innovative and supportive electricity systems in order to motivate end users to participate in the energy and/or ancillary services market directly or through their supplier or aggregator. Specific social measures or regulated prices should only be maintained for vulnerable consumers (Tükenmez & Demireli., 2012). Network tariffs should also provide appropriate operational and investment price signals to network users; Time-of-use or capacity-based tariffs are more efficient than flat rates in this respect. Network tariffs should be fully cost-oriented and based on a transparent and non-discriminatory distribution of network costs. Investment in local production for captive consumption should be facilitated by appropriate market arrangements and network tariffs that accurately reflect the real benefits of distributed generation and the associated system costs. Investment in energy efficiency should be further increased to reduce Europe's primary energy dependence and costs, thereby contributing to affordability for citizens and industry.

Targeted support may be required to make it easier for low-income households to invest. The development of demand management in Europe is different; In most Member States it is well developed in the professional market segment, particularly

among industrial and commercial enterprises, but the great potential in the residential segment is not yet exploited. To realize this potential, a clear and harmonized definition of roles and responsibilities at EU level would be useful, particularly for suppliers (or balancing parties), aggregators and network operators. This regulatory framework should also provide clarity on contractual, financial and operational arrangements (data management and exchange) between the affected parties. Furthermore, responsibility for grid imbalances should lie with market participants, including intermittent renewable energy producers that cause imbalances.

Electricity prices and network tariffs are an important element of market design that facilitates the development of demand management. End-user prices and marginal cost network tariffs must enable optimal use of the full potential of demand management. Finally, a legal requirement for operators to equip all prosumers and high-consumption end-users with a smart meter would be helpful for the development of demand management; The current regulations can be retained for smaller consumers (Kelsey & Meckling., 2018).

REFERENCES

- Chuang, J., Lien, H. L., Den, W., Iskandar, L., & Liao, P. H. (2018). The relationship between electricity emission factor and renewable energy certificate: The free rider and outsider effect. *Sustainable Environment Research*, 28(6), 422-429.
- Fouquet, D., & Johansson, T. B. (2008). European renewable energy policy at crossroads—Focus on electricity support mechanisms. *Energy policy*, 36(11), 4079-4092.
- Johnstone, N., Haščič, I., & Popp, D. (2010). Renewable energy policies and technological innovation: evidence based on patent counts. *Environmental and resource economics*, 45, 133-155.
- Kelsey, N., & Meckling, J. (2018). Who wins in renewable energy? Evidence from Europe and the United States. *Energy Research & Social Science*, 37, 65-73.
- Meyer, N. I. (2003). European schemes for promoting renewables in liberalised markets. *Energy policy*, 31(7), 665-676.
- Morthorst, P. E. (2000). The development of a green certificate market. *Energy policy*, 28(15), 1085-1094.
- Nicolini, M., & Tavoni, M. (2017). Are renewable energy subsidies effective? Evidence from Europe. *Renewable and Sustainable Energy Reviews*, 74, 412-423.
- Pan, Y., & Dong, F. (2023). Green finance policy coupling effect of fossil energy use rights trading and renewable energy certificates trading on low carbon economy: Taking China as an example. *Economic Analysis and Policy*, 77, 658-679.

Richter, M. (2012). Utilities' business models for renewable energy: A review. *Renewable and Sustainable Energy Reviews*, 16(5), 2483-2493.

Tükenmez, M., & Demireli, E. (2012). Renewable energy policy in Türkiye with the new legal regulations. *Renewable Energy*, 39(1), 1-9.

Electric car pollution as a source of carbon footprint reduction

Rareş-Mihai Niţu¹, Radu-Alexandru Budu², Silvia-Elena Iacob³

Abstract

Introduction: Climate change is represented both by natural phenomena, which consist in the rotation of the Earth or the way in which the flora develops, and by artificial phenomena, which are represented by different actions of people. From the most popular calculations such as the carbon footprint to the level of pollution caused by gas emissions, all of these elements represent exogenous calculations to the climate control process, affecting the way the climate is influenced and thereby the biosphere in which humans live live, changed. The negative impact of the manufacturing and mining sectors is well known, but not only, they belong to the category of traditional services that are already present and functioning.

Aim: This article focuses on identifying the polluting resources emerging in new industries created for environmental sustainability and good governance. The aim of this paper is to show that the green solutions come with an opportunity cost regarding pollution. In order to achieve the reduction of household emission targets, there is a need to pollute more for the next short period of time.

Method: The method of research consists in key finding of the current concerns of other authors and the statistics of the authorized organizations. Although they are considered environmentally friendly, the production of electric cars contributes to reducing the carbon footprint, but a higher level of pollution is needed than it appears at first glance.

Findings In a completely paradoxical way, to reduce pollution in the long term, it is necessary to pollute more in the short term.

Originality and value: The article underlines the fact that the way in which the new industrial methods of production of goods and services are interpreted and appreciated, especially the production of electric cars, must be interpreted comprehensively.

Key Words: electric, lithium, pollution

Jel Codes: O18, P18, P28.

1. INTRODUCTION

Although an attitude focused on recycling and sustainable development is encouraged, it should not be forgotten that each sector generates (in different forms and in different percentages) environmentally harmful resources (Noudeng et al., 2022). Electric car batteries have the great advantage of not producing any carbon. However,

¹ PhD, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

² PhD, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania.

³ Vice-Dean, Bucharest Academy of Economic Studies, Faculty of Theoretical and Applied Economics, Romania

contrary to expectations, there is no agreed or recognized way to recycle them without having to use toxic chemicals to reuse certain battery components that could be reused. Solar panels lead to less pollution and the production of energy from free resources, in this case the sun as a common good for all people. However, the recycling of photovoltaic modules and cells that have reached the end of their life requires composting and management, which cannot be fully achieved using environmentally friendly methods. Products that promise to be ecological, biodegradable or susceptible to any pollution due to their use must be designed at the design stage so that they do not have a negative impact on the environment. Otherwise, the beneficial, positive effects

these needs by producing more, better and at an affordable price. One of the main needs of people is mobility, especially for family transport, namely the car. This means of transport is a special product that makes art out of the category of basic human needs (travel) due to the freedom of movement and the presence of multiple actors at a geographical level resulting from their use will be nullified by the disposal of the waste that the item in question produces at the end of its life. The article looks at the impact that the demand for electric vehicles, and automatically electricity to power these cars, has on the open market. In addition, it will be determined which is the healthy way from an economic perspective to ensure healthy and sufficient growth in the green energy sector and the production of electric cars (Noudeng et al., 2022).

The level of economic development continues to lead to increasing consumption and diversification of needs. On the one hand, the population at the peak of its existence leads to more needs to be satisfied and, consequently, the market needs more producers who are able to satisfy, which attract more customers year after year (Noudeng et al., 2022). On the other hand, these goods can also belong to the category of luxury goods, which are cars that aim not only to move the individual from point A to point B, but also to provide a higher level of conformity (Noudeng et al., 2022). The combustion of conventional resources (liquefied petroleum gas, gasoline and diesel with different octane ratings), as one of the largest fuel-consuming goods, has been found to be a major cause of increased environmental pollution and carbon footprint (Lai et al., 2022). As a result, clear decisions were made at an international but also local/regional level in order to be able to reduce the use of cars with higher pollutant classes and a consumer orientation towards the purchase of environmentally friendly products was sought. We are talking about electric cars or cars that use alternative resources such as artificial fuel (biofuel) or CNG (compressed natural gas). All of these alternatives are considered viable solutions, at least in the short term, to reduce pollution while meeting individual needs. It should be noted that, in addition to the high costs compared to traditional refueling methods, the refueling infrastructure is also not sufficiently developed to compare with gas stations or gas stations that are already frequented by most drivers (Lai et al., 2022). Ultimately, travel costs are higher simply due to the need for information and the search for a gas station. In addition, installations currently require higher maintenance costs and are higher than traditional vehicles (Noudeng et al., 2022).

2. LITERATURE REVIEW

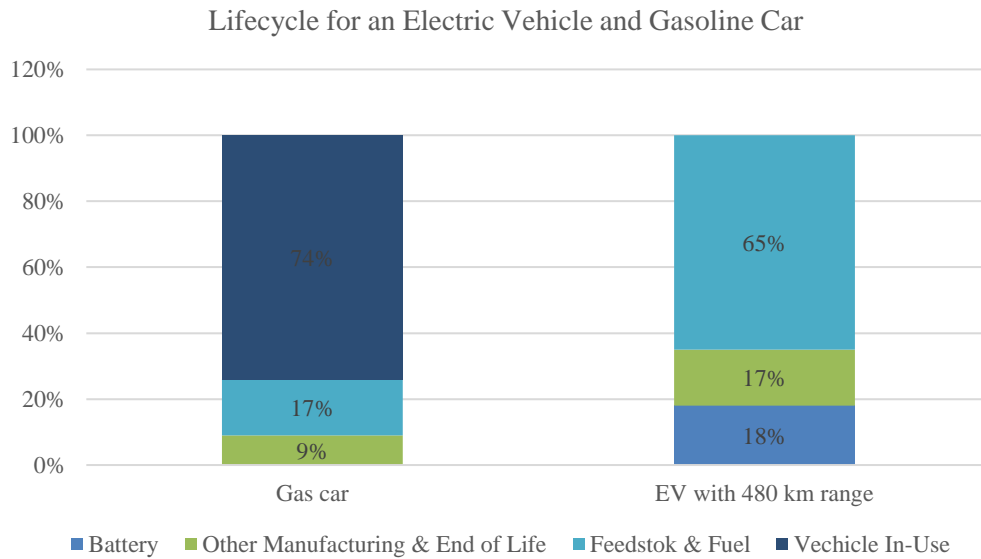
To encourage the purchase of such vehicles, a more favorable tax regime has been introduced for the procurement process. Some countries have offered subsidies to ease financial pressures, and in some areas the taxes and fees associated with owning such a movable asset have disappeared. What is encouraging for consumers and promises a return on investment is the value of utility costs, which are much cheaper with electricity than with fossil fuels. Although there are different opinions about the quality of service of an electric car, on a microeconomic level the demand is growing (Lai et al., 2022). At the beginning of 2011 there were almost 20,000 electric cars, and at the end of 2011 there were almost 5 million such cars (Noudeng et al., 2022). These market signals show that the level of infrastructure has declined, the quality of these machines has become better and better, and technology has advanced to the point where the price is affordable for individuals. Although several factors should be taken into account, the essential elements such as the distance that can be traveled with a full battery or the acquisition and maintenance costs have been designed to provide a beneficial solution (Ferrero et al., 2016). There is also the option of buying cars that run on hydrogen. The main disadvantage of machines that use this alternative feeding method is their very high cost. Since it is a mechanism that consumes a very high calorific value, it is necessary to have more safety features and an installation stable enough not to pose a danger to people on the road. Although the technology exists, the market does not have enough experience to provide a practical solution. Administrative and operating costs are very high. In terms of performance (Lai et al., 2022).

The main resource when discussing electric cars is not the batteries or raw materials in raw form that are used to build them (we refer to electrical circuits, physical systems attached to cars, or the ores and resources that are used to make an electric vehicle work). The most important resource is electricity (Ferrero et al., 2016). The most important resource when discussing electric cars is not the batteries or raw materials used to build them (Pistoia & Liaw., 2018).. The most important resource is electricity. Modern movements are leading to a shift towards green energy production, but today most energy comes from raw, polluting, traditional resources. Increasing demand for electric cars would cause prices to rise and automatically increase the use of conventional, polluting electricity methods (Ferrero et al., 2016). If the energy demand to power electric cars will be greater than the capacity to produce green energy, then the tension between resources and the need to reduce the carbon footprint will be greater and more difficult to achieve. This only affects the performance part, but not the development part. The possibility of supply from your own sources, from energy that each person generates individually through the installation of solar panels, can be taken into account. In another form, windmill farms can be developed as a form of business specifically to power these machines (Ferrero et al., 2016). If it is functionally possible to ensure the year-round production of electricity from renewable resources, this varies depending on the owners of special machines, the recycling process of the facilities must take into account the way in which the final waste is disposed (Pistoia & Liaw., 2018).

3. RESEARCH METHODOLOGY

The projects and action plans that we are currently implementing (be they projects or concrete actions such as the Green Deal document at the European Union level) contain concrete measures to reduce current levels of pollution. The goals set are methodically thought out to alleviate the current problems of society. There is no concrete plan for the formation of economic sectors that have no negative impact at all, but rather for the formation of sectors that currently reduce environmental pollution by changing the paradigm and reorienting production and service processes in a different direction. In order for an economic process to be designed correctly and coherently in the field of the Green Economy (approach more focused on the area of service delivery) and in the field of the Circular Economy (approach more focused on the procurement of ecological products) the recovery is already more mature Products) (Requia et al., 2018). The entire work process must be ecological or as clean as possible in terms of the resources used and the results achieved (Feng et al., 2022). Currently, recycling cannot be discussed when considering electric cars. Some of these old parts can be recycled, but they are body parts or accessories inside or within the ride. Mainly plastics, metal materials and the other textiles in them can be operated on later. This is also the case with hybrid cars (Requia et al., 2018). These are vehicles that have an engine that uses conventional fuels such as gasoline or diesel, but are secondarily supported by an electrically powered engine.

The batteries and other components contained in an electric car (the cable system and the collection of existing circuits) have an average operating life of 10 years. Once such a system reaches a capacity of 70% of the efficiency level it had at the start of product use, it is considered inefficient and is sent for scrapping. The most valuable resources in these deposits are lithium and nickel, which are found in the components (Requia et al., 2018). These are valuable because it is cheaper in operation to retrieve these resources from a machine that has already been adopted than to process them raw, from unmodeled resources. However, two industrial processes must take place for processing (Requia et al., 2018). First, the battery or circuit containing these resources must be processed to get into a raw form that allows for reprocessing. In order for the preacher to reintroduce these resources into another production cycle, he must fundamentally modify and process them, which creates new costs and, as a result, price increases. The second process involving these resources is processing and modeling to make them the subject of new products (Requia et al., 2018). The need for lithium-nickel resources also arises in the area of energy and electrical installation. There is no secondary market for these resources and they cannot be operated at a lower quality (i.e. a quality lower than their chemical and technical properties).

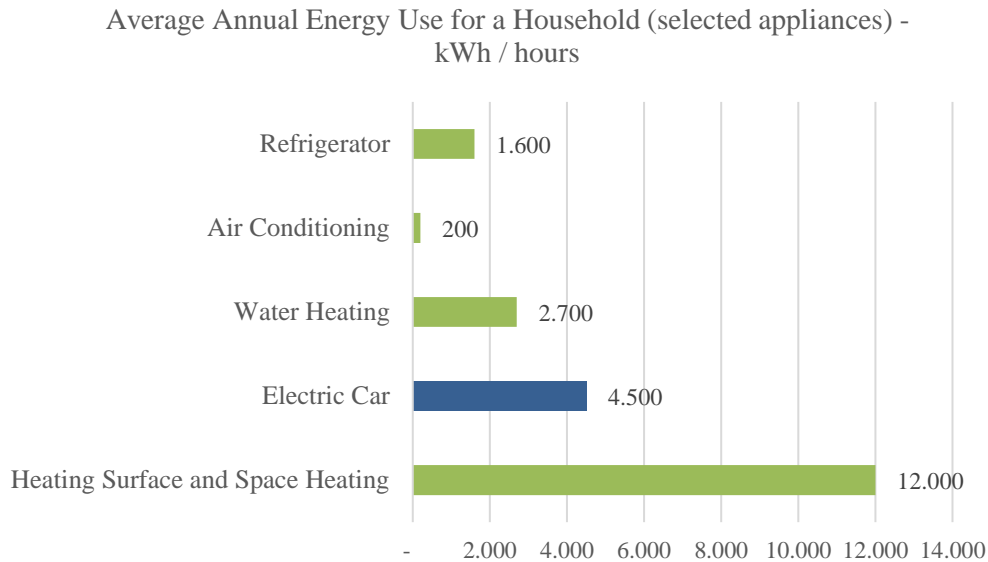


Source: Authors own processing of data from Eurostat database

As mentioned earlier, lithium and nickel production are two key industries in the production of electric cars. Importantly, however, it represents a primary source of production for many sectors of electrical product manufacturing. They are part of electrical circuits and components and therefore all variations of these two niche mineral sectors are felt by the end user in several sectors (Holland et al., 2019). Nickel is a crucial metal in modern infrastructure and technology and is used primarily in stainless steel and alloys. In addition, it is one of the key factors in the construction process of electric cars. Due to its electrical conductivity, nickel is also ideal for facilitating the flow of electricity in battery cells. In general, there are two main categories as to how these ores can be mined (Feng et al., 2022).

First of all, laterite deposits are the main source for the extraction and production of nickel. These are deposits that predominantly occur in tropical areas (Holland et al., 2019). The extraction process is traditional opencast mining (Feng et al., 2022). There, large amounts of earth and gravel have to be selected in order to obtain processable ore forms. Basically, air quality is decreasing and the high demand for cars also leads to an increase in the CO₂ footprint. In principle, to obtain materials that form environmentally friendly machines, it is necessary to pollute more for a short period of time, at least until demand reaches the level of available ore supplies (Chen et al., 2023). Second, nickel can also be found in sulfur ores, which are the underground or ground-level mining of ore deposits containing nickel-rich sulfide minerals. The processing process is similar, except that this option involves mechanical and chemical processing of the deposits in order to obtain the required material. Sulfur deposits are currently the most widely used

source of nickel, which is why many are investing in technological innovations to reduce pollution while continuing to supply the market with raw materials (Chen et al., 2023).



Source: Authors own processing of data from Eurostat database

Nickel extraction can therefore have significant environmental impacts such as deforestation, habitat destruction and soil erosion. This is not only about increasing the level of pollution, but also about changing the flora and fauna in order to make the mining quarry usable and functional, which is the only form of work where nickel extraction is possible. In addition, nickel ores often contain high moisture content, requiring energy-intensive drying processes to prepare them for further extraction (Holland et al., 2019). Once extracted, smelting laterite requires a significant amount of energy, most of which comes from fossil fuels, resulting in even higher pollution costs than previously reported. If the negative impact on the environment lasted longer than the use and wear of the minerals in the devices used, the investments would no longer be worthwhile. However, there is still the possibility of extracting these ores using sulfide. Sulfide mining is cleaner, but it also presents other environmental challenges (Holland et al., 2019). The extraction and processing of sulfide ores can release sulfur compounds and heavy metals into the environment, which if handled improperly can lead to acid mine drainage and contamination of water sources (Chen et al., 2023). In this case, the impact on the contaminated people would be immediate and accentuated. In addition, the use of sulfides to extract minerals is more expensive due to their hard rock nature, which is why the market is encouraged to use this method only when there

are very large supply shortages, which is difficult to do with high volumes of perishable goods such as cars (Camargos et al., 2022). Lithium is the second most important ore in the electric car industry and is largely responsible for battery performance and consumption. It is essentially used in phone batteries and any form of energy storage, battery or network scale (Camargos et al., 2022). Through the intelligent use of extraction processes and their combination with the latest technologies, manufacturers can create vehicles that promise a longer consumption range in the fully electric car sector from year to year. In terms of obtaining this element, there are generally two methods of use. The first method is to pump liquid substances from underground storage spaces, more precisely into evaporation ponds, where solar energy evaporates the water over the long term, leaving the lithium content behind. This substance is then absorbed and further processed to extract the useless waste and obtain the necessary substance (Camargos et al., 2022). The second option is extraction from hard rock or mineral ores found in quarry areas (Chen et al., 2023). This requires a large drilling capacity, which entails the intensive use of powerful machines powered by fossil fuels. However, this method is more environmentally harmful than the first variant. During ore extraction, the ore is drilled, sandblasted and crushed. The deposits are then processed into special machines that also use fossil fuels for the process (Holland et al., 2019). The chemical processing process emits less carbon dioxide per ton, even when chemicals are involved. The advantage of these methods lies precisely in the use of procedures that do not produce pollutants, do not leave residues in the atmosphere and do not require mechanical but chemical force, which is why the administration appears more environmentally friendly. Responsible practices in the extraction of nickel and lithium resources are therefore essential for the automotive industry for electric cars. However, these practices require the implementation of rules and environmental regulations that promote energy efficiency and environmental protection. The policies adopted and developed due to innovation and the increasing demand for such goods must target the main source, namely the final process, as well as all the technical processes that take place to obtain them. The regulations may be fiscal in nature and may be caused by the direct imposition of a tax on a certain amount of minerals (regardless of the form in which they are extracted) (Holland et al., 2019). But they can also be environmental policy measures or be applicable by setting a certain level of environmental indicators. Environmental indicators can take many forms and have calculation methods, including when analyzing the quality of the environment. Depending on the objective, the air quality, the amount of waste left behind or the amount of environmentally harmful resources attracted by industrial processes can be analyzed. The ultimate goal of these measures must be to reduce water consumption (for industrial use, not personal consumption), reduce the level of pollution of natural resources (e.g. water pollution from groundwater) and develop new technologies to optimize resource consumption. It seems that the transition to a green, sustainable economy can only be achieved through increased consumption of pollutants. What needs to be kept in mind is the opportunity cost of the environment. In this context, there is the market for CO₂ emission certificates

as well as for certificates of origin or waste permits. All of these instruments are primarily aimed at systematically regulating the business environment to ensure good environmental governance. Although it is of interest at international level to use electric masons over those who use energy convention methods, the implementation time must be influenced by the quality of the guidelines but also by technological development. Even if it seems like a good idea, working methods indicate certain opportunity costs that arise from activities that can end up having a greater than normal impact on the environment. One of the possibilities that are emerging in the market, but which is currently not a viable solution for mineral resources, is the recycling of materials/minerals, in their case nickel and lithium, from the machines used by the cars that are no longer in use become. I have to keep in mind that the process of modeling reconstruction can also pollute the environment, but to a lesser extent, so repurposing/reusing these resources is a long-term solution. The central point on which this entire process depends is the quality of resources when they are mature. In other words, the ores extracted from mature batteries must continue to have the technical qualities, those properties that allow them to be functional. Otherwise, it must be observed whether there is another industry that would need the conversion. Then the process must be pursued further, because the aim is to introduce these goods into environmentally friendly processes that generate added value and satisfy needs without increasing the pollutant index. What is gained on the one hand is lost on the other, and the added value only becomes visible at the level of bureaucracy, since the circuit in which the money supply would be integrated would be larger, but not of higher quality (Holland et al., 2019).

4. CONCLUSION

Green energy is a complex process that not only includes certain working behaviors, but also prescribes a certain set of laws, certain rules for economic operators, as well as a way of working for new companies. This way of working must take place at multiple levels and is closely linked to other industrial or economic services that enable the transition to a zero-carbon zone. If the green economy were supported by traditional economic sectors, the goal would not be achievable and the efficiency would be low. The key factors in achieving the objectives set by the European Commission and other organizations at international level are technological development and energy efficiency (which in turn depends on the responsible use of technology and compliance with product data sheets). There are currently at least environmentally friendly variants in the passenger car sector, but their average costs are higher than classic alternative variants. Although there are more systems that reward and encourage the purchase of electric cars, in certain areas of the European Union there is either no infrastructure that allows individuals to use electric cars carelessly or the costs are too high, even if there are still deductions and Tax exemptions are taken into account. The same principle applies to cars that use fossil fuels or compressed natural gas.

REFERENCES

- Camargos, P. H., dos Santos, P. H., dos Santos, I. R., Ribeiro, G. S., & Caetano, R. E. (2022). Perspectives on Li-ion battery categories for electric vehicle applications: a review of state of the art. *International Journal of Energy Research*, 46(13), 19258-19268.
- Chen, Q., Hou, Y., Lai, X., Shen, K., Gu, H., Wang, Y., ... & Zheng, Y. (2023). Evaluating environmental impacts of different hydrometallurgical recycling technologies of the retired nickel-manganese-cobalt batteries from electric vehicles in China. *Separation and Purification Technology*, 311, 123277.
- Feng, T., Guo, W., Li, Q., Meng, Z., & Liang, W. (2022). Life cycle assessment of lithium nickel cobalt manganese oxide batteries and lithium iron phosphate batteries for electric vehicles in China. *Journal of Energy Storage*, 52, 104767.
- Ferrero, E., Alessandrini, S., & Balanzino, A. (2016). Impact of the electric vehicles on the air pollution from a highway. *Applied energy*, 169, 450-459.
- Holland, S. P., Mansur, E. T., Muller, N. Z., & Yates, A. J. (2019). Distributional effects of air pollution from electric vehicle adoption. *Journal of the Association of Environmental and Resource Economists*, 6(S1), S65-S94.
- Lai, X., Chen, Q., Tang, X., Zhou, Y., Gao, F., Guo, Y., & Zheng, Y. (2022). Critical review of life cycle assessment of lithium-ion batteries for electric vehicles: A lifespan perspective. *Etransportation*, 12, 100169.
- Noudeng, V., Quan, N. V., & Xuan, T. D. (2022). A Future Perspective On Waste Management of Lithium-Ion Batteries for Electric Vehicles in Lao Pdr: Current Status and Challenges. *International Journal of Environmental Research and Public Health*, 19(23), 16169.
- Pistoia, G., & Liaw, B. (Eds.). (2018). *Behaviour of lithium-ion batteries in electric vehicles: battery health, performance, safety, and cost*. Springer.
- Requia, W. J., Mohamed, M., Higgins, C. D., Arain, A., & Ferguson, M. (2018). How clean are electric vehicles? Evidence-based review of the effects of electric mobility on air pollutants, greenhouse gas emissions and human health. *Atmospheric Environment*, 185, 64-77.

Permanent or Temporary Effects of Natural Disasters on Total Employment in Türkiye: A RALS-LM and DF_GLS Unit Root Analysis with Structural Breaks

Ramazan Arslan¹, Mehmet Akif Peçe²

Abstract

Introduction: Türkiye's history is marked by the profound economic and social impacts of earthquakes and other natural disasters, beyond their physical destruction.

Aim: This study aims to assess the influence of natural disasters on Türkiye's employment figures, focusing on the long-term effects of the 2005-2023 pandemic and the Kahramanmaraş earthquake.

Method: Employing RALS-LM and DF-GLS unit root analyses with structural breaks, this research evaluates the significance of these events on economic data, particularly employment, over specified periods.

Findings: Analysis of quarterly data from 2005 to 2023 reveals no significant changes in employment due to the Kahramanmaraş Earthquake. However, notable impacts were observed in the second quarter of 2020, with temporary effects in the fourth quarter of 2019 and the first quarter of 2021.

Originality and Value: This study uniquely examines the effects of the Reverend Burunson, Kahramanmaraş Earthquake, and Covid-19 Pandemic on employment within a single framework. The results are vital for understanding the economic consequences of such disasters and pandemics, offering insights for policymakers to respond more effectively.

Keywords: Employment, RALS-LM, DF-GLS Unit Root Analysis with Structural Breaks, 2020 Covid-19 Pandemic, 6 February Kahramanmaraş Earthquake, Turkish Economy

Jel Codes: J08, C01

1. INTRODUCTION

Natural disasters have left deep and lasting impacts on human communities throughout history. These impacts have not only been limited to material damage but have also deeply affected economic, social and cultural structures. Especially communities living in geologically active regions such as Türkiye often face the challenges of natural disasters such as earthquakes and floods. This study analyses the impact of major natural disasters in Türkiye, especially the Kahramanmaraş earthquake and the COVID-19 pandemic, on society and the economy. The analysis includes the

¹ Associate Professor, Bartın University, Faculty of Economics and Administrative Sciences, Department of Economic, Türkiye

² Assistant Professor, Bartın University, Faculty of Economics and Administrative Sciences, Department of Economic, Türkiye

analysis of structural breaks using RALS-LM and DF-GLS unit root tests and focuses on the effects of natural disasters on employment.

Although this study focuses on Türkiye's earthquake history and the effects of these disasters on economic and social structures, the unique value of the research is that it deals with the effects of Kahramanmaraş earthquake and COVID-19 pandemic on employment within the same study. In this framework, the effects of large-scale events such as earthquakes and pandemics on the economy and social life are addressed through extensive literature reviews and detailed empirical analyses. Until the literature section of the study, a groundwork is prepared to help us understand the economic and social transformations caused by natural disasters.

The main objective of the study is to understand the effects of natural disasters on employment data in Türkiye and to determine whether these effects are temporary or permanent. The findings may contribute to policy makers to develop more effective intervention strategies. In addition, this study contributes to a better understanding of the economic impacts of natural disasters and to the development of disaster management and crisis response policies. In this context, the study aims to contribute to the development of strategies to increase the resilience of societies in the context of employment policies of managers in the face of natural disasters and to accelerate post-disaster recovery processes.

2. Earthquake History of Türkiye and General Effects of Earthquakes on Economy

It is known that many earthquakes have occurred since the early ages of human history. In 1300 BC, a severe earthquake occurred in the city of Troy, and the city was severely damaged in the earthquake (Tatar & Baytimur, 2020, p. 507). The first modern natural disaster in history is the Lisbon Earthquake of 1 October 1755. With this earthquake, the earthquake phenomenon was explained based on scientific reasons. At the same time, it is recorded as a first in human history in terms of showing that measures can be taken against natural disasters such as earthquakes (Güvel, 2001: 15).

The first information on disasters in Türkiye dates back to 1488. On this date, a great earthquake occurred in Istanbul. The second earthquake, the most severe in terms of its effects and also known as "apocalypse suğra", was the Istanbul earthquake that occurred in 1509. It is known that approximately 13.000 people lost their lives in this earthquake. After this earthquake, two major earthquakes were recorded in Istanbul in 1719 and 1766. In the earthquake that occurred in Izmir in 1688, it is recorded that 15,000 people lost their lives and three-quarters of the houses were destroyed (Tatar and Baytimur, 2020, p. 507. 507). One of the known major earthquakes occurred in 1789 in the region of Harput, Mazgirt, Çemişgezek, Peri, Palu and Keban mine. It is understood from the records that 51,000 people lost their lives in the earthquake and that it completely destroyed a 21-hour longitudinal and transverse area within walking distance under the conditions of the day. Another devastating earthquake in the Ottoman period occurred in Çeşme and Urla in 1883. In this earthquake, many village settlements were wiped off the map (Tatar & Baytimur, 2020, p. 509; Koyuncu & Koyuncu, 2016) p.379).

From 1900 to 2011, 182 major earthquakes occurred in Türkiye in terms of magnitude. According to TMMOB data, this figure is 225 (Altun, 2018, p. 5). In these earthquakes, 86,644 people lost their lives and 566,000 houses were destroyed or heavily damaged. One of the most severe earthquakes in the history of the Republic occurred in Erzincan in 1939. In this earthquake, 32,962 people lost their lives and 116,720 houses were severely damaged. Another major earthquake was the Marmara earthquake of 17 August 1999. This earthquake affected seven provinces including Kocaeli, Sakarya, Yalova, Bolu, Bolu, Eskişehir, Bursa and Istanbul. In this earthquake, 18,374 people lost their lives, 36,948 people were injured and 93,618 houses were severely damaged.

The most severe earthquake (magnitude 8) among developed countries in the world occurred in China in 2008. The earthquake, which affected more than half of China, killed 69,226 people, injured 374,643 people and left 4.8 million people homeless. The direct and indirect cost of the earthquake to the Chinese economy reached 124 billion dollars (Şahin & Kılınç, 2016, p. 38). The Marmara earthquake ranked eighth among the ten earthquakes with high costs that occurred in the world between 1980-2012. In terms of production and employment effects, the Marmara earthquake can be evaluated separately from other earthquakes. The World Bank estimated that the Marmara Earthquake would cause a 50 per cent permanent loss in SME employment (Bibbee et al., 2000, p. 10). The earthquake also caused loss of qualified labour force by affecting the production volume. In the Marmara earthquake, 3,491 people were affected in the manufacturing industry and nearly 10 per cent of them lost their lives in the earthquake. Nearly 8% of those employed at a level that could cause production loss were affected by the earthquake (Aktürk and Albeni, 2002, p.2-7; Akar, 2013, p. 198). In the earthquakes that occurred in Türkiye between 1980-2014, 21,193 people lost their lives and 5,972,249 people were affected by the earthquake. The total cost of the earthquake to the economy was determined as 25 million dollars (Şahin and Kılınç, 2016, p. 38).

On the other hand, 269 earthquakes that caused loss of life and damage occurred between 1900 and 2023. The largest earthquakes in terms of loss of life and damage were the 2023 Kahramanmaraş, 1939 Erzincan and 1999 Gölcük-centred Marmara earthquakes, respectively. The population of the 11 provinces affected by the Kahramanmaraş-centred earthquake was recorded as 14,013,196 people as of 2022. This figure corresponds to 16.4 per cent of the country's population. 3.8 million people are employed in the disaster area, which is 13.3 per cent of the employment in the region. The burden of the earthquake on the Turkish economy is estimated to be approximately 103.6 billion dollars. This figure is estimated to reach approximately 9 per cent of the national income in 2023 (SBB, 2023, p. 130).

3. General Effects of Earthquakes on Economy

Earthquake is one of the most horrible natural disasters that cause many casualties and injuries and damage settlements. In Türkiye, earthquakes are the type of disaster with the highest economic and social costs (Altun, 2018, p. 3; Dikmen, 2019, p. 31). Since Türkiye is a country in the earthquake zone, it is frequently exposed to earthquake

disasters. Many people lose their lives or are injured in the disasters that occur. In addition, many houses or workplaces can be more or less severely damaged. Especially for underdeveloped countries, the cost of earthquakes can be more severe. The reason for this can be said to be the lack of due diligence in the establishment stages of settlement centres in these countries, the lack of necessary and sufficient earthquake surveys or insensitivity to the possible consequences of earthquakes.

The negative effects of earthquakes are seen on employment, economic growth and inflation in the short term. In the long term, it threatens sustainable development by damaging development policies. It has been revealed in the researches that earthquakes have negative effects on GDP, per capita income, development and human capital (Akar, 2013, pp. 189-192). Earthquakes adversely affect the capital stock and labour market in the country, leading to a decrease in GDP and reducing economic growth. Accordingly, national income per capita is also adversely affected. Increased earthquake cost is reflected to governments as budget pressure. Natural disasters such as earthquakes also affect the development plans of the country. It causes existing plans to be changed or postponed. Thus (Akar, 2013, p 190;

The area affected by the Marmara earthquake constituted 23 per cent of the country's population and the most affected population constituted 6 per cent of the total population. While the share of the seven provinces affected by the earthquake in GNP was 34.7 per cent, the share of industrial value added was 46.7 per cent (SPO, 1999: 1). According to the report prepared by the SPO after the Marmara earthquake, it was estimated that the earthquake had an impact of 9-13 billion dollars on capital accumulation and national product (Altun, 2018, p. 3). On the other hand, the Kahramanmaraş-centred earthquake on 6 February 2023, which was described as the disaster of the century, affected ten provinces (Kahramanmaraş, Hatay, Gaziantep, Adıyaman, Malatya, Kilis, Şanlıurfa, Adana, Osmaniye, Diyarbakır, Elazığ) and caused great damage and loss of life. According to official statements, 50,783 people lost their lives, more than 100,000 people were injured and more than 300,000 buildings consisting of more than 300,000 independent sections were damaged (TMMOB, 2023).

4. Literature Review

The increasing number of disasters in the world and their heavy social and economic costs have been the focus of social scientists as well as natural scientists. Therefore, there is a gradual increase in the number of studies on disasters.

Aktürk and Albeni (2002) examined the impact of natural disasters on economic performance in the context of the earthquakes that occurred in Türkiye in 1999 and their effects. In the study, the contribution of the earthquake region to the country's GDP was found to be 34%. Tetik and Akbulut (2023) examined the economic and financial effects of the earthquake on 6 February 2023 in the context of exports, and developed policy recommendations as a solution to the problems of export firms damaged by the earthquake. Studies on earthquakes have generally focused on the social, economic and financial effects of natural disasters and their effects on economic performance (Akar, 2013; Aktürk and Albeni, 2002; Altun, 2018); Tetik and Akbulut, 2023. In these studies,

it has been determined that natural disasters, especially earthquakes, have severe consequences on human resources and economy.

An earthquake is an important phenomenon that can cause fluctuations in items such as employment, production, income and expenditure in a country, cause interruptions in the production process and cause contractions in total supply. For this reason, it is important to analyse the effects of earthquakes on economic performance in terms of future planning. The economic effects of earthquakes have been generally discussed in the studies (Borensztein, Cavallo and Valenzuela, 2008: 4; Benson, 1997: 59; Selçuk and Yeldan, 2001: 8; Pelling, Özerdem and Barakat, 2002: 293). The fact that the studies investigating the employment effects of disasters are insufficient in the literature increases the importance of the studies to be conducted in this field. The aspect that makes this study different from other studies in the literature is that the economic effects of the 6 February 2023 Kahramanmaraş-based earthquakes have been revealed in terms of employment.

Natural disasters can significantly change the economic structure and employment dynamics of the communities they affect. These effects vary in different sectors and geographies. For example, a study by Okubo and Strobl (2021) examined the effects of the 1959 Ise Bay Typhoon on firms in Nagoya City, Japan. This study showed that flood damage had heterogeneous effects across firms and sectors. In particular, older manufacturing firms managed to survive after prolonged inundation, but this limited employment and sales growth while stimulating capital growth (Okubo & Strobl, 2021). In the construction sector, employment growth was observed due to post-disaster reconstruction demand.

On the other hand, a study by Eskander, Fankhauser, Jha, Batool, and Qaisrani (2018) investigated the economic responses of rural households in Pakistan to flood disasters. This study finds that farmers exposed to floods move away from agriculture as an immediate response to disasters, but return within a year. Although flood exposure reduced savings, adjustments in income strategies helped farmers to overcome immediate losses and start the recovery process (Eskander et al., 2018).

However, a study by Benson and Clay (2004) notes that the economic impacts of natural disasters are usually short-term, but in some cases can have long-term effects. In particular, infrastructure damage and labour force loss caused by disasters can negatively affect long-term economic growth (Benson & Clay, 2004).

Hallegatte and Przyluski (2010) emphasise that the economic effects of natural disasters are not only limited to direct damages, but also have indirect effects. These indirect effects include increase in unemployment rates, closure of enterprises and decrease in investments (Hallegatte & Przyluski, 2010).

A study by Johar, Johnston, Shields, Siminski, and Stavrunova (2020) examined the effects of natural disasters on economic and financial outcomes in Australia. This study found that damage to homes from natural disasters had no average impact on employment and income, but increased financial hardship and financial risk aversion (Johar et al., 2020).

Another study by Roth Tran (2020) analysed the dynamic responses of local economies after natural disasters in the USA. This study finds that disasters increase total and per capita income in the long run (after 8 years). This effect was driven initially by a temporary increase in employment and in the longer run by an increase in average weekly wages (Roth Tran, 2020).

A study by Aziz, Nawaz and Hanif (2022) analysed the effects of natural disasters and terrorism on tourism growth. This study found that natural disasters and terrorism have varying degrees of impact on tourism growth. In general, the effects are negative, but in some cases, positive results are also observed (Aziz et al., 2022).

A study by Friedt (2018) analysed the effects of natural disasters on international trade and thus on employment and factor prices. This study found that trade reallocation caused by natural disasters had significant effects on employment and factor prices in unaffected Floridian communities (Friedt, 2018).

5. Application

5.1. Method and Data Set

Unit root tests are among the tests frequently used in econometrics literature to reveal the effects of shocks or stochastic properties on the parameters selected for use in econometric analysis. Stationarity, which means that the mean, variance and autocovariance of a variable are constant over time, provides information about whether the effects of shocks occurring in the series in unit root tests will be temporary or permanent. If the series are stationary, the effect of shocks ends in the short run, but if the series are not stationary, the effect of shocks may have permanent results (Damar et al., 2021: 665).

The concept of shock used in this study reflects the definition of macroeconomic shocks in general. While stationarity tests provide information on whether the effects of these shocks will be temporary or permanent, unit root tests with structural breaks are extremely important in terms of reflecting the break dates caused by shocks.

The data set of the study is obtained from TurkStat database. Employment data shows the number of workers employed in Agriculture, Industry, Service and Construction sectors in thousands of people. In addition, seasonally adjusted data are included in the analysis. Quarterly data between 2005-2023 constitute the observation interval of the study. In this study applied on Türkiye's employment data, the unit root test with structural breaks is preferred in order to reveal the possible effects of these events that may deeply affect the economy such as Covid-19 pandemic and Ukraine-Russia War in the scientific and empirical field.

The statistics used in unit root tests are generally based on parameters that determine the location of the break points and are therefore used as a control in the analyses. As stated in a study by Meng et al. in 2014, conventional unit root testing procedures attempt to minimise this dependence by ignoring the presence of any break under the null hypothesis (Meng et al., 2014, p. 349). However, this approach has its own

problems; in particular, problems such as false rejection under the null hypothesis and size distortions may arise.

In this context, the transformed RALS-LM test statistic offers an approach that is independent of the dependence on control variables and allows for structural breaks under the null hypothesis. The RALS regression uses information from non-normal errors to detect nonlinear effects, and this does not require the assumption of a particular nonlinear functional form. This feature increases the power of transformed RALS-LM tests when structural breaks and non-normal errors are present. This advantage can be clearly observed in comparisons with both linear and nonlinear test methods (Meng et al., 2014, p. 354).

The DF-GLS unit root test considered in this study was developed by Elliott et al. in 2006 in order to provide a solution to the problem of low power, which is frequently encountered and criticised in unit root tests. This test is based on the GLS (Generalised Least Squares) correction of the data and is thus included in the class of more efficient unit root tests. The GLS-detrend method increases the sensitivity and power of the test by removing trend effects in time series. This approach provides a more sensitive solution to trend problems that are frequently encountered in the analysis of economic data (Wu, 2010:1590). Considering the fluctuations and trend changes in employment data in the Turkish economy, the DF-GLS test has become an indispensable tool for economic analysts and researchers. Especially in analysing long-term economic trends and cycles, the accuracy and reliability provided by this test can play a critical role in shaping economic forecasts and policy decisions.

The DF-GLS (Dickey-Fuller Generalised Least Squares) test, developed by Elliott et al. (1996) and based on the GLS-detrending (Generalised Least Squares smoothing) method, is proposed as a more powerful alternative to the traditional ADF (Augmented Dickey-Fuller) test. The DF-GLS test provides a powerful test statistic that can be used to determine whether the series is integrated to the first order ($I(1)$) or integrated to the zero order ($I(0)$). The advantage of the DF-GLS unit root test is that it provides more accurate and reliable results than the ADF test for most data generating processes. Therefore, the DF-GLS test has become a widely preferred method among unit root tests (Wu, 2010:1590).

5.2. Empirical Results

Following the above theoretical discussion on the methodological structure and theoretical foundations of the DF-GLS and RALS-LM unit root tests with structural breaks, in this phase of our research, we aim to turn to the empirical applications of these tests and the findings obtained from these applications. In this section, we provide an analytical analysis of the application of both DF-GLS and RALS-LM unit root tests on the employment data set. This analysis will provide an opportunity to critically assess the performance and reliability of both tests in analysing economic time series. In addition, we will also discuss in detail how the break dates of these tests and the results of whether the breaks in these dates are temporary or permanent have an impact on the

interpretation of economic data and macroeconomic policy decisions. Thus, by considering the practical applications and results of these theoretical tests, it is aimed to reveal their place and importance in economic analyses more clearly.

Table 1: RALS-LM Structural Break Unit Root Test Results

RALS-LM Test Statistic	-9.228		
Break Date-1	2019:Quarter 4		
Break Date-2	2021:Quarter 1		
Critical Values	-4.558(%1)	-4.044(%5)	-3.773(%10)
Etki	Geçici		

According to Table 1, the break dates indicating a significant change in the series are the fourth quarter of 2019 and the first quarter of 2021. The fact that the RALS-LM test statistic is -9.228 and this value is greater than the critical values at 1%, 5%, and 10% significance levels suggests that these break points indicate that the series deviates from a stationary structure at certain time intervals, but these deviations do not cause a permanent effect. This suggests that the overall structure of the series may be disturbed by temporary shocks, but may return to its stationary state over time. Such a situation implies that the series can react to events in the period under study, but these events do not have a long-term structural effect.

RALS-LM Test Statistic: -9.228 indicates that the series is stationary when compared to the critical values. Since the absolute value of the test statistic is greater than the critical values at 1%, 5% and 10% significance levels, the rejection of the null hypothesis (the existence of a unit root in the series) implies that the series is stationary.

Break Dates: The two important break dates identified in the analysis are the fourth quarter of 2019 and the first quarter of 2021. These dates coincide with the recovery from the 2018 Reverend Burunson crisis, which had significant effects on the Turkish economy, and the economic recovery from the Covid-19 pandemic.

Impact: The "transitory" effect means that the shocks that occurred in the employment data at the dates of these breaks will diminish or disappear over time. This suggests that policymakers can maintain economic equilibrium through short-term interventions.

Table 2: DF_GLS Structural Break Unit Root Test Results

DF_GLS Test Statistic	-2.427		
Break Date	2020:Quarter 2		
Critical Values	-3.763(%1)	-3.240(%5)	-2.949(%10)
Etki	Kalıcı		

The fact that the DF-GLS test statistic presented in Table 2 is -2.427 and this value is above the critical values of -3.763, -3.240 and -2.949 indicates that there is a permanent effect in the series. This reflects that the test supports the presence of a unit root in the series and that the analysed series is non-stationary. The second quarter of 2020, which was determined as the break date, marks the period when a change occurred in the series and this change has a permanent nature that will affect the future behaviour of the series. This result implies that the series has undergone a certain structural change in the period analysed and this change will continue.

5.3. Discussion and Findings

The RALS-LM unit root test results analysed in this study evaluate the stationarity properties of the employment data of the Turkish economy and the effects of economic events since 2005. The test statistic of -9.228 presented in Table 1 reveals that the series is stationary and the current economic shocks cause temporary effects. These findings suggest that short-term interventions against macroeconomic shocks may be sufficient and the economy can recover quickly from such shocks. Two important break dates, the fourth quarter of 2019 and the first quarter of 2021, mark the periods of economic recovery following the 2018 Pastor Brunson crisis and the beginning of the mitigation of the effects of the Covid-19 pandemic.

From an academic perspective, this study reveals the limitations and potentials of econometric modelling and unit root tests. Econometric models need to be constantly reviewed and improved in order to push the limits of the methods used in analysing unexpected and rare events such as earthquakes and to make better predictions. Moreover, more comprehensive and detailed data sets are needed to understand the short and long-term economic impacts of such events.

On the other hand, the test statistic of -2.427 in the DF-GLS structural break unit root test in Table 2 indicates that the series is non-stationary and contains a unit root. This reveals that the Covid-19 pandemic in the second quarter of 2020 had permanent effects on employment data. These lasting effects emphasise the need for policymakers to develop long-term strategies to adapt to the changes in the economy after the pandemic.

Methodologically, unit root tests with structural breaks such as DF-GLS and RALS-LM detect stationarity properties in time series more precisely and add richness to economic analyses. The methodological approach of this study plays an important role in understanding the structural breaks caused by shocks and guiding policy decisions, especially in a dynamic economy like Türkiye.

6. CONCLUSION

The main objective of this study was to analyse the effects of the earthquake that occurred in Kahramanmaraş in the first quarter of 2023 on employment and to identify potential breaks. However, the empirical results of the RALS-LM and DF-GLS unit root tests with structural breaks show that, contrary to expectations, this event did not cause a break in the employment series in the analysed period.

The fact that the economic effects of the Kahramanmaraş earthquake did not cause a clear break in the employment data can be explained by several reasons. Firstly, the effects of the earthquake may not have been fully felt yet, because it may take time for the economic effects to become evident. Secondly, the current employment structure may be considered to be resilient to the earthquake; for instance, the share of the affected sectors in employment may be low or it may recover quickly thanks to the flexibility of the labour market. Third, the rapid response of the public and private sectors may have mitigated the potential negative effects of the earthquake.

The results of the analysis point to two important break dates in the fourth quarter of 2019 and the first quarter of 2021. These breaks seem to point to the economic recovery after the Rahip Brunson crisis and the post-pandemic recovery process. These findings suggest that the effects of previous economic shocks have diminished over time and the Turkish economy has shown a certain resilience to such events. Again, the break observed in the second quarter of 2020 shows the negative impact of the pandemic on employment.

The results of this study provide important insights for policymakers, especially in understanding the economic impacts of natural disasters and developing strategies to cope with these impacts. Firstly, it is important to closely monitor employment data and be prepared for potential lagged effects. Secondly, structural reforms and disaster preparedness plans are vital to increase economic resilience and accelerate post-disaster recovery.

In sum, although the economic impacts of the Kahramanmaraş earthquake did not manifest clearly as expected, this highlights the need for continuous assessment and adaptation in economic analyses and policy-making processes. The Turkish economy has shown that it has the capacity to recover from past shocks and the results of this study suggest that economic policies should be further strengthened to face current and future challenges.

REFERENCES

- Akar, S. (2013). The Effects of Natural Disasters on Public Finance and Macro Economy: An Assessment of Türkiye. *Journal Of Management And Economics Research*, 11(21), 185-206.
- Aktürk, İ., & Albeni, M. (2002). The effect of natural disasters on economic performance: 1999 earthquakes in Türkiye and their effects. *Journal of Süleyman Demirel University Faculty of Economics and Administrative Sciences*, 7(1).
- Altun, F. (2018). Economic and social effects of disasters: An evaluation through the case of Türkiye. *Journal of Social Work*, 2(1), 1-15.
- Aziz, A., Nawaz, M., & Hanif, S. (2022). Effect of Natural Disasters and Terrorism on Tourism Growth: Evidence from Top Ten Tourist's Destination. <https://dx.doi.org/10.52131/joe.2022.0402.0086>

- Benson, C., (1997). The Economic Impact of Natural Disasters in Vietnam. Overseas Development Institute, Working Paper 98.
- Benson, C., & Clay, E. J. (2004). Understanding the Economic and Financial Impacts of Natural Disasters. The World Bank. <https://openknowledge.worldbank.org/handle/10986/15025>
- Bibbee, A., Gönenç, R., Jacobs, S., Konvitz, J., & Price, R. (2000). Economic Effects of the 1999 Turkish Earthquakes: An Interim Report. OECD Economics Department Working Papers No. 247. https://www.oecd-ilibrary.org/economic-effects-of-the-1999-turkish-earthquakes_5lgsjhvj837f.pdf?itemId=%2Fcontent%2Fpaper%2F233456804045&mimeType=pdf
- Borensztein, E., Cavallo, E., & Valenzuela, P. (2008). Debt Sustainability Under Catastrophic Risk: The Case for Government Budget Insurance. IMF Working Paper, WP/08/44, 2-26.
- Damar, E., Özcan, C. C., & Özmen, İ. (2021). Analysing tourism shocks with structural break unit root tests: The case of Türkiye. *Journal of Turkish Tourism Research*, 5(1), 660-677.
- State Planning Organisation (1999). Economic and social effects of the earthquake, possible financing needs, measures to be taken in the short-medium and long term. SPO.
- Dikmen, A.T. (2019). Macroeconomic Effects of Natural Disasters in Türkiye (Unpublished doctoral dissertation). Atatürk University Institute of Social Sciences, Erzurum.
- Elliott, G., Rothenberg, T. J., & Stock, J. H. (1996). Efficient Tests for an Autoregressive Unit Root. *Econometrica*, 64(4), 813-836.
- Eskander, S., Fankhauser, S., Jha, S., Batool, S., & Qaisrani, A. (2018). Do natural disasters change savings and employment choices: evidence from Pakistan. Kingston University. <https://eprints.kingston.ac.uk/id/eprint/51028/6/Eskander-S-M-S-U-51028-VoR.pdf>
- Friedt, F. L. (2018). Natural Disasters, Trade, and Local Factor Prices: The Urban Equilibrium Effect of Rerouted Trade. <https://dx.doi.org/10.2139/ssrn.3214243>
- Güvel, E. A. (2001). Political Economy of Natural Disasters: Natural Risks and Disaster Planning. Istanbul: Istanbul Stock Exchange.
- Hallegatte, S., & Przyluski, V. (2010). The economics of natural disasters: Concepts and methods. Policy Research Working Paper Series. <https://doi.org/10.1596/1813-9450-5507>
- Johar, M., Johnston, D., Shields, M., Siminski, P., & Stavrunova, O. (2020). The Economic Impacts of Direct Natural Disaster Exposure. <https://dx.doi.org/10.2139/ssrn.3679022>

- Koyuncu, M., & Koyuncu, S. (2016). Disaster Management in the Ottoman Empire. *Journal of Contemporary Medicine*, 6(4), 378-381.
- Meng, M., Im, K. S., Lee, J., & Tieslau, M. A. (2014). More powerful LM unit root tests with non-normal errors. In *Festschrift in Honour of Peter Schmidt*. Springer New York, New York, 343-357.
- Okubo, T., & Strobl, E. (2021). Natural Disasters, Firm Survival and Growth: Evidence from the Ise Bay Typhoon, Japan. *Keio Economic Studies*. <http://ies.keio.ac.jp/upload/pdf/en/DP2020-005.pdf>
- Pelling, M., Ozdem, A., & Barakat, S. (2002). The Macro - Economic Impact of Disasters. *Progress in Development Studies*, 2,4: 283-305.
- Roth Tran, B. (2020). The Local Economic Impact of Natural Disasters. <https://dx.doi.org/10.24148/wp2020-34>
- Selçuk, F., & Yeldan, E. (2001). On The Macroeconomic Impact of the August, 1999 Earthquake in Türkiye: A First Assessment. *Economic Research Forum (ERF), Working Paper.*, 1-17.
- Şahin, İ., & Kılınç, T. (2016). Economic effects of earthquakes in Türkiye between 1980-2014. *Journal of Economic Innovation*, 4(1), 33-42.
- Tatar, Ö., & Baytimur, S. O. (2020). Earthquakes and Meteorological Disasters in the Ottoman Empire between 1789-1808. *Fırat University Journal of Social Sciences*, 30(2), 505-518.
- Presidency of the Republic of Türkiye, Presidency of Strategy and Budget. (2023). 2023 Kahramanmaraş and Hatay Earthquakes Report. Accessed: 14.11.2023, <https://www.sbb.gov.tr/wp-content/uploads/2023/03/2023-Kahramanmaras-ve-Hatay-Depremleri-Raporu.pdf>
- Tetik, N., & Albulut, İ. İ. (2023). Economic and Financial Effects of the Earthquake on 6 February 2023: A Review on Exports. *Academic Suggestions for the Aftermath of Kahramanmaraş Centred Earthquakes*, in (93-103), Özgür Publications, Gaziantep.
- Union of Chambers of Turkish Engineers and Architects (TMMOB). (2023). 6 February Earthquakes 8th Month Evaluation Report. Accessed: 14.11.2023, <https://www.tmmob.org.tr/icerik/tmmob-6-subat-depremleri-8-ay-degerlendirme-raporu-yayimlandi>.
- Wu, S. (2010). Lag length selection in DF-GLS unit root tests. *Computational Statistics & Data Analysis*, 54(12), 3255-3262. <https://dx.doi.org/10.1080/03610918.2010.508143>

Forward premium puzzle: Evidence from South East European Countries

Arbresh Raveni¹, Agim Mamuti²

Abstract

Introduction: This paper investigates the UIP condition in South East European Economies.

Aim: The aim of this study is by testing UIP using short-term interest rates and exchange rate data to examine the degree of monetary convergence of SEE economies towards Euro Area.

Method: Apart from the baseline UIP model, we employ a GARCH-GED model and account for structural breaks.

Findings: UIP holds true only in the case of Bulgaria and Croatia. The results for Romania and Moldova are ambiguous, suggesting that UIP holds true only if we control for the effects of structural breaks. UIP condition is rejected for Albania, Bosnia & Herzegovina, North Macedonia, Serbia and Turkiye.

Originality and value: This study fills the gap in the literature by testing UIP for SEE countries. The results of this study are important for judging whether the capital markets of these countries are ready to join the EU without causing dramatic changes in their financial markets. This study also makes a contribution to the body of literature reporting the existence of the “**forward premium puzzle**” i.e. the tendency for countries with high interest rates to see their currencies appreciate rather than depreciate as UIP predicts.

Key Words: Uncovered Interest Parity, forward premium puzzle, GARCH model, cointegration, South East European Economies

Jel Codes: E43, F31, G15

1. INTRODUCTION

Uncovered Interest Parity (UIP) is a fundamental theory of exchange rate determination and a measure of financial market integration and efficiency which is widely used in the empirical literature for examining the degree to which financial prices have equalized between countries. However due to data limitations, most of the UIP studies are focused on industrialized countries. The aim of this study is to fill the gap in the literature by testing UIP using short-term interest rates and exchange rate data for Albania, Bosnia & Herzegovina, Bulgaria, Croatia, North Macedonia, Moldova Romania, Serbia and Turkiye. This paper therefore provides one of the first systematic

¹ Assistant Professor, Mother Teresa University-Skopje, Faculty of Technical Sciences, North Macedonia

² Full Professor, Mother Teresa University-Skopje, Faculty of Technical Sciences, North Macedonia

examinations of the degree of capital mobility of the South East European (SEE) economies. Three different sets of tests are used for country-by-country analysis: workhorse UIP model estimated by OLS for Croatia, Romania and Türkiye; cointegration analysis estimated by Engle-Granger test and Gregory-Hansen test for Serbia and VAR analysis for Bulgaria, Bosnia and Herzegovina, Albania, North Macedonia and Moldova. In order to account for any nonlinearities in the UIP condition also a GARCH-GED model augmented with dummy variables for structural breaks is used to test for UIP in all countries. In addition to country-by-country analysis, a panel regression analysis is also conducted. The results of this study are important for judging whether the capital markets of these countries are ready to join the EU or whether the necessary monetary convergence is achieved in order to adopt the euro without causing dramatic changes in their financial markets. This study also makes a contribution to the body of literature reporting the existence of the “**forward premium puzzle**” i.e. the tendency for countries with high interest rates to see their currencies appreciate rather than depreciate as UIP predicts.

This study is organized as follows: the first section provides a survey on the existing literature on UIP, focusing on emerging market studies; the second section provides an overview of the findings of existing empirical studies on specific countries in our sample. Potential structural changes, data and methodology descriptions are provided in the third section. The final section summarizes the findings and conclusions and highlights some of limitations of this empirical investigation.

2. LITERATURE REVIEW

2.1. Theoretical perspective of Interest Rate Parity

Interest Parity is a fundamental theory explaining exchange rate determination, and a measure of financial market integration and efficiency which states that in an ideal economy where there are no significant transaction and information costs, as well as no restrictions on international capital flows, any excess return by interest rate differential on perfectly substitute assets is wiped away by the future currency movements.

Forward rates gave rise to the notion of Covered Interest Parity(CIP), which states that the ratio of the forward to the spot exchange rate will equal the interest differential between assets with otherwise similar characteristics measured in local currencies, once currency risk has been eliminated by covering the transaction through the use of forward contracts (Meredith& Chinn, 2005). CIP is usually considered to be a risk-free arbitrage condition that holds regardless of investor preferences. In other words, CIP should hold by definition if capital is mobile and significant deviations from CIP are interpreted as reflecting barriers to cross-border capital flows (Mansori, 2003). CIP test is therefore one of the most straightforward ways to assess the extent of capital mobility between countries (Obstfeld, 1995). In practice, transaction costs, information costs, differential

tax treatment and government inference or regulations may preclude CIP from holding perfectly (Mansori, 2003). The CIP condition can be stated as follows:

$$f_{t,t+k} - s_t = (i_{t,k} - i_{t,k}^*) \quad (1)$$

where $f_{t,t+k}$ is the log of the k -period forward rate at time t , s_t is the log spot exchange rate at time t , and both exchange rates are expressed as unit of the foreign currency over the domestic currency. $i_{t,k}$ and $i_{t,k}^*$ are the domestic and the foreign k -period maturity risk-free bond yields expressed in respective currency terms.

Uncovered Interest Parity (UIP) differs from CIP since the investment is not covered by the forward contract, thus leaving the investor at risk of future deviation of spot rate from expectation. Assuming the investor is risk neutral, UIP condition can be stated as follows:

$$s_{t,t+k}^e - s_t = (i_{t,k} - i_{t,k}^*) \quad (2)$$

UIP condition it is tested jointly with the assumption of rational expectations in the exchange markets i.e. market participants use efficiently all the information available at time t to form expectation of future spot rate $s_{t,t+k}^e$ and make mean zero errors in prediction:

$$s_{t+k} = s_{t,t+k}^e + \xi_{t,t+k} \quad (3)$$

where $\xi_{t,t+k}$ is a white-noise forecasting error term uncorrelated with all information known at time t , including the interest differential and the spot exchange rate (Chinn, 2006). A test of UIP therefore jointly tests two underlying assumptions that there is capital mobility and that exchange rates efficiently embody expectations that are not systematically incorrect. If currency markets are efficient, so that the forward rate is an unbiased predictor of the future spot rate, then the UIP condition is identical to the CIP condition with the exception of a possible risk premium for investors that are not risk neutral (Mansori, 2003). The forward rate unbiasedness hypothesis can be expressed as follows:

$$s_{t,t+k}^e - s_t = f_{t,t+k} - s_t = (i_{t,k} - i_{t,k}^*) \quad (4)$$

Substituting (3) into (2) gives the “risk-neutral efficient market hypothesis”(RNEMH):

$$\Delta s_{t,t+k} = (i_{t,k} - i_{t,k}^*) + \xi_{t,t+k} \quad (5)$$

where $\Delta s_{t,t+k} = s_{t+k} - s_t$ is the realized change in the exchange rate from t to $t+k$. RNEMH can be tested in the regression framework, representing the workhorse model for testing UIP:

$$\Delta s_{t,t+k} = \alpha + \beta(i_{t,k} - i_{t,k}^*) + \xi_{t,t+k} \quad (6)$$

$$H_o : \begin{matrix} \alpha = 0 \\ \beta = 1 \end{matrix}$$

Under the assumption that the forecasting error term $\xi_{t,t+k}$, is stationary and orthogonal to all information known at time t , has zero mean and is serially uncorrelated (Sachsida et al.,2001), OLS is a consistent estimator of β . While OLS is not a fully efficient estimator, it is still the standard choice in the literature of UIP (Flood & Rose, 2001). A rejection of UIP implies that one or both of the assumptions of rational expectations and risk neutrality do not hold (Taylor,1995), hence the failure of RNEMH, however, it is not sufficient for the failure of the unbiasedness hypothesis. An economic channel is needed that generates the appropriate correlation between interest differentials and these deviations, hence, shocks that cause future exchange rate appreciation, must at the same time increase the forward discount and, assuming CIP, increase the domestic interest rates relative to those abroad (Meredith & Ma, 2002). The failure of rational expectations assumption implies that the forecast error $\xi_{t,t+k}$ depends on information available at time t , and is correlated with interest differential ($it, k - it, k^*$), thus violating the assumption of orthogonality and iid error term. The failure of risk neutrality assumption implies that risk averse investors demand a premium if holding a currency involves risk. Regarding the constant term, a significant non-zero value may reflect a constant foreign exchange risk premium as well as default risk or political risk or may capture other factors such as transaction costs (Lee, 2006).

Empirical literature, following in the next section, is in general unfavorable of UIP condition. There is, however, some weak evidence supportive of the UIP theory for emerging markets, long horizon investments, and fixed exchange rate regimes. The empirical studies are focused mostly on the developed economies due to lack of data for emerging markets and the vast majority of studies document the so called **"forward premium puzzle"** i.e. in countries with higher interest rate there is a tendency for their currencies to appreciate rather than depreciate as UIP predicts (Lothian & Wu, 2011). The vast body of research is focused on explaining the deviations from UIP condition, in terms of possible time-varying risk premium or due to non-rationality of market expectations. Other possible explanations that do not require rejection of the assumptions of risk neutrality and rational expectations are given in terms of transaction costs, "peso problem", simultaneity bias, structural breaks, incomplete information with rational learning and "rational bubbles".

2.2 Empirical evidence on UIP theory for SEE countries

To our best knowledge, there is no empirical evidence to date primarily focused on testing UIP for SEE countries. Kasman et al.(2007) investigating for monetary policy convergence of new EU members includes in his study Croatia, Bulgaria and Turkiye and testing for UIP using cointegration analysis finds that UIP holds for Croatia and Turkiye, suggesting that the coordination of monetary policies of these countries not yet

member of the EU seems much better than most of the recent member countries. Francis et al.(2002) investigating the effect of liberalization of financial markets on UIP condition includes Turkiye in their sample and suggest that UIP holds better in the post-liberalization period. Özmen & Gökcan (2004) investigates the interrelations between purchasing power parity (PPP) and uncovered interest parity (UIP) in Turkiye using Johansen cointegration analysis for a system containing Turkish and US inflation rates, interest rates, and exchange rate. The results appear to support the hypothesis that the system contains UIP and PPP relations. Zhivkov et al.(2016) investigating UIP in Eastern Europe using a CGARCH-M model augmented with structural breaks include in their study Croatia, Romania and Serbia. Their findings suggest that UIP does not hold in none of these countries. Cuestas et al.(2017) include in their study Croatia and Romania and test UIP hypothesis by distinguishing between forward-looking and static expectations. Their findings suggest that UIP holds only in the case of forward-looking expectations. Dabrowski & Janus (2021) include Croatia and Romania in their investigation and use a GARCH-GED model allowing for structural breaks and augment the model with several risk measures in order to explain the deviation from UIP condition. Their results suggest a significant deviation from the UIP condition. The decomposition of the deviation from UIP for both Croatia and Romania was not explored further due to data limitations.

3. RESEARCH METHODOLOGY AND DATA

This section presents the methodology and data used in this study. The first section presents the methodology used for country-by-country analysis and panel data analysis of UIP for SEE countries. The second section presents the interest rates and exchange rates data details, the construction of the panel data and data limitations. The third section presents the unit root tests results for determining the order of integration of time series.

3.1 Research Model and Hypothesis

Uncovered interest parity, for countries which series are stationary is tested empirically by using the workhorse model in equation (7), estimated by OLS:

$$\Delta s_{t,t+k} = \alpha + \beta(i_{t,k} - i_{t,k}^*) + \xi_{t,t+k} \quad (7)$$

$$H_o : \begin{matrix} \alpha = 0 \\ \beta = 1 \end{matrix}$$

Cointegration analysis is used for countries which series are AR(1) using **Engle-Granger** methodology i.e. testing whether the error term $\xi_{t,t+k}$ contains a unit root. If the hypothesis of unit root is rejected, $\xi_{t,t+k}$ is stationary, hence, UIP holds true:

$$\Delta s_{t,t+k} = \alpha + \beta(i_{t,k} - i_{t,k}^*) + \xi_{t,t+k} \quad (8)$$

$$\Delta \xi_{t,t+k} = \alpha \xi_{t,t+k-1} + \beta \Delta \xi_{t,t+k-1} + \dots + v_{t,t+k},$$

$$H_0: \alpha = 0$$

Engle-Granger methodology has limitations especially when dealing with a long data span when the data generating process may be affected by major economic events such as financial and economic crises. To examine further the robustness of our results to structural breaks, Gregory and Hansen (1996) cointegration test is applied, which accounts for an endogenously-determined break.

For countries that have introduced currency board arrangement (Bulgaria since 1997m7, Bosnia since 1997M1) UIP is tested following Holtemöller (2005) by investigating the time-series properties of the risk premium, i.e. the risk premium can only be integrated of order zero if the spread between the domestic and reference interest rates is stationary. The interest rate spread can only be integrated of order zero if domestic and reference interest rates are cointegrated with cointegrating vector **(1, -1)**. Backwards recursive Johansen trace tests and likelihood ratio (LR) tests for restrictions on the cointegration vector are applied for this purpose (Holtemöller (2005), p.5). The LR trace test is a test for the rank **r** of the matrix **Π** in the vector error correction representation of a **n**-dimensional vector autoregressive (**VAR**) model for domestic and foreign interest rate (**n=2**), following Johansen (1995) or Lütkepohl (2001):

$$\Delta x_t = (\Pi : v) \begin{pmatrix} x_{t-1} \\ 1 \end{pmatrix} + \sum_{i=0}^{p-1} \Gamma_i \Delta x_{t-i} + e_t,$$

where **xt=(it-it*)'**, **Γi** are **2x2** coefficient matrices, **p** is the lag length of the level representation of the VAR model and **et** is a 2-dimensional serially uncorrelated error term. **v** reflects a constant restricted to the cointegration space. “*The existence of a stationary relationship between the interest rates is indicated by a cointegration rank of **r=1**. If **r=2** both variables are integrated of order zero. When a single stationary relation between domestic and foreign interest rate is present, it is tested if the restriction **β=(1, -1)** If this restriction is not rejected, it can be concluded that the spread **β' xt=(it-it*)** is integrated of order zero, hence, UIP holds true*” (Holtemöller (2005), p.7).

An econometric challenge faced by researches in testing UIP condition in emerging markets is modelling relatively frequent structural breaks, especially identifying break dates endogenously (Bakeart et al.,2002; Goh et al, 2006). In order to account for possible nonlinearities of the UIP condition caused by frequent structural changes in transition economies we additionally employ a similar model to Dabrowski & Janus (2021). We test for the UIP condition by using a GARCH-GED model augmented with dummy variables in order to model structural breaks:

$$\Delta s_{t\alpha,t+k} = \alpha + \beta(i_{t,k} - i_{t,k}^*) + \sum_{j=0}^2 d_j D_j + \xi_{t,t+k} \quad (8)$$

$$\xi_{t,t+k} = \mu_t \delta_t$$

$$\delta_2^t = \eta + \theta \xi_{t-1}^2 + \gamma \delta_{t-1}^2$$

where μ_t follows a Generalized Error Distribution (GED), and $\eta \geq 0$, $\theta \geq 0$, $\gamma \geq 0$ and $\theta + \gamma < 1$.

3.2 Exchange rate and interest rate data

The empirical part of this study focuses on testing UIP for SEE countries currency dominated assets against euro dominated assets. The monthly time series of exchange rates and interest rates are taken from the International Financial Statistics of the IMF database.

The literature review of UIP studies suggests that the choice of the interest rates series is based on the relevant interest rate of the market being studied; however, the choice of interest rates for SEE countries is constraint by the data availability. 3 months deposit rates and 3 months money market rates are used where available, and the 3 months 'euribor' interest rates is used for the comparable euro denominated asset. The sample period for the countries and interest rates specifications are reported in Table 1:

Table.1 Sample and data specification

Countries	Sample peroid	Money Market rate (MM) Deposit rate (D)
Albania	2001:01-2022:12	D
Bosnia & Herzegovina	2002:01-2022:12	D
Bulgaria	2001:01-2022:12	MM
Croatia	2001:01-2022:12	MM
North Macedonia	2001:01-2022:12	D
Moldova	2001:01-2022:12	D
Romania	2001:01-2022:12	MM
Serbia	2002:01-2022:12	D
Turkiye	2001:01-2022:12	MM

For the panel analysis an unbalanced panel data set is constructed using 3 months deposit rates for SEE countries and 3 months German deposit rates.

3.3 Unit root tests

Several studies suggest that the failure of UIP condition may be a statistical phenomenon that occurs because of the very persistent autocorrelation in the forward premium implying that the variables in the model are non-stationary (Olmo & Pilbeam, 2009). The standard Augmented Dickey Fuller (ADF) test is conducted for all the series

augmented by a deterministic term and a constant. The number of lagged differences used on the specification of the testing equation is based firstly on the model diagnostics, and secondly on the information criteria. In the presence of a structural break in time series the ADF test is weakened i.e. its capacity to reject the unit root null is reduced. Hence, considering the above suggestions of a possible structural break in the fiscal variable from the descriptive analysis, the ADF test with structural break is conducted in a presence of a single structural break (in each case identified by the algorithm included in JMulti)³. The results are provided in Table 2.

Table.2 The order of integration of the time series

Countries	DER= $\Delta s_{t,t+k}$	DIR= $i_{t,k} - i_{t,k}^*$
Albania	AR(0)	AR(1)
Bosnia&Herzegovina	AR(0)	AR(1)
Bulgaria	AR(0)	AR(1)
Croatia	AR(0)	AR(0)
North Macedonia	AR(0)	AR(1)
Moldova	AR(0)	AR(1)
Romania	AR(0)	AR(0)
Serbia	AR(1)	AR(1)
Turkiye	AR(0)	AR(0)

4. EMPIRICAL RESULTS

Table 3 provides estimates of UIP hypothesis using equation (7) estimated on a country-by-country basis. Estimation using the 3-month horizon data at a monthly frequency led to overlapping observations, and thereby, serially correlated regression errors. Several empirical studies following Hansen and Hodrick (1980) have used the Generalized Method of Moments (GMM) estimator of Hansen (1982) to correct the standard errors of the parameter estimates for MA serial correlation of order k-1 (i.e., MA(2) in our case). However, if the degree of overlap is large relative to the sample size, standard GMM asymptotic theory no longer provides a good approximation to the finite sample distribution of Uncovered Interest Parity regression tests, therefore we refrain from using GMM estimation in this study. The problem of serial correlation is accounted for by applying the Cochrane-Orcut transformation of all variables, if CFR holds true and the GLS estimator is used to test for UIP. However, if CFR is rejected, Newey-West standard errors that are robust to both heteroscedasticity and

³ See Appendix.1 for details on unit root testing

autocorrelation will be used for the inference on the significance of UIP estimates. The diagnostics suggest that the model is well specified for Croatia , however suffers from serial correlation in case of Romania and Turkiye. The CFR is tested and does not hold true for both countries, therefore the Cochrane-Orcut estimation cannot be used. Newey-West standard errors are reported in Table.3.

Table.3 UIP estimates by OLS

Countries	$\alpha=0$ [p-value]	$\beta=0$ [p-value]	$\beta=1$ Wald test [p-value]
Croatia	-0.009 [0.749]	0.001 [0.853]	[0.080]
Romania	-0.004 [0.870]	0.009 [0.003]	[0.000]
Turkiye	0.013 [0.289]	0.001 [0.043]	[0.000]

The results suggest that UIP condition holds true for Croatia confirming that the necessary monetary convergence was achieved in the Croatia economy before adopting the euro in January 2023. For Romania and Turkiye the results confirm the usual finding of the “forward premium puzzle”. The coefficients of β in both countries are positive and their absolute values are small, supporting the hypothesis that the results of UIP are less favorable for the emerging countries compared to developed economies.

The variables are cointegrated if the residuals from the cointegrating regression are stationary. The estimated coefficients are unbiased, efficient and superconsistent even though the hypothesis of autocorrelation is not rejected. The unit root test for residuals is conducted which suggests that for Serbia the residuals are nonstationary, hence UIP is invalid. Gregory and Hansen (1996) test is a direct extension to the Engle and Granger test and it is especially insightful when the null hypothesis of no cointegration is not rejected by the Engle and Granger test. The Gregory and Hansen (1996) allows for cointegration with structural breaks. Table 4 reports the test results suggesting no cointegration even after accounting for structural breaks, hence, UIP does not hold true for Serbia.

Table. 4 Gregory and Hansen (1996) test results for Serbia

Model	Break date	Test statistics	5% critical value	H0: no cointegration
C	2008 :10	-3.812	-4.165	H0 is not rejeted
C/T	2002:01	-4.064	-4.853	H0 is not rejeted
C/S	2006:10	-4.558	-4.138	H0 is not rejeted

The results for VAR analysis for Bulgaria and Bosnia & Herzegovina are presented in Table 5. The LR trace test statistics for the hypothesis that there is at most one cointegration relationship is smaller than the corresponding critical values. In the corresponding VECM with a constant restricted to the cointegration space, the LR test statistics for the (1,-1) restriction has a p-value of 38.2% and the Bulgarian interest rate adjusts by the adjustment parameter $\alpha_1=0.002$, hence the restriction imposed on the cointegration vector appears to be valid. Conclusively, the spread of money market rates in Bulgaria and Euribor is stationary i.e. suggesting that UIP hold true in the case of Bulgaria. In the case of Bosnia & Herzegovina the results suggest a cointegration vector, however the evidence is weak due to serial correlation. The restriction imposed on the cointegration vector is not valid, suggesting that UIP does not hold perfectly. The bound test procedure is conducted for Albania , North Macedonia and Moldova, however even after trying different lags there is still problem with serial correlation in all countries, hence the estimates are biased and inconsistent and inference from the test is invalid, therefore, the F-tests are not reported. The VAR analysis in all three countries suggests no cointegration relationship among interest rates, hence failure of UIP.

Table. 5 VAR analysis results

Countries	Order of lags	Rank of Π Trace value vs. critical value	LR test $\beta=(1,-1)$ [p-value]
Bulgaria	6	$r=1$ $4.86 < 7.38$	[0.3827] H0 is not rejeted
Bosnia & Herzegovina	6	$r=1$ $2.08 < 3.61$	[0.0035] H0 is rejeted
Albania	10	$r=0$ $9.85 < 10.77$	
Moldova	7	$r=0$ $11.75 < 17.34$	
North Macedonia	6	$r=0$ $10.56 < 13.63$	

The results of the panel analysis are presented in Table 6. In order to choose between FE and OLS, the restriction that the fixed effects are identical and can be modeled with an overall intercept as in OLS model, is tested. The results of LR and F-test suggest using one way FE model. The results from the Lagrange Multiplier test indicate that there is sufficient evidence to reject the null hypothesis that the variances of the country-specific disturbance term are equal to zero, hence suggesting that random effects are jointly significant, therefore the RE is preferred.

Table. 6 Panel analysis results

Models	Test	Test statistics [p-value]	5% critical value	Hypothesis tested	Decision
One way FE vs. OLS	LR~ χ^2	35.205 [0.000]	15.51	Reject H0: $\alpha_i = \alpha$	FE
	F tests	5.18 [0.000]	2.51		
One way RE vs. OLS	LM~ χ^2	40.205 [0.000]	3.84	Reject H0: $\alpha u^2 = 0$	RE
FE vs. RE	Hausman	0.86 [0.000]	3.84	H0: random	RE

The results of the Hausman test suggest that it is safe to use the RE, conclusively, RE model is chosen for further analysis. However, the estimated $\rho = 0.66 > 0.4$ suggests that there is autocorrelation in the residuals within groups, hence, using the estimates for making economic inference it would be misleading. The results from the panel analysis $\beta = 0.0016$, p. value [0.000], confirm the “forward premium puzzle”.

Several empirical studies employ a simple method for testing the UIP condition by exporting the time series properties of the deviation from the UIP. We explore this approach and the results are presented in Table 7. The results confirm the finding that UIP holds true for Croatia and Bulgaria. The findings suggest a failure of the UIP condition for Albania, North Macedonia, Serbia and Bosnia & Hercegovina. Contrary to the OLS specifications, the results suggest that UIP holds true in Türkiye. The results also suggest that, if accounting for structural breaks, the UIP condition holds true for Romania and Moldova.

Table. 7 Unit root testing of deviation from UIP

Country	Unit root test	Deterministic terms	Lags	Test statistic	5% critical value	Order of integration
Albania	ADF test with no structural break	intercept, no time trend	2	-0.8757	-2.86	AR(1)
	ADF test with structural break	Shift dummy (2008 M7)	2	-0.7753	-2.88	AR(1)
Bosnia & Hercegovina	ADF test with no structural break	intercept, no time trend	4	-2.5253	-2.86	AR(1)
	ADF test with structural break	Shift dummy (2008 M10)	4	-2.6058	-2.88	AR(1)
Bulgaria	ADF test with no structural break	intercept, no time trend	10	-3.1735	-2.86	AR(0)
	ADF test with structural break	Shift dummy (2003 M4)	10	-3.4749	-2.88	AR(0)
Croatia	ADF test with no structural break	intercept, no time trend	8	-2.8942	-2.86	AR(0)
	ADF test with structural break	Shift dummy (2003 M9)	8	-3.5352	-2.88	AR(0)
Moldova	ADF test with no structural break	intercept, no time trend	3	-2.9806	-2.86	AR(1)

	ADF test with structural break	Shift dummy (2015 M3)	3	-2.4947	-2.88	AR(0)
North Macedonia	ADF test with no structural break	intercept, no time trend	1	-1.1475	-2.86	AR(1)
	ADF test with structural break	Shift dummy (2003 M3)	1	-0.4456	-2.88	AR(1)
Romania	ADF test with no structural break	intercept, no time trend	4	-1.9686	-2.86	AR(1)
	ADF test with structural break	Shift dummy (2008 M10)	4	-4.0492	-2.88	AR(0)
Serbia	ADF test with no structural break	intercept, no time trend	6	-1.8459	-2.86	AR(1)
	ADF test with structural break	Shift dummy (2003 M4)	6	-2.6592	-2.88	AR(1)
Turkiye	ADF test with no structural break	intercept, no time trend	3	-4.0300	-2.86	AR(0)
	ADF test with structural break	Shift dummy (2021 M12)	3	-4.4865	-2.88	AR(0)

We proceed our investigation by exploring possible nonlinearities on UIP condition. Several empirical studies have confirmed that exchange rate volatility might affect the validity of the UIP test, therefore we account for the potential heteroscedasticity in the regression residuals by employing a GARCH (1.1) model augmented by dummy variables for structural breaks. Overall, the results suggest that the 'garch' terms are

significantly different from zero and the conditional variance is stable. The results confirm the baseline model findings that UIP holds true only for Bulgaria and Croatia.

For a robustness check we exclude the period of COVID-19 crisis, i.e. we reduce the sample up to 2019M3 and repeat our analysis, however the results are very similar to the full sample estimation.

Table.8 UIP estimates by GARCH-GED

Countries	α [p-value]	β [p-value]	UIP Condition holds true
Albania	-0.007 [0.044]	0.001 [0.096]	no
Bosnia & Hercegovina	-0.007 [0.831]	0.006 [0.079]	no
Bulgaria	-0.002 [0.426]	0.001 [0.428]	yes
Croatia	-0.001 [0.679]	0.002 [0.847]	yes
Moldova	-0.006 [0.388]	0.001 [0.008]	no
North Macedonia	-0.001 [0.787]	0.001 [0.081]	no
Romania	0.003 [0.000]	0.000 [0.074]	no
Serbia	-0.001 [0.016]	0.000 [0.000]	no
Turkiye	0.030 [0.001]	0.000 [0.009]	no

5. CONCLUSION

The study investigates the degree of monetary integration of South East European Countries with Euro Area through testing UIP hypothesis. Several sets of tests are used for country-by-country analysis: workhouse UIP model estimated by OLS for Croatia, Romania, and Turkiye; cointegration analysis for Serbia; VAR analysis for Bulgaria, Bosnia & Herzegovina, Albania, Moldova and North Macedonia; exploring the time series properties of deviation from UIP for all countries; and the GARCH-GED model for all countries in the sample. Overall, the results of these different test are compatible suggesting that UIP holds true only in the case of Bulgaria and Croatia. The results for Romania and Moldova are ambiguous, suggesting that UIP holds true only if we control

for the effects of structural breaks. UIP condition is rejected for the remaining countries in this study. The results are similar to Holtemoller (2005) finding of cointegration for Bulgaria and Romania and similar to Kasman et al (2005) findings of cointegration for Croatia but contrary to Zhivkov et al.(2016), Cuestas et al.(2017) and Dabrowski & Janus (2021) findings that UIP does not hold true in any of the countries of this sample. Generally, the average estimate for country-by-country analysis and additionally the panel estimate of $\beta=0.0016$ appears to be far from unity, but positive, suggesting that the findings of this study are in line with other empirical studies reporting less unfavorable results for UIP for emerging countries. Due to data limitation, the analysis of the source of deviation of UIP for each individual country is left for future research.

REFERENCES

- Bekaert, G., Campbell R. H., and Robin L.(2002), "Dating the integration of world equity markets", *Journal of Financial Economics*, 65 (2): 203-247.
- Chinn, M. (2006), "The (partial) rehabilitation of interest rate parity in the floating rate era: Longer horizons, alternative expectations and emerging markets", *Journal of International Money and Finance*, 25:7-21.
- Chinn, M. and Meredith.G. (2005), "Testing Uncovered Parity at short and long horizons", NBER Working Paper, nr.11077 .
- Cuestas, J.C., Filipozzi, F. and Staehr, S. (2015), "Uncovered Interest Parity in Central and Eastern Europe: Sample, Expectations and Structural Breaks," Working Papers 2015014, The University of Sheffield, Department of Economics.
- Dąbrowski, M, A. and Janus, J. (2021) "Does the interest parity puzzle hold for Central and Eastern European economies?," MPRA Paper 107558, University Library of Munich, Germany.
- Flood, R., and Rose, A. (2001), "Uncovered Interest Parity in crisis: The interest rate defence in the 1990s", IMF Working Papers, WP/01/207.
- Francis, B., Hasan, I., and Hunter, D. (2002), "Emerging market liberalization and the impact of Uncovered Interest Rate Parity", *Journal of International Money and Finance*, 21(6) : 931-956.
- Goh, S.K., Lim, G.C. and Olekalns, N. (2006) Deviations from uncovered interest parity in Malaysia, *Applied Financial Economics*, 16:10, 745-759
- Gregory, A. W. and Hansen, B. E. (1996), "Residual based tests for cointegration in models with regime shifts," *Journal of Econometrics*, 70: 99–126.
- Hansen, P. and Hodrick, J. (1980), "Forward exchange rates as optimal predictor of future spot rates," *Journal of Political Economy*, 88: 829–853

- Holtemoller, O. (2005), “Uncovered interest rate parity and analysis of monetary convergence of potential EMU accession countries,” *International economics and Economic Policy*, 2: 33–66.
- Johansen, S. (1995), “A statistical analysis of cointegration for I(2) variables”, *Econometric Theory*, vol.11(1), 25-59.
- Kasman, A., Kirbas-Kasman, S., and Turgutlu, E. (2008), “Monetary policy convergence of potential EMU accession countries: A cointegration analysis with shifting regimes”, *Economic Modelling*, 25:340-350.
- Lee, B. (2006), “Uncovered Interest Parity Puzzle: Cross-section and time-series analysis”, SSRN Working Paper.
- Lothian, J., and Wu, L. (2011), “Uncovered Interest Parity over the past two centuries”, *Journal of International Money and Finance*, 30:448-473.
- Mansori, K. (2003), “Following in their footsteps: comparing interest parity condition in Central European Economies to the Euro Countries”, CES ifo Working Paper, nr 1020.
- Meredith, G., and Ma, Y. (2002), “The forward premium puzzle revisited”, IMF Working Papers, WP/02/28.
- Obstfeld, M. (1995), “International capital mobility in 1990s”, Princeton University Press, 1995.
- Özmen, E. and Gokcan, A. (2004), “Deviations from PPP and UIP in a financially open economy: The Turkish evidence,” *Applied Financial Economics*, pp. 779–784.
- Sachsida, A., Ellery, R., and Teixeira, J.R. (2006), “Uncovered Interest Parity and the Peso Problem: The Brazilian Case”, *Applied economic Letters*, 8:179-181.
- Taylor, M. (1995), “The economics of exchange rates”, *Journal of economic Literature*, 33:13-47.
- Živkov, D., Njegić, J., Momčilović, M., & Milenković, I. (2016), “Exchange Rate Volatility and Uncovered Interest Rate Parity in the European Emerging Economies”, *Prague Economic Papers*, 25(3), 253-270. doi: 10.18267/j.pep.562.

APPENDIX 1 : Unit root test results

Country	Variable	Unit root test	Deterministic terms	Lags	Test statistic	5% critical value	Order of integration
Albania	der	ADF test with no structural break	intercept, no time trend	3	-8.3131	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2008 M10)	3	-3.2952	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	1	-0.9119	-2.86	AR(1)
	dir	ADF test with structural break	Shift dummy (2008 M7)	1	-0.7549	-2.88	AR(1)
Bosnia & Hercegovina	der	ADF test with no structural break	intercept, no time trend	5	-12.9659	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2022 M8)	5	-11.4047	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	1	-2.5197	-2.86	AR(1)
	dir	ADF test with structural break	Shift dummy (2008 M10)	1	-2.6012	-2.88	AR(1)
Bulgaria	der	ADF test with no structural break	intercept, no time trend	5	-9.1535	-2.86	AR(0)
	der	ADF test with	Shift dummy (2008 M10)	2	-3.1480	-2.88	AR(0)

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

		structural break					
	dir	ADF test with no structural break	intercept, no time trend	6	-1.5670	-2.86	AR(1)
	dir	ADF test with structural break	Shift dummy (2003 M4)	1	-1.6098	-2.88	AR(1)
Croatia	der	ADF test with no structural break	intercept, no time trend	6	-9.6777	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2010 M2)	4	-3.6498	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	1	-3.6891	-2.86	AR(0)
	dir	ADF test with structural break	Shift dummy (2003 M9)	1	-3.3061	-2.88	AR(0)
Moldova	der	ADF test with no structural break	intercept, no time trend	6	-4.7356	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2015 M6)	4	-3.3077	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	3	-2.9725	-2.86	AR(0)
	dir	ADF test with structural break	Shift dummy (2015 M3)	1	-2.5100	-2.88	AR(1)

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

North Macedonia	der	ADF test with no structural break	intercept, no time trend	6	-9.3092	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2008 M10)	2	-3.4190	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	1	-1.1964	-2.86	AR(1)
	dir	ADF test with structural break	Shift dummy (2003 M3)	1	-0.5430	-2.88	AR(1)
Romania	der	ADF test with no structural break	intercept, no time trend	6	-4.2031	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2009 M1)	2	-3.7281	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	1	-4.9835	-2.86	AR(0)
	dir	ADF test with structural break	Shift dummy (2008 M10)	1	-4.0462	-2.88	AR(0)
Serbia	der	ADF test with no structural break	intercept, no time trend	5	-6.8636	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2008 M10)	2	-1.8206	-2.88	AR(1)
	dir	ADF test with no time trend	intercept, no time trend	2	-2.6702	-2.86	AR(1)

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

		structural break					
	dir	ADF test with structural break	Shift dummy (2002 M1)	1	-1.9651	-2.88	AR(1)
Turkiye	der	ADF test with no structural break	intercept, no time trend	6	-5.4439	-2.86	AR(0)
	der	ADF test with structural break	Shift dummy (2018 M11)	2	-3.7495	-2.88	AR(0)
	dir	ADF test with no structural break	intercept, no time trend	5	-3.8928	-2.86	AR(0)
	dir	ADF test with structural break	Shift dummy (2021 M12)	2	-4.6400	-2.88	AR(0)

Ethical Choices in Cosmetic Products: Examining Sustainable Cosmetic Brands with Content Analysis

Bilge Villi¹, Reyhan Bahar²

Abstract

Introduction: Environmental problems around the world are increasing day by day, and sustainability is becoming more and more important in every aspect of life. Sustainability: While it advises us to live with less harm to nature, the environment and the planet, it also changes many of our habits. One of these changing habits is related to the consumption of cosmetic products.

Aim: The aim of the study is to examine the websites of cosmetic brands in the sustainable cosmetics category in Türkiye using content analysis and to reveal how much they attach importance to sustainability and how much they prioritize sustainability.

Method: Content analysis, one of the qualitative research methods, was used in the study. To access the list of sustainable cosmetic products, the official website of "PETA (People for the Ethical Treatment of Animals)", an international organization, and the websites "cosmos-standard.org" were used.

Findings: Findings regarding the eco labels of sustainable cosmetic products are presented. In addition, the content analysis results obtained from the websites of the keywords determined within the scope of sustainability are included.

Originality and value: When international literature is examined, there are few studies on sustainable cosmetics; No similar study has been found in the national literature. For this reason, it is thought that this study will be a pioneering study and will make significant contributions to the literature.

Key Words: Sustainability, Sustainable Cosmetics, Ethical Consumption, Content Analysis

Jel Codes: M10, M30, M31, M39

1. INTRODUCTION

Sustainability is an increasingly important concept today (Garetti and Taisch, 2012). On the one hand, the depletion of natural resources and the climate crisis, and on the other hand, the increasing demand for natural resources, which are becoming increasingly scarce as the population continues to grow, increase the importance of sustainability (Ripple et al., 2020). In this scenario, the manufacturing industry is one of

¹ Dr., Balıkesir University, Sındırgı Vocational School, Business Management, Turkey.

² Dr. Bandırma Onyedi Eylül University, Gönen Vocational School, Business Management, Turkey.

the largest contributors to energy and resource consumption and emissions (Garetti and Taisch, 2012; World Economic Forum, 2019). Most manufacturing companies that incorporate sustainability into their vision outperform their competitors and gain competitive advantage in the long term by saving money through brand reputation, customer satisfaction, resource efficiency and waste reduction (Isaac et al., 2016). The cosmetics industry, due to its continuous growth worldwide and high consumption of natural resources, represents one of the main sectors that require a long-term vision to manage sustainability (Bomet et al., 2019).

The purpose of this study is to statistically examine how much importance they attach to sustainability and how much they prioritize sustainability by examining the websites of cosmetic brands in the sustainable cosmetics category in Türkiye. While there are few studies on sustainable cosmetics in the international literature, there is no similar study in the national literature. For this reason, it is thought that this study will be a pioneering study and will make significant contributions to the literature.

2. LITERATURE REVIEW

Although not a basic need, cosmetics are a category of products that many people benefit from. Cosmetics, fragrances and personal care products have been widely used since ancient times. However, in the 19th century, affordable chemicals rather than natural ingredients began to be used to popularize the use of cosmetics. In the 20th century, advances in manufacturing and technology led to the rapid growth of the cosmetics industry (Kumar, 2005). This rapid growth has brought concerns about the environment, health, animal testing and safety for consumers (Amberg and Fogarassy, 2019).

Sustainability is meeting the needs of the present generation without jeopardizing the ability of future generations to meet their needs. In other words, sustainability is meeting what we need today while worrying about the needs of tomorrow's people (Lavuri et al., 2022). This environmentally and life-sensitive production approach has led to the emergence of a brand new cosmetics school, the "sustainable cosmetics" school, which does not consume nature, animals and human labor. The increasing importance given to environmental and health issues increases the demand for chemical-free, natural, non-animal-tested and recyclable products in the selection of cosmetic products (Mangtani et al., 2020).

While the global value of the cosmetics industry was 532 billion USD in 2019, the natural cosmetics market was 36.2 billion USD in 2019. The natural cosmetics market accounts for approximately 7% of the total cosmetics market (Munerah et al., 2021). The global value of organic cosmetics is estimated to increase from USD 34.5 billion in 2018 to USD 54 billion by 2027 (Sadiq et al., 2021). This data can be interpreted as an indicator of the growing importance of organic cosmetics. Organic cosmetics constitute a large part of the market. Due to the economic development in Türkiye, the cosmetics market is growing at an average rate of 10% per year. The share of organic cosmetics in

the Turkish market is estimated to be around 5% (Türkiye Cumhuriyeti Ekonomi Bakanlığı, 2016).

3. RESEARCH METHODOLOGY

Content analysis, one of the qualitative research methods, was used in the study. To access the list of sustainable cosmetic products, the official website of PETA (People for the Ethical Treatment of Animals) and cosmos-standard.org websites were used. Only 75 websites of 85 brands were accessed. Nine criteria were established for sustainable cosmetics. These criteria are "cruelty-free", "vegan", "Etco (Cosmos) certification", "sustainability policy", "environmental policy", "Gmp (Good Manufacturing Practice)", "MSDS approval", "natural or organic ingredient information" and "zero waste information/recycling information". Table 1 below shows the frequencies and percentages of these criteria.

Table 1: Sustainable Cosmetics Criteria

SUSTAINABLE COSMETIC CRITERIA	Exist		Not Exist	
	N	Percent	N	Percent
Cruelty-Free	37	%50	37	%50
Vegan	39	%52.7	35	%47.3
Etco (Cosmos) Certificate	21	%28.4	53	%71.6
Sustainability Policy	20	%27	54	%73
Environmental Policy	11	%14.9	63	%85.1
Gmp (Good Manufacturing Practice)	9	%12.2	65	%87.8
MSDS Approval	1	%1.4	74	%98.6
Natural or Organic Content Information	53	%71.6	21	%28.4
Zero Waste Information / Recycling Information	7	%9.5	67	%90.5

When Table 1 is examined, 37 of the 75 sustainable cosmetics brands whose websites were accessed have cruelty-free certification, 39 have vegan certification, and 21 have Etco (Cosmos) certification. While the number of brands with a sustainability policy is 20, the number of brands with an environmental policy is 11. While 9 brands have Gmp (Good Manufacturing Practice) certification, only 1 brand has MSDS approval. While

53 brands include natural and organic content information on their websites, zero waste and recycling information is only available for 7 brands.

Table 2: Content Analysis Categories of Sustainable Cosmetics Brands

Brand Name		Cruelty-Free	Vegan	Etko (Cosmos) Certificate	Sustainability Policy	Environmental Policy	Gmp	MSDS Approval	Nat. or Org. Content Inf.	Zero Waste / Recycling Inf.
1	Siveno	+	+	+	+	-	+	-	+	+
2	Alls Biocosmetics	-	-	+	+	-	+	-	+	-
3	Iva Natura	+	+	+	+	-	+	-	+	-
4	Rhaneva	-	+	+	+	-	-	-	+	-
5	Ecowell	+	+	+	-	-	-	-	+	-
6	Fiolas	+	+	+	+	-	-	-	+	-
7	Momwell	+	+	+	+	-	-	-	+	-
8	Olive Farm	-	-	+	-	-	+	-	+	-
9	Nov Natural Organic Vegan	+	+	+	-	-	+	-	+	-
10	Clooe	-	-	+	-	-	-	-	+	-
11	Biopedia	-	-	+	-	-	-	-	-	-
12	Turtlee	+	+	+	+	-	+	-	+	-
13	Garage Organics	-	-	+	-	-	-	-	+	-
14	Gülbirlik	+	+	+	-	-	-	-	+	-
15	Rosense	+	+	+	-	-	-	-	+	-
16	Care	-	+	+	-	-	-	-	+	-
17	The Elite Home	-	+	+	+	-	-	-	+	-
18	Saraçoğlu	-	-	-	+	-	-	-	+	-
19	Aks Kozmetik Kimya Tic.	+	+	-	+	+	-	-	+	-
20	Akten Kozmetik San. Paz. A.Ş	+	+	-	+	-	-	-	+	-
21	Badecanlar Şefkatli Kozmetik	+	+	-	-	-	-	-	+	-
22	Balmy	-	-	-	-	+	-	-	+	-
23	Baproy Bitkisel	+	-	-	-	-	-	+	+	-
24	Bioterra	-	-	-	-	-	-	-	+	-
25	Bonivias	-	+	-	-	-	-	-	+	-
26	Cosmed Cosmeceuticals	+	+	-	-	-	-	-	+	-
27	Cream Co	+	+	-	+	+	-	-	+	-
28	Cyrène	+	-	-	-	-	-	-	+	-
29	Deauty Skin	+	+	-	-	-	-	-	+	-
30	Duaderm	+	+	-	-	-	-	-	-	-
31	EcoWera	+	+	+	-	-	-	-	+	-
32	Eskapharma Sag. Ur. ve Koz. San.	+	+	-	-	-	-	-	-	-
33	The Purest Solutions	+	-	-	+	+	-	-	+	-
34	Evyap Evcil	-	-	-	+	+	-	-	-	-
35	Golden Rose	+	+	-	-	+	-	-	-	-
36	G&Z Organic Cosmetics	+	+	-	-	-	-	-	+	-
37	Halalles	+	+	-	-	-	-	-	+	-
38	Honnes	-	-	-	+	-	-	-	-	-

39	<i>Kaibeaauty Natural</i>	+	+	-	-	-	-	-	+	-
40	<i>Krijen Natural Products</i>	+	+	-	-	-	-	-	+	-
41	<i>Lindos Naturals</i>	+	+	-	+	+	-	-	+	+
42	<i>Love'nta Cosmetics</i>	-	-	-	-	-	-	-	+	-
43	<i>Luxera Paris</i>	+	+	-	-	-	-	-	+	-
44	<i>Markazen</i>	+	+	+	-	-	-	-	+	-
45	<i>Meradya</i>	-	-	-	-	-	-	-	+	-
46	<i>Misbahce</i>	-	-	-	+	-	-	-	+	+
47	<i>Oh Fresh Cosmetics</i>	+	+	-	-	-	-	-	+	+
48	<i>Orgamyra Kozmetik</i>	+	-	-	-	-	-	-	+	-
49	<i>Raquun</i>	-	-	-	-	-	-	-	+	-
50	<i>Rituel De Beaute</i>	+	+	-	-	-	-	-	+	-
51	<i>Rose And Cure</i>	-	-	-	-	-	-	-	+	-
52	<i>Sanitrum</i>	+	+	-	-	-	-	-	+	-
53	<i>Set Grup Dan.ve Tekstil San. Tic.</i>	-	-	-	-	+	+	-	+	+
54	<i>She Vec Sağlık ve Koz. Ür.</i>	-	+	-	-	-	-	-	+	-
55	<i>Simya Evi</i>	-	-	-	-	-	-	-	+	-
56	<i>Skin401 (Flavus)</i>	+	+	-	-	-	-	-	-	-
57	<i>Thalia Natural Beauty</i>	-	-	-	-	-	+	-	-	-
58	<i>Turtlee Organics</i>	+	+	+	+	+	+	-	+	-
59	<i>Urban Care (Selen Kozmetik)</i>	+	+	-	+	+	-	-	+	+
60	<i>Wiwify (Alfo)</i>	+	+	-	+	+	-	-	+	+

Table 2 shows the criteria related to sustainability that sustainable cosmetic brands have on their websites. "+" and "-" signs were used according to whether the brands have these criteria or not. Afterwards, the content analysis score was determined for each brand by summing the "+". Of the 75 brands analyzed, 60 brands have at least 1 of these criteria. The 14 brands that did not have any of these criteria were not included in the content analysis. Among 60 brands, the two brands with the highest content analysis score (7 points) are "Siveno" and "Turtlee Organics". The nine brands with the lowest content analysis score (1 point) are "Biopedia", "Bioterra", "Honnas", "Love'nta Cosmetics", "Meradya", "Raquun", "Rose And Cure", "Simya Evi" and "Thalia Natural Beauty". In addition, 6 of these 9 brands with the lowest scores contain only "natural or organic ingredient information". Table 3 below shows the number of sustainable cosmetic brands according to their content analysis scores.

Table 3: Content Analysis Score Table of Sustainable Cosmetics Brands

<i>Number of Criteria Available on the Website</i>	<i>Number of Brands</i>
Contains 7 criteria	2
Contains 6 criteria	5
Contains 5 criteria	5
Contains 4 criteria	12
Contains 3 criteria	14
Contains 2 criteria	12
Contains 1 criteria	9
No Criteria on the Website	14
Total	73

When Table 3 is analyzed, it is seen that the number of cosmetic brands with the highest number of criteria (7) out of 9 sustainability criteria is 2. While the number of brands with 3 criteria is 16, the number of brands that do not have any of the 9 sustainability criteria is 14.

4. CONCLUSION

The phenomenon of globalization is rapidly increasing the international circulation of products and services. The examination of the environmental and social impact of products in all processes such as where, under which conditions, with which raw materials, packaging, logistics, usage process, reuse, etc. is becoming more and more in the focus of consumers (Molinas, 2014). As a result, brands' sustainability efforts and the practices that characterize them are gaining great importance. While changing consumer expectations increase the demand for products with less environmental and social impacts, companies that meet these expectations gain competitive advantage. Especially for companies operating in global markets or aiming to globalize, having certain labels and certificates is of great importance due to legal requirements.

The significant increase in interest in ethical consumption in recent years has aroused both academic and sectoral interest. The fact that ethical consumption is on the agenda shows that global concerns and a sense of responsibility are important issues for consumers. Products and services that do not cruelty to animals, have reduced environmental impact and do not exploit workers are preferred by ethical consumers. In this study, the websites of cosmetic brands in the sustainable cosmetics category in Türkiye were examined and the importance and priority they give to sustainability were revealed. In order to reach the list of sustainable cosmetic products, the official website of PETA (People for the Ethical Treatment of Animals) and cosmos-standard.org websites were used. For sustainable cosmetics, 9 criteria have been established as "cruelty-free", "vegan", "Etco (Cosmos) certificate", "sustainability policy", "environmental policy", "Gmp (Good Manufacturing Practice)", "MSDS approval", "natural or organic ingredient information" and "zero waste information / recycling information".

Only 75 of the 85 brands on the websites of "PETA (People for the Ethical Treatment of Animals)" and "cosmos-standard.org" were accessed. As a result of the analysis, it was concluded that the brands did not sufficiently include the criteria determined within the scope of the study. Today, while websites are an important communication tool used to reach large audiences for businesses, it has been observed that they are not used actively enough. These brands should use their websites more actively in this direction in order to emphasize the theme of sustainability. Empirical studies can be conducted by adapting the sustainable consumption scale to the cosmetics sector in order to fill the gap in the literature. In addition, the ethical consumption tendencies of different age groups in the cosmetics sector can be measured.

REFERENCES

- Amberg, N., Fogarassy, C. (2019). Green Consumer Behavior in the Cosmetics Market, *Resources*, 8(3).
- Bom, S., Jorge, J., Ribeiro, H.M., Marto, J., 2019. A Step Forward on Sustainability in the Cosmetics Industry: A Review. *J. Clean. Prod.* 225, 270–290.
- Garetti, M., Taisch, M. (2012). Sustainable Manufacturing: Trends And Research Challenges. *Production Planning & Control*, 23(2-3), 83-104.
- Isaac, R., De Melo Conti, D., Ghobril, C.N., Netto, L.F., Junior, C.T. (2016). Sustainability and Competitive Advantage: A Study in A Brazilian Cosmetic Company. *Int. Bus. Res.* 10 (1), 96–106.
- Kumar, S. (2005). Exploratory Analysis of Global Cosmetic Industry:Major Players, Technology and Market Trends, *Technovation*.
- Lavuri, R., Jabbour, C. J., Grebinevych, O., Rouband, D. (2022). Green Factors Stimulating the Purchase Intention of Innovative Luxury Organic Beauty Products: Implications for Sustainable Development.
- Mangtani, N., Bajpai, N., Sahasrabudhe, S., & Wasule, D. (2020), Importance of Artificial Intelligence and Augmented Reality in Cosmetic and Beauty Industry Post Covid 19, *World Journal of Pharmaceutical Research*, 9(8).
- Molinas, G. F. (2014). Sürdürülebilirlik İçin Eko Etiketler, *İş Dünyası ve Sürdürülebilir Kalkınma Derneği*, İstanbul.
- Munerah, S., Koay, K. Y., Thambiah, S. (2021), Factors Influencing Non-Green Consumers' Purchase Intention: A Partial Least Squares Structural Equation Modelling (PLS-SEM) Approach", *Journal of Cleaner Production*, 280.
- Ripple, W. J., Wolf, C., Newsome, T. M., Barnard, P., Moomaw, W. R., Grandcolas, P. (2019). World Scientists' Warning of A Climate Emergency. *Bioscience*.
- Sadiq, M., Adil, M., Paul, J. (2021), An Innovation Resistance Theory Perspective on Purchase of Eco- Friendly Cosmetics, *Journal of Retailing and Consumer Services*, 59.
- Türkiye Cumhuriyeti Ekonomi Bakanlığı. (2016), Kozmetik Sektörü: Sektör Raporları. Kimya Ürünleri ve Özel İhracat Daire Başkanlığı, İhracat Genel Müdürlüğü.
- World Economic Forum. (2019). Making Manufacturing Sustainable by Design. October.

The Effect of Russia's Invasion of Ukraine on the Stocks of Energy Companies; Evidence from Stock Markets of Energy Importing and Exporting Countries

Hasan Huseyin Yildirim¹, Cevriye Yuksel Yildirim²

Abstract

Introduction: Capital markets are affected by many economic and non-economic events. Wars bring important uncertainties for the economy. The war launched by Russia against Ukraine on February 24, 2022 affected both the two countries and many other countries in many ways. Especially, there have been significant changes in the economic structure of the countries that are close to the two countries. In addition, countries in trade with Russia and Ukraine were affected by this war.

Aim: The aim of this study is to reveal the impact of the Russia-Ukraine war on the stock markets of the 5 countries that export the most energy and the 5 countries that import the most energy.

Method: In the application part of the study, Zivot Andrews structural break test was applied to determine whether there was a structural break by using 24-month data of 10 countries.

Findings: According to the analysis results obtained from the tests carried out, it was determined that the Russia-Ukraine war had an impact on some of the selected countries, while it did not cause a structural break in some of them.

Originality and value: Although approximately 1.5 years have passed since the Russia-Ukraine war, which started in February 2022, all world economies are still experiencing the effects of the war. Countries and companies were affected by the war, especially in terms of energy. In this study, the impact of the war on the energy sector is discussed.

Key Words: Energy Sector, Russia-Ukraine War, Zivot-Andrews Structural Test

Jel Codes: C20, G10, N70, Q34

1. INTRODUCTION

Considering the last two decades, the 2008 global financial crisis has had significant effects on financial markets in terms of its effects around the world. The Covid-19 virus, which emerged in Wuhan, China at the end of 2019, was declared a "pandemic" by WHO on March 11, 2020. There have been restrictions and shutdowns around the world to mitigate the effects of the pandemic. Due to the measures taken to prevent the spread of the virus, the problems experienced in production have affected the markets significantly. Since 2021, there have been relaxations in the measures and bans against the Covid-19 epidemic. It is to continue to create significant effects on the markets, despite the fact that 2 years have passed since the Russia-Ukraine war that started in 22 February 2022 (Solmaz, 2022:386).

The war between Russia and Ukraine had a significant negative impact on overall business transactions in Europe and other parts of the world (Onwuzu et. al., 2023: 52). Financial markets bring together those who need funds and those who supply funds. Those in need of funds find the ideal amount of funds at affordable cost through the capital market and earn profits by performing value-added production. Those who supply funds, on the other hand, earn by lending their savings and thus increase their wealth. Financial markets are an important requirement for national economies to reach their development and growth targets. Financial markets are affected by many factors as well as affecting the economy. These factors can be

¹ Assoc. Prof. Dr., Balıkesir University, Burhaniye Applied Sciences Faculty, Finance and Banking, Turkey

² Lecturer, Balıkesir University, Burhaniye Vocational School, Accounting and Tax Applied, Turkey

classified in various ways as macro-micro, economic and non-economic. Political conflicts between countries, military interventions are examples of non-economic factors affecting financial markets (Safitri and Hariyanto, 2022:30).

Geopolitical conflicts bring huge impacts and shocks to the economy of various parts of the world. The escalating conflict between Russia and Ukraine has led to an increasingly tense international situation, increasing geopolitical risks and the uncertainty of global economic policy. Russia is one of the leading countries in the world. Russia economy size and its dominant role in energy markets make it possible for this conflict to affect commodity and financial markets around the world. (Shen and Hong; 2023:1).

The war between Russia and Ukraine affected the stock market. The reasons for this impact are the increase in the geographic risk due to the war, the migration of nearly five million people from Ukraine to other countries in the center of Europe, and the heavy restrictions and sanctions imposed by multinational companies against Russia (Meihong & Chao, 2022:1)

Military conflicts as Russia-Ukraine make increase the uncertainty of investors about the future profitability of companies, which leads to volatility in stock prices (Yousaf et al., 2022). Stock prices react quickly to positive and negative information coming from national or international markets. Especially in finance theory, according to the efficient market's hypothesis, it is assumed that all information is reflected in the price of the stock (Singh et al., 2021).

The war between Russia and Ukraine negatively affected the international supply chain. Russia and Ukraine are one of the main suppliers in the international markets of commodities such as wheat, barley, maize, rapeseed oil, sunflower oil and corn in agriculture and also petroleum, palladium and titanium (Alam et al., 2022; Onwuzu et. al., 2023: 53). Russia and Ukraine are the top two agricultural commodity producers in the world (Malhotra, 2023). The negativities experienced in the supply of these commodities led to instability in the international markets.

Russia, which supplies oil, is an important country in meeting the world's oil demand. The oil industry has a significant share in Russia's exports. In response to Russia's invasion of Ukraine, the USA wanted to punish Russia by imposing an embargo on Russia's oil exports. While this situation had a negative impact on Russia, it also caused problems in the supply of countries with oil demand. In addition, the contraction in oil supply caused prices to increase. Petroleum constitutes an important input especially in many stages of industrial production. It is inevitable that a volatility and price increase in oil prices will affect the financial performance of companies. Investors make decisions by being extremely sensitive to the deterioration in the financial performance of companies. Ultimately, this may cause changes in the company's stocks.

This war had a disastrous effect on not only the energy sector but on the commodity market, foreign direct investment, supply chain and tourism business also. The Russian invasion of Ukraine has emerged as an external shock to global food supply chains. This situation is worrying in terms of achieving the food security and sustainable development goals of developing countries (Hatab, 2022: 38).

The Russia-Ukraine war has not only economic but also social effects for both countries and other countries. Migration, especially from Ukraine to Europe, unemployment, increase in crime rates and slowdown in population growth rate can be listed as some of these effects (Onwuzu et. al., 2023: 52).

In the introduction part of the study, the recent important changes in the world economy are mentioned. Particularly, the relationship between Russia and Ukraine war and the stock market is included. In the Content section, the world energy outlook and Russia's importance here are included. In the literature section of the study, previous studies on the subject were mentioned. In the data and method section, the application

stages and findings of the study are discussed. In the Conclusions and recommendations section, the findings of the study are interpreted by comparing similar studies in the literature.

2. CONTENT

Sustainable access to energy resources at affordable costs is among the priority goals of all countries today. A problem in energy supply security will cause negativities in production and consumption. Problems that may occur globally put energy supply security at risk. National, regional or global problems, especially in countries that have a significant share in energy supply or demand, may negatively affect economies.

The war launched by Russia against Ukraine in 2022 affected primarily Ukraine and Russia, then Europe and the whole world. Russia is an important country in the world energy market. In this respect, the Russia-Ukraine war affected the energy markets and indirectly the energy companies in the countries that import and export energy. Information on Russia's share in the world energy sector is given below.

Table .1 shows the shares of energy types in the world's primary energy consumption. Looking at Table 1, it can be seen that the highest share in primary energy consumption is oil, with a share of 33% in 2019 and 31.2% in 2020, and coal has a share of approximately 27% in 2019 and 2020. Thirdly, it is seen that natural gas has a share of 24% for 2019 and 2020.

Table .1 Primary Energy (Consumption by Fuel*)

	Oil	Natural Gas	Coal	Nuclear Energy	Hydro-Electricity	Renewables	Total
2019	191.89	140.54	157.64	24.93	37.69	28.82	581.51
	%33	%24	%27	%4,2	%6,4	%5,4	%100
2020	174.20	137.62	151.42	23.89	38.16	31.71	557.10
	%31,2	%24,6	%27,1	%4,2	%6,8	%5,7	%100

Source: BP Statistical Review of World Energy 2021 (*: In this review, primary energy comprises commercially traded fuels, including modern renewables used to generate electricity. Energy from all sources of non-fossil power generation is accounted for on an input-equivalent basis)

Looking at Table 1, it can be seen that oil, natural gas and coal, which are fossil fuels, have the highest shares among primary energy sources. Table 2 lists the reserves and production amounts of these fossil fuels in the world and Russia for 2020. Russia has 8.6% of the world's oil reserves and 12% of its oil production in 2020. Russia has 19% of the world's natural gas reserves and 16% of its production for 2020. When we look at Russia's coal reserves in the world for 2020, it is seen that it has a 15% share of coal production and a 5% share of coal production. Considering all these, it can be seen that Russia is an important country in energy supply.

Table .2 Russia's Share in the World by Energy Types for 2020

	Oil Total proved reserves (Thousand million barrels)	Oil: Production in thousands of barrels per day	Natural Gas Total proved reserves (Trillion cubic metres)	Natural gas: Production in billion cubic metres	Coal Total proved reserves	Coal: Production
World	1300.9	88391	188.1	3853.7	1074108	159.61
Russia	112.1	10667	37.4	638.3	162166	8.37

Share of Russia	% 8,6	% 12	% 19	% 16	% 15	% 5
------------------------	-------	------	------	------	------	-----

Source: BP Statistical Review of World Energy 2021

3. LITERATURE

Sheng and Hong (2023) examined the causality between the economic policy uncertainty of Germany and the geopolitical risk index with the Granger-causality test, with monthly data covering the months of January 2001 and July 2022 in their study. As a result, they concluded that increasing geopolitical risks may increase the uncertainty in Germany's economic policy.

Safitri and Hariyanto (2022), in their study using the event study method, investigated whether the start of the Russia-Ukraine war had an abnormal return on 9 ASEAN country's stock markets. Considering the findings, it was concluded that the war did not cause an abnormal change on the returns of the country's stock markets.

Meihong and Chao (2022) used the data of 21766 companies from 86 countries in their study and analyzed whether the war caused abnormal returns with the event study method. As a result, they found that oil and gas industry and military industry firms obtained higher abnormal returns compared to other sectors. In addition, the sanctions applied by the companies against Russia caused a high level of negative effect on the stock returns.

Nur Rizqi Febriandika et al. (2023), they used the event study method by using the variables of stock returns, abnormal returns and trading volume to examine the reaction of the Indonesian Islamic stock market in the energy sector before and after Russia's invasion of Ukraine. It was concluded that Russia's invasion of Ukraine had an effect on the selected variables. Depending on this result, it has been found that the Indonesian stock market is efficient in semi-strong form.

Ha (2023) used novel multivariate wavelet analysis approaches with the data of geopolitical risk index and renewable energy volatility index variables between 01.04.2019 - 13.06.2022. According to findings show that geopolitical risks can negatively impact renewable and green energy.

Malhotra et al. in their study in 2023, investigated whether the war had an impact on the stock market of 10 countries that imported wheat from both countries during the war between Russia and Ukraine. It has been determined that the war had an impact on the stock markets of 10 countries in the short and long term.

Kumari et al. in their study in 2023, they discussed the impact of the Russia-Ukraine war on EU stock markets using the event study method. They found that the war had negative effects on stock market returns.

Jahanshahi et al. In their study in 2022, they tried to model the change in crude oil prices in the time period including the effects of the Covid 19 epidemic and the Russia-Ukraine war by using machine learning and deep learning methods. They aim to predict crude oil prices with the model they created. The model has predictive power with a mean absolute error of approximately 38%.

Lai et al. In their study in 2022, they investigated the effects of the Russia-Ukraine war on US stock markets using the event study method. They find that negative returns occurred in sectors in the US stock market because the US imposed various sanctions on Russia due to the war. Although there are sectors negatively affected by the war, it is determined that there is no impact on the energy sector, information technology sector, communication service sector and real estate sector.

In their study in 2023, Bossman and Gubareva investigated the financial effects of the geopolitical risk caused by the Russia-Ukraine war on the stock markets of G7 and E7 countries with a non-parametric quantile-on-quantile regression model. It has been concluded that some of the E7 countries are resistant to geopolitical risks. This shows that the portfolio investor can diversify by adding G7 countries to the portfolio while creating a portfolio from E7 stocks.

Huang et al. In their study in 2023, they investigated the effects of crude oil prices on the stock market in the context of importing and exporting countries. After the war, countries importing crude oil found that there was a greater correlation between crude oil prices and stock markets than exporting countries.

Mohammed et al. In their study in 2022, they revealed the impact of the Russia-Ukraine war on the shares of renewable energy companies using the event study method. They found that renewable energy stocks provide positive abnormal returns compared to traditional energy stocks.

In their study in 2023, Bagchi and Biswajit looked at the effects of changes in crude oil prices due to the Russia-Ukraine war on the stock markets in G7 countries. It has been determined that there are structural breaks in stock returns from the last week of February 2022 to the last week of March 2022.

Kartal et al. In their study in 2023, they investigated the effects on carbon emissions according to energy types, using France's annual data between 1970 and 2021. They concluded that the nuclear energy used by France is useful in reducing carbon emissions. While there were countries in Europe experiencing natural gas shortages after the Russian war, it can be said that France was partially affected by this situation.

Tiwari et al. In their study in 2022, they investigated the impact of the Russia-Ukraine war on the exchange rate. As a result, they found that the war negatively affected the Indian rupee.

Li et al. In their study in 2022, they investigated whether future price fluctuations of important commodities during the Russia-Ukraine war had an increasing effect on the volatility of European stock index prices. According to the results of the research, it was determined that large export goods had a greater impact on the European stock market than small export goods during the Occupation.

When we look at the studies in the literature above, it can be seen that the Russia-Ukraine war had an impact on capital markets and economies. There have been significant changes in the sectors, especially for the products that Russia and Ukraine supply in the global supply chain.

4. DATA AND METHOD

Proxy stock market data and energy index of 10 countries were used as data sets in the study. 5 of the 10 countries are divided into two groups as the countries that export the most energy in the world, and the other 5 countries are the countries that import the most energy. Energy exporting countries are Saudi Arabia, Russia, Canada, USA and United Arab Emirates. Energy importing countries are China, India, Japan, Germany and England. 24-month data of the countries with a monthly frequency between 12/2021 and 11/2023 was used.

The coding of the variables is given in table 3.

Table .3 Variables Codes

Energy Exporters		Energy Importers	
Codes	Variables Contents	Codes	Variables Contents
EX_SA_M	Saudi Arabia- TADAWUL 30 (MT30)	IM_CIN_M	China - CSI 1000 (CSI1000I)
EX_RUS_M	Russia- MOEX Russia Index (MOEX)	IM_IND_M	India - Nifty 500 (
EX_CAN_M	Canada - S&P TSX 60 Index (TSE60)	IM_JAP_M	Japan - TOPIX 100
EX_USA_M	United States - FTSE USA (FTWIUSAU)	IM_GER_M	Germany – DAX (GDAXI)
EX_UAE_M	United Arab Emirates (UAE) - FTSE ADX General	IM_UK_M	United Kingdom - FTSE 100
EX_SA_EI	Saudi Arabia - Energy Index (TENI)	IM_CIN_EI	China - FTSE 200 Alternate Energy CNY (FTXIN3601020C)
EX_RUS_EI	Russia- MOEX Oil and Gas (MOEXOG)	IM_IND_EI	India - S&P BSE Oil & Gas (BSEOIL)
EX_CAN_EI	Canada - S6P TSX Energy Index (SPTTEN)	IM_JAP_EI	Japan - Nikkei 500 Electric Power
EX_USA_EI	United States - NYSE Energy (NYE)	IM_GER_EI	Germany - DAX Chemical and Energy (CXPCX)
EX_UAE_EI	United Arab Emirates (UAE)- FTSE ADX Energy Index	IM_UK_EI	United Kingdom - FTSE 350 Electricity (FTNMX651010)

In the application phase of the research, firstly, the descriptive test statistics of the variables were examined. Then, the correlation between the variables was examined. Unit root test was used to determine whether the variables had a trend over time. Finally, the Zivot Andrews unit root test was applied to determine whether the variables had a structural change over time.

4.1 Research Findings

Table .4 Descriptive Test Statistics and Correlation Analysis Results of Market Returns of Exporting Countries

	EX_SA_M	EX_RUS_M	EX_CAN_M	EX_USA_M	EX_UAE_M
Mean	11557.53	2646.709	1214.108	1760.342	9689.510
Median	11432.15	2460.575	1215.285	1739.700	9786.225
Maximum	13733.87	3787.260	1322.670	2021.300	10552.37
Minimum	10102.70	1957.310	1117.100	1503.700	8488.360
Std. Dev.	902.1866	496.6431	52.68659	124.0300	464.7776
Skewness	0.679775	0.696604	0.096697	0.062760	-0.686999
Kurtosis	2.841865	2.428942	2.267806	2.552855	3.916129
Jarque-Bera	1.873383	2.267136	0.573509	0.215694	2.727165
Probability	0.391922	0.321883	0.750696	0.897765	0.255743
Sum	277380.7	63521.02	29138.59	42248.20	232548.3
Sum Sq. Dev.	18720637	5673050.	63845.17	353819.4	4968419.
Observations	24	24	24	24	24
Correlation					
EX_SA_M	1				
EX_RUS_M	-0.0251	1			
EX_CAN_M	0.4603	0.2912	1		
EX_USA_M	0.2098	0.8453	0.6608	1	
EX_UAE_M	0.0506	-0.6617	-0.1574	-0.5127	1

Table 4 contains descriptive test statistics of market returns of exporting countries. Looking at the probability distribution of the Jarque-Bera test, it is seen that the representative market returns of the countries in the 24-month period exhibit a normal distribution. There appears to be a high positive correlation (0.8453) between the USA and Russia. The second positive high correlation (0.6608) is between the USA and Canada. There is a negative correlation (-0.6617) between the United Arab Emirates and Russia. Similarly, there is a negative correlation (-0.5127) between the United Arab Emirates and the USA.

The results of the ADF and PP unit root tests applied for the variables are given in Table 5. Looking at the ADF and PP test results, it was concluded that most of them were stationary at the first difference. According to the ADF test results, it is seen that Canada, the USA and the United Arab Emirates are stationary at level and constant.

Table .5 ADF and PP Unit Root Test Results of Proxy Markets for Energy Export Countries

UNIT ROOT TEST RESULTS TABLE (ADF)						
Null Hypothesis: the variable has a unit root						
At Level						
		EX_SA_M	EX_RUS_M	EX_CAN_M	EX_USA_M	EX_UAE_M
With Constant	t-Statistic	-1.5641	-2.3189	-2.7723	-2.6607	-3.2515
	Prob.	0.4841	0.1748	0.0778	0.0960	0.0297
		n0	n0	*	*	**
With Constant & Trend	t-Statistic	-2.6867	-3.1361	-2.9738	-2.6246	-2.9306
	Prob.	0.2502	0.1218	0.1601	0.2736	0.1718
		n0	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-0.2639	-0.7792	-0.8022	-0.5287	-0.4800
	Prob.	0.5799	0.3675	0.3569	0.4766	0.8109

		n0	n0	n0	n0	n0
At First Difference						
		d(EX_SA_M)	d(EX_RUS_M)	d(EX_CAN_M)	d(EX_USA_M)	d(EX_UAE_M)
With Constant	t-Statistic	-4.8478	-4.7148	-7.0315	-5.8785	-4.3021
	Prob.	0.0009	0.0012	0.0000	0.0001	0.0031
		***	***	***	***	***
With Constant & Trend	t-Statistic	-3.9125	-6.2408	-6.8637	-6.1998	-4.5495
	Prob.	0.0300	0.0002	0.0001	0.0003	0.0080
		**	***	***	***	***
Without Constant & Trend	t-Statistic	-4.9187	-4.8248	-7.0759	-6.0247	-4.3607
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0001
		***	***	***	***	***
UNIT ROOT TEST RESULTS TABLE (PP)						
Null Hypothesis: the variable has a unit root						
At Level						
		EX_SA_M	EX_RUS_M	EX_CAN_M	EX_USA_M	EX_UAE_M
With Constant	t-Statistic	-1.5641	-2.3496	-2.7723	-2.6607	-3.2490
	Prob.	0.4841	0.1661	0.0778	0.0960	0.0299
		n0	n0	*	*	**
With Constant & Trend	t-Statistic	-2.6867	-4.0590	-2.9102	-2.6004	-2.9628
	Prob.	0.2502	0.0210	0.1775	0.2832	0.1630
		n0	**	n0	n0	n0
Without Constant & Trend	t-Statistic	-0.2656	-0.7691	-0.8986	-0.5744	0.4800
	Prob.	0.5793	0.3720	0.3163	0.4574	0.8109
		n0	n0	n0	n0	n0
At First Difference						
		d(EX_SA_M)	d(EX_RUS_M)	d(EX_CAN_M)	d(EX_USA_M)	d(EX_UAE_M)
With Constant	t-Statistic	-5.5811	-4.7355	-7.3225	-6.0303	-4.2959
	Prob.	0.0002	0.0012	0.0000	0.0001	0.0031
		***	***	***	***	***
With Constant & Trend	t-Statistic	-5.2470	-6.2408	-7.1209	-6.9982	-4.5493
	Prob.	0.0019	0.0002	0.0000	0.0001	0.0080
		***	***	***	***	***
Without Constant & Trend	t-Statistic	-5.2142	-4.8590	-7.1798	-6.1924	-4.3544
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0001

Table 6 contains the Descriptive Test Statistics and correlation analysis results of the Energy Indices of Exporting Countries. When looking at the probability distribution of the Jarque-Bera test of energy indices, it is seen that it has a normal distribution. It is seen that the highest correlation (0.9383) between the indices is between the US energy index and the Canadian energy index. It has been concluded that the correlation results between market indices of energy exporting countries are different from the correlation results between energy indices.

Table .6 Descriptive Test Statistics and correlation analysis results of Energy Indices of Exporting Countries

	EX_SA_EI	EX_RUS_EI	EX_CAN_EI	EX_USA_EI	EX_UAE_EI
Mean	6122.218	7016.217	237.3446	12390.17	2174.675
Median	6111.570	6507.025	239.8950	12614.70	2184.865
Maximum	7027.320	9159.500	269.3200	13852.10	2314.000
Minimum	5380.030	5253.690	163.7900	9146.200	1993.670
Std. Dev.	472.5028	1315.502	25.55671	1137.140	75.57286
Skewness	0.072974	0.509838	-1.020759	-1.067236	-0.309467
Kurtosis	2.029861	1.787676	4.082710	3.807727	2.990870
Jarque-Bera	0.962470	2.509468	5.340054	5.208397	0.383163
Probability	0.618020	0.285152	0.069250	0.073962	0.825652
Sum	146933.2	168389.2	5696.270	297364.1	52192.21
Sum Sq. Dev.	5134956.	39802519	15022.34	29741013	131358.9

Observations	24	24	24	24	24
EX_SA_EI	1				
EX_RUS_EI	0.1623	1			
EX_CAN_EI	0.3200	-0.11033	1		
EX_USA_EI	0.1172	-0.0927	0.9383	1	
EX_UAE_EI	0.4035	-0.1374	-0.1567	-0.1779	1

Table 7 and Table 8 shows the results of ADF and PP unit root tests of the energy index in the stock markets of energy exporting countries. It has been determined that Canada, the USA and the United Arab Emirates are stationary at constant and level values. It was determined that all indices were stationary when first difference was taken.

Table .7 ADF Unit Root Test Results of Energy Index

UNIT ROOT TEST RESULTS (ADF)						
Null Hypothesis: the variable has a unit root						
At Level						
		EX_SA_EI	EX_RUS_EI	EX_CAN_EI	EX_USA_EI	EX_UAE_EI
With Constant	t-Statistic	-1.8591	-1.3407	-3.5457	-3.8123	-3.2962
	Prob.	0.3444	0.5926	0.0158	0.0088	0.0270
		n0	n0	**	***	**
With Constant & Trend	t-Statistic	-1.9493	-3.3529	-3.7274	-3.1823	-4.6496
	Prob.	0.5968	0.0840	0.0440	0.1158	0.0065
		n0	*	**	n0	***
Without Constant & Trend	t-Statistic	0.3762	-0.2382	0.5705	1.3397	-0.4234
	Prob.	0.7846	0.5894	0.8305	0.9482	0.5181
		n0	n0	n0	n0	n0
At First Difference						
		d(EX_SA_EI)	d(EX_RUS_EI)	d(EX_CAN_EI)	d(EX_USA_EI)	d(EX_UAE_EI)
With Constant	t-Statistic	-4.1892	-4.3219	-3.0429	-4.8596	-5.8049
	Prob.	0.0039	0.0031	0.0488	0.0013	0.0001
		***	***	**	***	***
With Constant & Trend	t-Statistic	-4.0841	-7.6450	-2.9156	-4.6710	-5.7667
	Prob.	0.0207	0.0000	0.1796	0.0083	0.0007
		**	***	n0	***	***
Without Constant & Trend	t-Statistic	-4.2766	-4.2312	-3.0700	-4.5688	-5.9253
	Prob.	0.0002	0.0002	0.0041	0.0001	0.0000
		***	***	***	***	***

Table .8 PP Unit Root Test Results of Energy Index

UNIT ROOT TEST RESULTS (PP)						
Null Hypothesis: the variable has a unit root						
At Level						
		EX_SA_EI	EX_RUS_EI	EX_CAN_EI	EX_USA_EI	EX_UAE_EI
With Constant	t-Statistic	-2.0447	-1.5725	-3.6269	-3.9456	-3.1648
	Prob.	0.2671	0.4800	0.0132	0.0065	0.0356
		n0	n0	**	***	**
With Constant & Trend	t-Statistic	-2.1112	-2.4126	-3.5292	-4.4828	-5.1139
	Prob.	0.5130	0.3640	0.0597	0.0087	0.0023
		n0	n0	*	***	***
Without Constant & Trend	t-Statistic	0.3212	-0.2423	0.8191	0.9454	-0.8379
	Prob.	0.7698	0.5879	0.8819	0.9027	0.3420
		n0	n0	n0	n0	n0
At First Difference						
		d(EX_SA_EI)	d(EX_RUS_EI)	d(EX_CAN_EI)	d(EX_USA_EI)	d(EX_UAE_EI)
With Constant	t-Statistic	-4.1758	-5.1200	-5.6502	-7.6396	-9.7915
	Prob.	0.0041	0.0005	0.0001	0.0000	0.0000

		***	***	***	***	***
With Constant & Trend	t-Statistic	-4.0675	-7.6450	-5.6468	-7.6930	-11.6993
	Prob.	0.0214	0.0000	0.0008	0.0000	0.0000
		**	***	***	***	***
Without Constant & Trend	t-Statistic	-4.2668	-5.2367	-5.6402	-7.3722	-8.7762
	Prob.	0.0002	0.0000	0.0000	0.0000	0.0000
		***	***	***	***	***

Table 9 includes descriptive test statistics and correlation analysis results of proxy indices of market of energy importing countries. Considering the probability results of the Jarque-Bera test, it is seen that the market indices of the countries exhibit normal distribution. Looking at the results of the correlation analysis, it was determined that there was a high positive correlation between the Japanese and Indian stock markets. Similarly, positive correlations were found between United Kingdom and Germany, and between Germany and Japan.

Table .9 Descriptive Test Statistics and Correlation Analysis Results of Market Returns of Energy Importing Countries

	IM_CIN_M	IM_IND_M	IM_JAP_M	IM_GER_M	IM_UK_M
Mean	6612.334	15413.16	1356.518	14716.31	7475.912
Median	6593.405	15107.88	1314.015	14969.31	7461.310
Maximum	8011.000	17361.10	1568.060	16446.83	7876.280
Minimum	5734.280	13387.55	1202.440	12114.36	6893.810
Std. Dev.	508.3674	1072.855	119.1448	1180.924	228.2226
Skewness	0.676605	0.409240	0.785334	-0.571233	-0.456790
Kurtosis	3.694981	2.308301	2.080050	2.368115	3.485280
Jarque-Bera	2.314173	1.148357	3.313305	1.704505	1.070127
Probability	0.314401	0.563167	0.190777	0.426453	0.585632
Sum	158696.0	369915.8	32556.44	353191.3	179421.9
Sum Sq. Dev.	5944061.	26473410	326496.1	32075355	1197968.
Observations	24	24	24	24	24
Correlation					
IM_CIN_M	1				
IM_IND_M	-0.4989	1			
IM_JAP_M	-0.3480	0.8889	1		
IM_GER_M	0.1303	0.4738	0.6703	1	
IM_UK_M	0.1391	0.0624	0.2416	0.6899	1

Table 10 shows the unit root test results of proxy market of energy importing countries. It seems that China and England are stationary and at the level and constant. Other countries appear to be stationary in their first differences. This shows that the country's stock markets have a trend.

Table .10 ADF and PP Unit Root Test Results of Proxy Markets for Energy Importer Countries

UNIT ROOT TEST RESULTS (ADF)						
Null Hypothesis: the variable has a unit root						
At Level						
		IM_CIN_M	IM_IND_M	IM_JAP_M	IM_GER_M	IM_UK_M
With Constant	t-Statistic	-3.6767	-0.6466	-0.2335	-1.5942	-2.8818
	Prob.	0.0118	0.8412	0.9208	0.4694	0.0630
		**	n0	n0	n0	*
With Constant & Trend	t-Statistic	-3.0459	-2.2966	-2.3736	-2.3382	-2.8317
	Prob.	0.1430	0.4191	0.3821	0.3989	0.2010
		n0	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-1.1230	0.8061	0.9543	-0.3118	-0.1618

	Prob.	0.2288	0.8796	0.9040	0.5621	0.6164
		n0	n0	n0	n0	n0
At First Difference						
		d(IM_CIN_M)	d(IM_IND_M)	d(IM_JAP_M)	d(IM_GER_M)	d(IM_UK_M)
With Constant	t-Statistic	-4.3046	-4.2062	-5.3684	-4.9949	-6.7134
	Prob.	0.0032	0.0038	0.0003	0.0006	0.0000
		***	***	***	***	***
With Constant & Trend	t-Statistic	-4.2688	-4.2695	-5.5156	-5.0117	-6.5744
	Prob.	0.0149	0.0142	0.0011	0.0031	0.0001
		**	**	***	***	***
Without Constant & Trend	t-Statistic	-4.1989	-4.1641	-5.1217	-5.1218	-6.8761
	Prob.	0.0002	0.0002	0.0000	0.0000	0.0000
		***	***	***	***	***
UNIT ROOT TEST RESULTS (PP)						
Null Hypothesis: the variable has a unit root						
At Level						
		IM_CIN_M	IM_IND_M	IM_JAP_M	IM_GER_M	IM_UK_M
With Constant	t-Statistic	-3.7792	-0.6405	-0.0049	-1.5824	-2.8412
	Prob.	0.0094	0.8427	0.9488	0.4751	0.0682
		***	n0	n0	n0	*
With Constant & Trend	t-Statistic	-3.8328	-2.3147	-2.3176	-2.3222	-2.7960
	Prob.	0.0331	0.4103	0.4089	0.4067	0.2124
		**	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-1.4528	0.9328	1.1888	-0.3118	-0.0752
	Prob.	0.1330	0.9007	0.9346	0.5621	0.6470
		n0	n0	n0	n0	n0
At First Difference						
		d(IM_CIN_M)	d(IM_IND_M)	d(IM_JAP_M)	d(IM_GER_M)	d(IM_UK_M)
With Constant	t-Statistic	-11.4737	-4.2090	-5.4798	-5.0006	-6.9292
	Prob.	0.0000	0.0038	0.0002	0.0006	0.0000
		***	***	***	***	***
With Constant & Trend	t-Statistic	-10.8173	-4.8504	-6.0808	-5.0136	-6.7777
	Prob.	0.0000	0.0043	0.0003	0.0030	0.0001
		***	***	***	***	***
Without Constant & Trend	t-Statistic	-8.3744	-4.1246	-5.1217	-5.1302	-7.1052
	Prob.	0.0000	0.0003	0.0000	0.0000	0.0000
		***	***	***	***	***

Table 10 contains the Descriptive Test Statistics and correlation analysis results of the Energy Indices of importer countries. When looking at the probability distribution of the Jarque-Bera test of energy indices, it is seen that it has a normal distribution. It is seen that the positive correlation (0.5453) between the indices is between the Japan energy index and the China energy index. It is seen that the negative correlation (-0.5249) between the indices is between the Germany energy index and the Japan energy index.

Table .11 Descriptive Test Statistics and correlation analysis results of Energy Indices of Importer Countries

	IM_CIN_EI	IM_IND_EI	IM_JAP_EI	IM_GER_EI	IM_UK_EI
Mean	189.1538	18683.31	168.3521	3789.205	10450.12
Median	196.9450	18583.05	157.8000	3788.160	10518.16
Maximum	256.0000	20610.00	242.4300	4136.060	11651.45
Minimum	121.8800	16915.04	128.3800	3382.720	9481.780
Std. Dev.	36.49574	964.9818	32.77360	192.7963	632.2157
Skewness	-0.229660	0.264137	0.898048	-0.491653	0.018652
Kurtosis	2.258224	2.575953	2.785572	2.824407	1.880593
Jarque-Bera	0.761206	0.458889	3.271941	0.997723	1.254463
Probability	0.683449	0.794975	0.194763	0.607222	0.534068
Sum	4539.690	448399.4	4040.450	90940.92	250802.9
Sum Sq. Dev.	30634.61	21417367	24704.50	854919.2	9193023.

Observations	24	24	24	24	24
Correlation					
IM_CIN_EI	1				
IM_IND_EI	-0.0986	1			
IM_JAP_EI	0.5453	0.3478	1		
IM_GER_EI	-0.2458	-0.1172	-0.5249	1	
IM_UK_EI	0.0338	-0.1087	-0.1878	0.2098	1

Table .12 ADF Unit Root Test Results of Energy Index

UNIT ROOT TEST RESULTS (ADF)						
Null Hypothesis: the variable has a unit root						
At Level						
		IM_CIN_EI	IM_IND_EI	IM_JAP_EI	IM_GER_EI	IM_UK_EI
With Constant	t-Statistic	-1.6379	-3.2827	-1.7463	-2.9581	-2.3068
	Prob.	0.4480	0.0278	0.3955	0.0542	0.1783
		n0	**	n0	*	n0
With Constant & Trend	t-Statistic	-2.4408	-3.2084	-2.0309	-3.4704	-2.3518
	Prob.	0.3511	0.1074	0.5533	0.0667	0.3924
		n0	n0	n0	*	n0
Without Constant & Trend	t-Statistic	-1.4886	0.1965	-0.3820	-0.4038	-0.1779
	Prob.	0.1248	0.7342	0.5348	0.5269	0.6111
		n0	n0	n0	n0	n0
At First Difference						
		d(IM_CIN_EI)	d(IM_IND_EI)	d(IM_JAP_EI)	d(IM_GER_EI)	d(IM_UK_EI)
With Constant	t-Statistic	-5.2104	-5.4795	-2.6715	-5.5987	-4.4697
	Prob.	0.0004	0.0002	0.0948	0.0002	0.0021
		***	***	*	***	***
With Constant & Trend	t-Statistic	-5.9916	-5.2949	-2.9364	-5.4658	-4.5037
	Prob.	0.0006	0.0017	0.1710	0.0012	0.0088
		***	***	n0	***	***
Without Constant & Trend	t-Statistic	-5.1546	-5.6100	-2.7357	-5.7356	-4.5841
	Prob.	0.0000	0.0000	0.0086	0.0000	0.0001
		***	***	***	***	***
UNIT ROOT TEST RESULTS (PP)						
Null Hypothesis: the variable has a unit root						
At Level						
		IM_CIN_EI	IM_IND_EI	IM_JAP_EI	IM_GER_EI	IM_UK_EI
With Constant	t-Statistic	-1.6755	-3.2140	-1.2253	-2.9789	-2.4252
	Prob.	0.4298	0.0321	0.6452	0.0520	0.1462
		n0	**	n0	*	n0
With Constant & Trend	t-Statistic	-2.4408	-3.1232	-1.3670	-3.4443	-2.4367
	Prob.	0.3511	0.1245	0.8434	0.0700	0.3529
		n0	n0	n0	*	n0
Without Constant & Trend	t-Statistic	-1.7776	1.0555	-0.3931	-0.6906	-0.1638
	Prob.	0.0720	0.9184	0.5311	0.4066	0.6161
		*	n0	n0	n0	n0
At First Difference						
		d(IM_CIN_EI)	d(IM_IND_EI)	d(IM_JAP_EI)	d(IM_GER_EI)	d(IM_UK_EI)
With Constant	t-Statistic	-5.9588	-11.0171	-2.6969	-9.5293	-4.4714
	Prob.	0.0001	0.0000	0.0904	0.0000	0.0021
		***	***	*	***	***
With Constant & Trend	t-Statistic	-7.0650	-10.3372	-2.9764	-9.0738	-4.5269
	Prob.	0.0000	0.0000	0.1603	0.0000	0.0084
		***	***	n0	***	***
Without Constant & Trend	t-Statistic	-5.5298	-11.2059	-2.7603	-10.3283	-4.5988
	Prob.	0.0000	0.0000	0.0081	0.0000	0.0001
		***	***	***	***	***

Table 12 shows the results of ADF and PP unit root tests of the energy index in the stock markets of energy importer countries. It has been determined that India and Germany are stationary at constant and level values. It was determined that all indices were stationary when first difference was taken.

Zivot Andrews structural break tests were applied to determine whether there was a structural break in the proxy market indices and energy indices of energy exporting countries in Table 13. According to the

test results, results were obtained that the Russia-Ukraine war caused a structural break in the proxy market index and energy indices of the countries (Russia and Canada) in 2022.

Table .13 Zivot-Andrews Structural Break Results in Energy Exporting Countries

	A – Intercept	B – Trend	C – Both
EX_SA_M	2023M04 (0.0130)	2023M01 (0.0126)	2023M04 (0.0061)
EX_SA_EI	2022M08 (0.0163)	2023M02 (0.0005)	2023M04 (0.0018)
EX_RUS_M	2022M09 (0.0069)	2022M12 (0.0243)	2022M11 (0.349745)
EX_RUS_EI	2022M09 (0.0012)	2023M02 (0.0017)	2023M01 (0.1131)
EX_Can_M	2022M06 (0.0958)	2022M07 (0.1444)	2022M11 (0.0081)
EX_Can_EI	2023M03 (0.0455)	2022M11 (0.0768)	2023M05 (0.0069)
EX_USA_M		2022M10 (0.0606)	2022M09 (0.2355)
EX_USA_EI	2023M05 (0.0023)		2023M05 (0.0073)
EX_UAE_M	2023M01 (0.1188)		2023M01 (0.0732)
EX_UAE_EI	2023M04 (0.0122)	2023M03 (0.2359)	2023M04 (0.0230)

Zivot Andrews structural break tests were applied to determine whether there was a structural break in the proxy market indices and energy indices of energy importer countries in Table 14. According to the test results, results were obtained that the Russia-Ukraine war caused a structural break in the proxy market index and energy indices of the countries (China, India, Japan, UK and Germany) in 2022.

Table .14 Zivot-Andrews Structural Break Results in Energy Importer Countries

	A – Intercept	B – Trend	C – Both
IM_Cin_M	2023M01 (0.007265)		
IM_Cin_EI	2022M06 (0.001387)	2023M02 (0.033814)	2022M06 (0.123328)
IM_Ind_M	2023M06 (0.078535)	2023M04 (0.084327)	2023M02 (0.033091)
IM_Ind_EI	2023M02 (0.003935)	2022M09 (0.718982)	2023M02 (0.004878)
IM_JAP_M	2023M05 (0.006256)	2023M01 (0.079395)	2023M05 (0.009517)
IM_JAP_EI	2022M05 (0.021582)	2022M09 (0.001158)	2022M08 (0.004270)
IM_GER_M	2023M01 (0.023775)	2023M07 (0.059114)	2022M11 (0.039546)
IM_GER_EI	2022M11 (0.030045)	2023M07 (0.166812)	2022M10 (0.003047)
IM_UK_M	2022M12 (0.048539)	2023M08 (0.060557)	2022M11 (0.000539)
IM_UK_EI	2023M07 (0.069204)	2023M06 (0.212904)	2023M03 (0.202761)

5. CONCLUSIONS AND RECOMMENDATIONS

Country economies are affected by many national or international dynamics. Factors affecting economies may be due to natural causes or artificial causes. Wars have an importance that affects the economies of other countries as well as the countries involved. In this study, the effects of the Russia-Ukraine war, which started in February 2022, on the economies were examined. In this context, it was investigated whether the war had an effect on the stock markets of the 5 countries that import the most energy and export the most energy.

Before the structural break analysis, the correlation analysis of energy importing and exporting countries was examined. According to the results of correlation analysis USA-Russia, USA-Canada, Japanese-Indian, UK-Germany, Japanese-Chinese has positive correlation. Also there are negative correlation between United Arab Emirates-Russia, United Arab Emirates-USA and Germany-Japanese.

In the structural break results after the correlation analysis, the Russia-Ukraine war caused a structural break in the proxy market index and energy indices of the countries (Russia and Canada) in 2022 for exporter countries. Also, the results were obtained that the Russia-Ukraine war caused a structural break in the proxy market index and energy indices of the countries (China, India, Japan, UK and Germany) in 2022 for importer countries.

The findings obtained as a result of the analysis are similar to those published in the literature by Meihong and Chao (2022), Nur Rizqi Febriandika et al. (2023), Ha (2023), Malhotra et al. (2023), Kumari et al. (2023), Mohammed et al. (2022), Bagchi and Biswajit (2023). However, the findings obtained as a result of the analysis differ from the study of Safitri and Hariyanto (2022).

The impact of the Russia-Ukraine war on the representative stock exchanges of the countries depends on the countries' trade, especially with these two countries. In future studies, the impact area of the study can be expanded by adding other countries. In this study, country selection was specific to energy. Similarly, countries can be selected by taking into account other products for which these two countries have significant supply. In this way, the impact of war on countries is also discussed through other sectors.

REFERENCES

- Abu Hatab, A. (2022). Africa's food security under the shadow of the Russia-Ukraine conflict. *The Strategic Review for Southern Africa*, 44(1), 37-46.
- Alam, M. K., Tabash, M. I., Billah, M., Kumar, S., & Anagreh, S. (2022). The Impacts of the Russia-Ukraine Invasion on Global Markets and Commodities: A Dynamic Connectedness among G7 and BRIC Markets. *Journal of Risk and Financial Management*, 15(8). <https://doi.org/10.3390/jrfm15080352>
- Bagchi, Bhaskar, and Biswajit Paul (2023). Effects of Crude Oil Price Shocks on Stock Markets and Currency Exchange Rates in the Context of Russia-Ukraine Conflict: Evidence from G7 Countries. *Journal of Risk and Financial Management* 16: 64. <https://doi.org/10.3390/jrfm16020064>
- Bossmann, A., & Gubareva, M. (2023). Asymmetric impacts of geopolitical risk on stock markets: a comparative analysis of the E7 and G7 equities during the Russian-Ukrainian conflict. *Heliyon*, 9(2).
- BP Statistical Review of World Energy - 70th edition (2021). <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report.pdf#page13>

- Ha, L. T. (2023). A wavelet analysis of dynamic connectedness between geopolitical risk and renewable energy volatility during the COVID-19 pandemic and Ukraine-Russia conflicts. *Environmental Science and Pollution Research*, 1-16.
- Huang, M., Shao, W., & Wang, J. (2023). Correlations between the crude oil market and capital markets under the Russia–Ukraine conflict: A perspective of crude oil importing and exporting countries. *Resources Policy*, 80, 103233.
- Jahanshahi, H., Uzun, S., Kaçar, S., Yao, Q., & Alassafi, M.O. (2022). Artificial Intelligence-Based Prediction of Crude Oil Prices Using Multiple Features under the Effect of Russia–Ukraine War and COVID-19 Pandemic., *Mathematics*, 10, 4361. <https://doi.org/10.3390/math10224361>
- Kartal, M. T., Pata, U. K., Depren, S. K., & Depren, Ö. (2023). Effects of possible changes in natural gas, nuclear, and coal energy consumption on CO2 emissions: Evidence from France under Russia’s gas supply cuts by dynamic ARDL simulations approach. *Applied Energy*, 339, 120983.
- Kumari, V., Kumar, G., & Pandey, D. K. (2023). Are the European Union stock markets vulnerable to the Russia–Ukraine war?, *Journal of Behavioral and Experimental Finance*, 37, 100793.
- Lai, Z., Shen, Y., Zhao, Z., Qin, J., & Tao, Z. Assessing the Impact of the Russia-Ukraine War on US Stock Market: Event Study Analysis and Fuzzy Set Approach. *Academic Journal of Humanities & Social Sciences*, 5(16), 14-27.
- Li, Y. A., Jin, J. C., Lyu, D. L., & Zheng, Q. (2022). Impact of Russia’s Export Commodities on the Europe Stock Market during and before the Russia-Ukraine War. *iBusiness*, 14, 213-229. <https://doi.org/10.4236/ib.2022.144016>
- Malhotra, G., Yadav, M. P., Tandon, P., & Sinha, N. (2023). An investigation on dynamic connectedness of commodity market with financial market during the Russia–Ukraine invasion. *Benchmarking: An International Journal*. Emerald Publishing Limited 1463-5771, DOI: 10.1108/BIJ-11-2022-0727
- Malhotra, G., Yadav, M. P., Tandon, P., & Sinha, N. (2023). An investigation on dynamic connectedness of commodity market with financial market during the Russia–Ukraine invasion. *Benchmarking: An International Journal*.
- Meihong Sun & Chao Zhang (2022): Comprehensive analysis of global stock market reactions to the Russia-Ukraine war, *Applied Economics Letters*, DOI: 10.1080/13504851.2022.2103077
- Mohammed, K. S., Usman, M., Ahmad, P., & Bulgamaa, U. (2023). Do all renewable energy stocks react to the war in Ukraine? Russo-Ukrainian conflict perspective. *Environmental Science and Pollution Research*, 30(13), 36782-36793.
- Nur Rizqi Febriandika, Rima Mila Wati and Mauizhotul Hasanah (2023). Russia’s invasion of Ukraine: The reaction of Islamic stocks in the energy sector of Indonesia. *Investment Management and Financial Innovations*, 20(1), 218-227. doi:10.21511/imfi.20(1).2023.19
- Onwuzu, K., Orga, J., & Okafor, O. (2023). An Empirical Study of Russia-Ukraine War on Global Business Sustainability Across The World. *International Journal of Management and Allied Research (IJMAR)*, 1(1), 52-63.
- Safitri, H., & Hariyanto, D. (2022). Capital Market Reaction in Asean Member Countries Against Market Shock: Russia and Ukraine War. *Journal of Asian Multicultural Research for Economy and Management Study*, 3(4), 30-37.
- Shen, L., & Hong, Y. (2023). Can geopolitical risks excite Germany economic policy uncertainty: Rethinking in the context of the Russia-Ukraine conflict. *Finance Research Letters*, 51, 103420.

Singh, J. E., Babshetti, V., & Shivaprasad, H. N. (2021). Efficient Market Hypothesis to Behavioral Finance: A Review of Rationality to Irrationality. *Materials Today: Proceedings*, <https://doi.org/10.1016/j.matpr.2021.03.318>

Solmaz, M. (2022). From 2002 to The Covid-19 Pandemic, to The Russia-Ukraine War Inflation in The Turkish Economy / 2002'den Covid-19 Pandemisine, Rus-Ukrayna Savaşına Türkiye Ekonomisinde Enflasyon. *Journal of Social Sciences and Humanities*, 6(2), 385-402.

Tiwari, R., Singh, P., Kargeti, H., & Chand, K. (2022). Impact of Russia Ukraine War on Exchange Rate in India. *Available at SSRN 4281532*.

Yousaf, I., Patel, R., & Yarovaya, L. (2022). The Reaction of G20+ Stock Markets to the Russia Ukraine Conflict 'Black-Swan' Event: Evidence From Event Study Approach. *SSRN Electronic Journal*, 100723. <https://doi.org/10.2139/ssrn.4069555>.

The potential in adoption of digital technologies in the hotel industry: Technological, Organizational and Environmental drivers

Marino Stanković¹, Melko Dragojević², Matija Fortuna³

Abstract

Introduction: Digital technologies are attempting organizations to completely transform from technological, orga

zational, and environmental aspects, of their operations into digital ones to increase not only their profitability but also the satisfaction of their clients, or in the case of the hotel industry, their guests.

Aim: The research aims to determine the impact and intensity of factors on the readiness of digital technologies adoption in the hotel industry regarding the technological, organizational, and environmental aspects of the hotel organization.

Method: SEM analysis is used to determine the reliability and acceptability of the readiness model of hotel organizations in the implementation of digital technologies. The data of 103 surveyed hotel managers at the middle and top management levels are processed.

Findings: The research results show the positive influence of technological factors (relative advantages and technological compatibility), organizational readiness (top support management, perceived benefits, and training programs), and environmental readiness (market orientation and customer satisfaction) on the implementation of digital technologies in hotel organizations.

Originality and value: This research can provide good guidelines and recommendations for hotel organizations, which are the aspects or factors that could affect the readiness for the potential application of digital technologies in their business systems.

Key Words: digital technologies, TOE framework, SEM analysis, digital transformation, hotel industry

Jel Codes: O14, L83, Z32

1. INTRODUCTION

In today's time of very rapid and expansive growth of digital transformation in almost all spheres and industries, it is important to note and mention the influence and readiness to introduce them among entities within tourism and, more specifically, the hotel industry (Buhalis et al., 2022). Digital technologies contain a large number of tools with which

¹ Research Assistant, University of Dubrovnik, Department of Economics and Business Economics, Dubrovnik, Croatia

² Research Assistant, University of Dubrovnik, Department of Economics and Business Economics, Dubrovnik, Croatia

³ IT Specialist, Fortenova d.d., Zagreb, Croatia

companies try to achieve a complete digital transformation of their business and thereby achieve greater and better business results but also achieve greater satisfaction of their customers, or in the case of the hotel industry, their guests (Masoud & Basahel, 2023).

The hotel industry, like most others, is in dire need of a digital transformation of its own business and has started implementing digital technologies and other innovative solutions. This implies the improvement or establishment of various digital tools in terms of software and hardware, as well, as in terms of telecommunication equipment, network infrastructure, databases, etc (Chaidi et al., 2021). Croatia is known for the large percentage of the tourism sector in the country's GDP and the multitude of small family and large hotel groups, and for this reason, everyone needs to be ready to implement such innovation policies (Orsini, 2018). Digital transformation allows hotels to collect and analyze vast amounts of data, to be more productive (Troisi et al., 2023). This data can be used to gain insights into guest behavior, preferences, and trends. Such information is invaluable for making informed decisions and tailoring services to meet guest expectations (Masoud & Basahel, 2023).

Recognizing the great benefits and operational advantages, and also potential innovations and increased efficiency that digital technologies enable the hotel industry, it is clear why this is an ongoing topic and a topic that has been the subject of a lot of research lately (Wynn & Jones, 2022). Hotels and the entire tourist community will move towards implementing such innovation policies and advanced technologies into their operational frameworks shortly (Koo et al., 2019). According to (Marušić et al. 2019) innovations are explained to be the key to achieving economic growth and well-being. Digital transformation can be considered as a certain kind of innovation because such organization and use of these technologies has not yet taken root globally, although it has been proven to bring results. Innovations as such may be positively accepted by the public and society, but a certain percentage of entities may oppose them (Marušić et al., 2019).

Digital technologies relate to the use of digital resources (technology, tools, applications, and algorithms) that efficiently search, analyze, generate, forward, and consume digital goods in a computer environment. They are a crucial component of the digital economy's infrastructure. IoT, AI, mobile apps, social networks, clouds, and big data are just a few examples of the different tools and systems that fall under the category of digital technology (Spremić, 2017).

This research aims to determine the influence of drivers on the readiness of the implementation of digital technologies in the hotel industry regarding the technological, organizational, and environmental aspects of the hotel organization. Moreover, this paper seeks to investigate the intensity of the impact of certain determinants in the potential adoption of digital technologies in hotels. In terms of our topic, large conglomerations and hotel groups will most certainly go in the direction of digital technologies, while possibly small and family hotels, due to the need for experimentation when making such large innovative decisions, will remain traditional and maintain the existing business and network infrastructure.

This research tries to answer the following questions:

RQ1: What are the technological drivers influencing hotels to adopt digital technologies?

RQ2: What are the organizational drivers influencing hotels to adopt digital technologies?

RQ3: What are the environmental drivers influencing hotels to adopt digital technologies?

To identify and determine the factors that influence hoteliers to implement digital technologies in their business systems, hotel managers at the middle and high levels of management of the hotel organization are examined. Furthermore, to obtain answers to the research questions, the research is carried out using the TOE framework. In this way, an attempt is made to determine the technological, organizational, and environmental aspects of the hotel's readiness for the implementation of digital technologies through the determinants or observed variables established in the research. Thus, the assumptions on a dataset of 103 hotel managers in Croatia were examined using the TOE framework and applying an analysis of structural equation modeling (SEM) in JASP software.

There are six sections of this study. Following the introduction, Section 2 of the paper addresses the literature on the adoption of digital technology in the hospitality industry as a background for the TOE framework's analysis of digital transformation in tourism. Section 3 provides a research methodology. The research framework and hypothesis development are developed in Section 4. The findings of the empirical study, including the measurement and structural model, are presented in Section 5. The study is summarized from the obtained results in Section 6, which also includes implications concerning the study's limitations and possible avenues for further research.

2. LITERATURE REVIEW

Innovations are a big part of the present and are certainly necessary for developing new functionalities and achieving great success. Some organizations in the hospitality sector are extremely opposed to innovative ways and still conduct their business in strictly traditional ways because they are not susceptible and ready to implement. On the other hand, there is a large number of subjects and businesses in tourism that operate harmoniously and innovatively and accept all available technological possibilities. Global tourism, apart from being one of the most fruitful and profitable branches, is also subject to major technological changes, and innovation in this branch can be very expressively visible. In their work, Marušić et al. (2019) concluded that hotels, as part of the hotel industry, and travel agencies, as part of tourism, are generally very inclined towards innovations and support them in a large percentage.

Regardless, of whether it was about digital transformation in marketing or just a product/service, a large sample of empirical research in this paper dictates that hotels are ready for innovations and want to implement them mostly as a result of the perceived benefits in organizations (Masoud & Basahel, 2023a). Recently, more and more hotels are trying to take advantage of the undoubtedly great advantage of digital transformation in

employee training to strengthen the digital skills of the employees themselves, adapt to the more complex requirements of market segments, and improve work productivity (Pascucci et al., 2023a). Also, Nikopoulou et al., (2023) state one of the most important factors that affect the hotel's readiness for digital transformation and the adoption of innovative ways of doing business is the support of the management of the organization. Precisely, the top management level of the hotel organization creates an adequate climate that acts on the comprehensive intention and motivation for the potential implementation of digital technologies (Ivanov et al., 2020).

Digital technologies can bring great relative advantages to hotels. If customer reviews are positive, they attract new customers just as bad ones reduce the demand for that accommodation (Anser, Yousaf, Khan, et al., 2020). Moreover, Anser, Yousaf, Usman, et al., (2020) say that digital technologies are one of the most important tools in the hotel industry that all participants should implement and start using as soon as possible, but they also emphasize that research on the benefits that these technologies bring to the hotel industry should continue to be carried out because only a large number of surveys combined with a long time component would give more accurate results. Technical compatibility represents the effect of the applicability of technological devices and systems in the hotel organization. Numerous devices and systems of technological infrastructure can have added value to the efficiency of hotel operations. Technical compatibility is a prerequisite or basis for thinking about the possible implementation of digital technologies in the organization (Wynn & Jones, 2022a). It is the basis of both personnel and infrastructure for bringing into question the applicability of digital technologies for a specific organization, including in the case of the hospitality sector (Ezzaouia & Bulchand-Gidumal, 2020).

In the hotel industry, important factors in the development and implementation of new technologies and systems can be those factors from the hotel's environment, which affect the final performance of the business. The base of a hotel's ability to provide its services in the best possible way with maximum guest satisfaction is the goal of every successful operation (Garbin Praničević & Mandić, 2020). It is precisely in the hospitality sector that it is one of the most crucial components for achieving an acceptable level of guest satisfaction and recognition of the hotel's service quality is to have the ability to meet all the needs of the guests in today's dynamic time. Therefore, the hotel needs to recognize whether the implementation of the digital technology system can influence the satisfaction of the target segment. (Buhalis & Moldavska, 2021; Wahab et al., 2022). In addition, positioning on the market represents the course of action of the hotel organization, which must respond to all the requirements of the target segments (Wahab et al., 2022a). In this way, if the hotel recognizes that it could influence guest satisfaction with a stronger level of digital transformation, then it would potentially improve its position in the market with digital actions. On the other hand, the hotel may be positioned on the market in such a way that it does not tend to digital transformation or hotel management mention that with the digital transformation, they will not achieve the expected effect of guest satisfaction, hence there is a possibility that the variables of the environmental aspect such as market

orientation or customer satisfaction do not affect the hotel's strategy for the implementation of digital technologies (Baquero, 2023a).

In addition, this research aims to determine the extent to which hotel companies have strategic frameworks based on which they plan activities related to the organization's readiness to adopt digital applications in the hotel (Jaremen, 2016; Garbin Praničević & Mandić, 2020). Digital technologies enable the modern marketing of the hotel organization's strategy, especially in improving labor productivity, introducing innovations into business processes, and improving the quality of the system to achieve a competitive advantage (Wynn & Jones, 2022). In addition, these technologies make it easier and simpler to build a network with stakeholders, especially when it comes to distributing the network and creating a vision for new strategic initiatives (Zentner et al., 2022). Maximizing digital technology should encourage managers to establish techniques for adoption and knowledge sharing that they can use in their decision-making (Khan & Hossain, 2018). Based on all the above, the research trades on the variable of strategic initiatives of the hotel management for digital technologies adoption as a factor by which the readiness of the hotel organization is measured for such actions.

3. HYPOTHESIS DEVELOPMENT AND RESEARCH MODEL

For this research, a model is being developed that combines three aspects of readiness in the hotel organization for the possible application of digital technologies. The model in the research is based on the TOE framework, according to which dimensions such as technological, organizational, and environmental context are key to identifying the state in which the organization is located and whether there is sufficient readiness for the potential application of new technologies (Nikopoulou et al., 2023). In the technological context, the determinants chosen in the model for measuring the application of digital technologies are relative advantage and technological compatibility. From the organizational aspect, the determinants of perceived benefits, training programs, and top managerial support are measured, while the determinants of the environmental aspect in the model are market orientation and consumer satisfaction impact. The dependent variable in the model represents the management's strategic initiative for the application of digital technologies in the hotel organization.

This section will try to explain our view on all the structural components of the TOE framework. Of course, our discussion will be conducted from the standpoint of the hospitality industry. Before we begin to develop our discussion it is necessary to state that the TOE framework is not the sole framework used for ICT adoption analysis in any sector, which naturally translates to the hospitality industry as well (for instance, see Rita et al. (2018) for an application of the UTAUT framework which we do not analyze here). Nevertheless, we try to cover all three parts of the TOE framework (even if parts are analyzed outside of TOE, but share notable commonalities) and their impact on the

adoption of ICT itself as all present both constraints and opportunities for technological innovation (Baker, 2012).

3.1. Technological Readiness

The ability of a hotel organization to effectively adopt and utilize technology to improve different elements of its operations, customer service, and overall efficiency is referred to as technological readiness (Lam & Law, 2019). It includes a broad range of tools and systems that contemporary hotels frequently employ to satisfy visitors and streamline internal operations. Technology readiness is essential for a hotel's competitiveness and capacity to fulfill evolving consumer demands. Utilizing the hotel's relative advantages and technical compatibilities can lower operating costs and enhance sustainability as a whole. As a result, to remain competitive in the market, hotels must constantly evaluate and spend money on technology (Ezzaouia & Bulchand-Gidumal, 2020).

In the research of Nam et al. (2021), technological context is perceived as a result of relative advantage (of the innovation to the preceding situation), technological complexity, and IT expertise (which can be thought of as parallel to the mentioned technological readiness) each one of which can be broken down into even more detailed factors. Through interviews, they find different implications for their unique case. But a more general insight would be that the managers in that particular study, regarding the technological context, seem keen on digital technologies adoption, but mainly through outsourcing. Wang et al. (2016) use quite similar factors of the technological context but do not focus on IT expertise as a separate one. In line with the theoretical assumptions, compatibility with relative advantage has a positive impact on the adoption, while complexity acts negatively.

Lam & Law (2019) look at it from a different perspective within the hotel industry. They find the need for digital transformation, stems from the customers which are evolving their demand around the ever-changing technology. With that said the hotels they analyzed lack digital readiness, which could be attributed to the passive corporate office. In the rest of the literature, the findings sometimes contradict, and some of the literature on the TOE framework does not even analyze the technology context separately (such as Ezzaouia & Bulchand-Gidumal (2020)), but that does not lessen its true impact on ICT adoption. As Baker (2012) put it, technological context is invaluable in the adoption process as it sets the limits to the technological change that an organization can undertake.

H1: The technological aspect of hotel readiness affects the adoption of digital technologies.

The perception of a relative advantage affects users' decision-making processes for the adoption of new technologies. The relative benefits of adopting an innovation are taken into account in the context of the organization's perceived benefits, which are gauged by the lower cost, cost-effectiveness, broad market coverage, and financial profitability (Mndzebele, 2013). The distinction between adopters and non-adopters in the adoption decision is made by perceived relative advantage, which is a crucial predictor of innovation adoption. According to several researchers, the relative benefit is a key factor in an organization's decision to adopt a technology (Eze et al., 2019; Vagnani & Volpe, 2017).

The crucial factor in deciding to employ digital transformation in business systems for the hospitality industry is the perceived relative advantage because of the positive impact on the diffusion of innovations for smart organizations. (Collado-Agudo et al., 2023).

H1a: The relative advantage factor of a hotel's technological readiness affects the adoption of digital technologies.

An important determinant of encouraging the use of technology in the organization is certainly technological compatibility because it represents one of the important factors in the speed of digital transformation in the hotel industry, which by itself exists in a dynamic market. The adoption of new technologies is linked to current IT infrastructure, corporate operations, and appropriate work habits. (Shahadat et al., 2023). Compatibility is related to the intention to innovate in the organization due to the perception of the values that the application of ICTs itself would contain (Mndzebele, 2013). Also, this determinant can bring about certain significant changes in the business technology system that would open up opportunities for more efficient adaptation to new market requirements (Faqih, 2019; Nguyen et al., 2022).

H1b: The technological compatibility factor of a hotel's technological readiness affects the adoption of digital technologies.

3.2. Organizational Readiness

In the setting of a hotel business, organizational readiness refers to the organization's ability and capacity to successfully adapt to changes, adopt new initiatives, and react to difficulties or opportunities. It includes a broad range of elements about the hotel's structure, culture, assets, and management (Carneiro et al., 2023). Organizational readiness is a dynamic process that calls for ongoing evaluation and modification rather than a static state. An organizationally prepared hotel will better enforce perceived benefits and management support for getting more innovative (Molina-Castillo et al., 2023). Perhaps it is necessary to mention the relationship between the terms of context and readiness. Sometimes these are used interchangeably, and one can argue that we approach it similarly. Others see readiness as one of the factors that influences the context itself (as the case of Cruz-Jesus et al. (2019), and Nam et al. (2021)). In the organizational context, readiness is seen as just one of the factors which influences the organizational context. Ezzaouia & Bulchand-Gidumal (2020) develop a detailed analysis of the factors within it which we try to base our research on too. Wang et al. (2016) use a more condensed list of the factors such as the functional perspective of the top management, their support, employees' training programs, internal benefits, capacity perspective, and firm size.

Ezzaouia & Bulchand-Gidumal (2020) see the organizational context as the main factor in the adoption of digital technologies. They list hotel characteristics, and financial resources, as key organizational factors, however since they do not use the TOE framework as is, the other factors such as manager characteristics, perceived, marketing, and managerial benefits, etc. can also be seen influencing the organizational context but they analyze them separately. With that said, no context is isolated from its influences. The TOE

framework simply provides a way of structuring the numerous factors in a way that as little overlap as possible exists between them. Or, as Baker (2012) put it, we deal with pertinent factors. Organizational readiness, one of them, is used to study the impact even outside the TOE framework, as in Anser et al. (2020). In their work the organizational is hypothesized to impact directly e-marketing and through it strategic business performance.

The organizational context incorporates well into the realm of analysis of digital technology adoption. This can be seen in several research, as rarely is the organizational context ever excluded or integrated with the other factors from the TOE framework. In Ezzaouia & Bulchand-Gidumal (2020) the organizational context can be argued to permeate through all the examined groups of factors, while the rest of the TOE framework isn't given as much attention. Nam et al. (2021) consider the financial justification and the resistance of employees as key organizational factors, which can be altered by effective HR training programs. These can be easily compared to the factors we observe, detailed in section Literature review. Regardless of the approach and the used influencing factors in the organizational context, it by itself poses an important distinctive set of characteristics that undeniably affect the ICT adoption process.

H2: The organizational aspect of hotel readiness affects the adoption of digital technologies.

In previous research, perceived benefits were considered to relate to the identification of potential improvements in the functioning of the organization, especially in terms of work efficiency and accuracy of data in business transactions, improving the direct relationship with the target segment. In addition, the aforementioned factor improves the relationship with business partners in terms of identifying competitive advantages. It thus represents an important determinant in the implementation of digital technology, as it reduces potential errors and increases guest satisfaction in the dynamic business of hotel organizations, which can be critical to success in the long term. ((Jaganathan et al., 2018); Leung et al., 2015).

H2a: The perceived benefits factor of a hotel's organizational readiness affects the adoption of digital technologies.

The success of the company is achieved by investing in employees, which also leads to long-term financial success. The cycle of success refers to employee satisfaction and customer satisfaction because a good selection of employees, intensive training, and a better-paid job lead to the satisfaction of employees who take a positive attitude towards the service and provide better customer service, thereby achieving customer loyalty (Rodríguez-Sánchez et al., 2020). Companies must have a clearly defined company mission, and employees should know to act following it. Work in tourism requires the development of various skills and systematic learning to maintain and improve the quality of service. Accelerated economic development is conditioned by the development of technology and automation of production, which largely replace human work (Kişi, 2019). Hotel service cannot be practiced; it is a unique and unrepeatable experience where the

competence of the employees and their ability to make a positive first impression come to the fore. Training programs are a very important component of the system of education and evaluation of knowledge in service companies, especially in the hotel industry, due to the complexity of business activities and relations with guests (Waqanimaravu & Arasanmi, 2020). By developing a quality motivation system and regularly monitoring satisfaction, management can take care of every employee. So, to create satisfied customers, it is necessary to have satisfied employees, because they express their satisfaction/dissatisfaction through their behavior concerning customers (Kljajic-Dervic & Dervic, 2017).

H2b: The employee training program factor of a hotel's organizational readiness affects the adoption of digital technologies.

Another important factor in organizational readiness for the application of ICTs is top management. According to Schot & Steinmueller (2018), positive management perceptions of hotel organizations lead to more efforts for the potential application of digital technologies. By expressing the organization's vision and communicating and reinforcing the organization's values, top management can promote transformation (Molina-Castillo et al., 2023). A favorable environment for technological innovation can be created through vision, ambition, and top management support. Leung et al. (2020) highlighted the importance of management support and attitude in assessing a hotel's readiness for early adoption of digital technologies. However, there is little empirical support for this assertion in the hospitality literature.

H2c: The top managerial support factor of a hotel's organizational readiness affects the adoption of digital technologies.

3.3. Environmental Readiness

In the context of a hotel organization, environmental readiness refers to the organization's level of preparation and commitment to addressing environmental sustainability and responsibility. The hotel must be prepared to embrace, put into practice, and efficiently manage market requirements (Ezzaouia & Bulchand-Gidumal, 2020). Environmental readiness is not only a responsible approach to business but also increasingly a market demand. Guests are often attracted to hotels that demonstrate a strong commitment to sustainability and environmental responsibility and their satisfaction is crucial (Acampora et al., 2022). Wang et al. (2016) state competitive pressure, guest satisfaction impact, and information intensity as potential environmental factors. These differ throughout the literature but can be summarized as factors relating to the competition, consumer satisfaction, and the market itself. The adoption of digital technologies is significantly impacted by aspects related to these. We can see that in Lam & Law (2019) where the environment sets the table for endeavors in the digital landscape. Among others, they list the understanding of the competition dynamics, ability to respond to change, and customer-centric collaborative culture as essential competencies framing the environmental context.

The environmental context plays a large role in influencing the adoption process of digital technologies while being one of the hardest to control factors. The characteristics that are typically hard to change must not be ignored for the lack of leverage an organization possesses over them. Baker (2012) holds industry structure, technology service providers' absence, and the regulatory environment as the most important environmental factors firms cannot fight but can adapt to. Social environment, as an external environment factor in Rita et al. (2018) serves as a motivation for technology usage. This again can be thought of as a view similar to Lam & Law (2019) where customers are the reason for the necessity of ICT implementation.

Adaption may be the crucial term used in the environmental context, as other factors can be more directly influenced. The environmental context requires changes to the company's culture, as affecting competitive pressure, reliance on instant messaging, and high product information intensity (as environmental factors noted by Wang et al. (2016)) are hardly able to be influenced. Environmental context, precisely with its relative unaffectedness, leads organizations to look for possible sources of sustainable competitive advantage (Cruz-Jesus et al., 2019). This, of course, can translate easily into aiding digital technology adoption as a way of acting upon these circumstances.

H3: The environmental aspect of hotel readiness affects the adoption of digital technologies.

The information from the sales force and sales activity is automatically integrated into the organization's information structure thanks to digital transformation. They can also make a wide range of international information resources easily accessible and make it easier to gather important consumer and competitive intelligence. Digital technologies also offer exceptional ways to target particular customer groups using mass customization and one-to-one marketing techniques (Pech & Vrchota, 2022). New technologies such as the Internet of Things (IoT) or Artificial Intelligence (AI) systems expand and create new information flows, which improves the company's capacity to take advantage of connections both inside and outside its borders (Dwivedi et al., 2021; Pascucci et al., 2023). In other words, these technologies may integrate internal processes and coordinate them with what suppliers and customers want. The corporation can identify new business prospects at the market level thanks to the intensive usage of some ICTs (Swamy, 2020). It is possible to access new worldwide markets and foreign collaborations, which leads to new business models that enhance customer value and boost profitability, as well as better segmentation, targeting, and positioning tactics (Birkel et al., 2023; Cui et al., 2023; Kamalaldin et al., 2020). Utilizing digital technologies should have an impact on how each dimension of market orientation affects a hotel's innovative activity. When they observe additional competitors in the market implementing the technology, organizations with a competitive mindset frequently feel under pressure. Companies in the tourism and hospitality sectors often see the need for and have a higher intention to adopt new technology to preserve their competitive position and avoid falling behind their rivals. (Infante-Moro et al., 2021).

H3a: The market orientation factor of a hotel's organizational readiness affects the adoption of digital technologies.

In the process of implementing any kind of technology, especially digital, it is extremely important for whom we implement it, that is, who are the users of such technology. Consumers in the name of guests are an important environmental factor for the potential application of digital technologies in hotel organizations (J. J. Kim et al., 2020). Conforming to consumer needs and expectations is no longer discretionary given the fiercer competition in the corporate world; it is now a requirement for success (Nikopoulou et al., 2023). The demand profile for hotel services reflects what extent and what kind of technology the hotel needs and whether that segment wants such technology in the hotels it chooses (Kim et al., 2020; Lin & Mattila, 2021). This factor is also connected with the possibility that hotel guests have the opportunity to evaluate each service and thereby influence the business and the provision of hotel services. The pressure of guest reviews and opinions is omnipresent in the hotel industry, as it strives to provide services to truly satisfy each guest, bringing them the right experience (Bonfanti et al., 2021). The influence of tourists is especially pronounced in contact with hotel employees, so it is very important to leave the right impression of the service (Xu, 2019). A wide range of hotel products and services gives consumers the power to choose the one that suits them best, that is, the one that best meets their wishes and needs (Y.-J. Kim & Kim, 2022; Vo et al., 2021). Due to all of the above, the influence of consumers is certainly a factor that should be emphasized in this aspect of readiness for implementing digital technologies.

H3b: The customer satisfaction factor of a hotel's organizational readiness affects the adoption of digital technologies.

The proposed hypothesized research model is illustrated in Figure 1

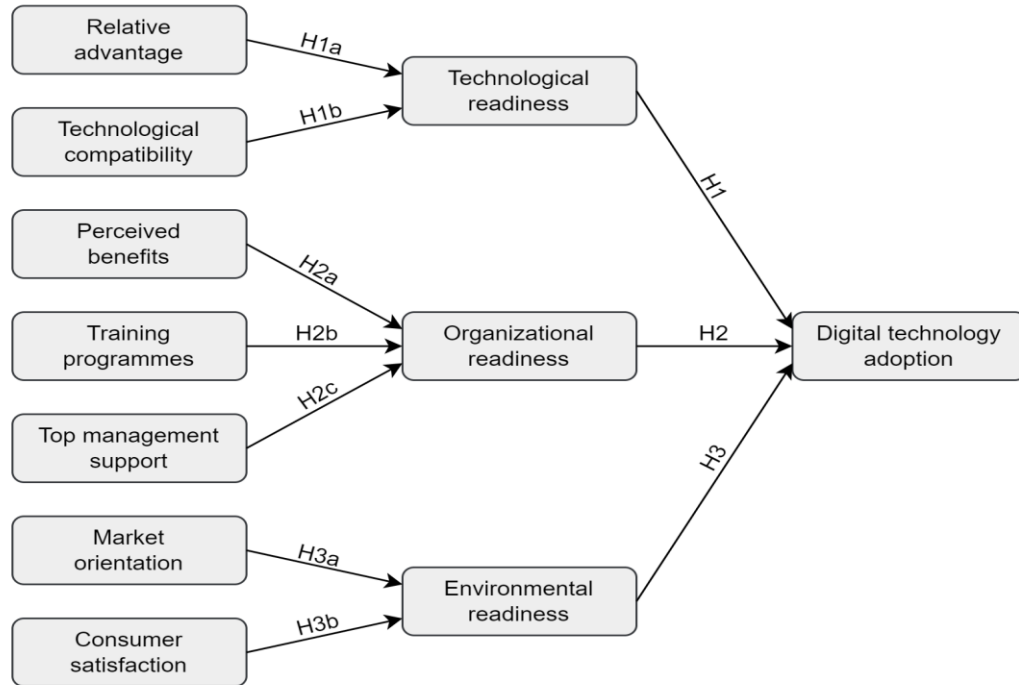


Figure 1. Hypothesized conceptual framework

4. RESEARCH METHODS

4.1. Data Sampling

In this research, a survey questionnaire was used as the primary source of research aimed at hotel managers at the top and middle management levels of the hotel organization. The sampling method is systematic, and the research was conducted in March 2023. The sample included managers in hotels categorized as three, four, and five stars in the area of southern Croatia, where there are a large number of tourist destinations and hotels at the same time. The chosen sector for the purposes of this research is the tourism and hospitality sector, because this is one of the most dynamic sectors in terms of the implementation of digital technologies in business systems (Cheng et al., 2023; Zhu et al., 2021).

Table 1: Observation of variables

Research constructs	Abbreviation of variables	Description	Variable measurement	Adaption sources
Technological readiness				
Relative Advantage	RA1	The hotel is trying to implement systems of Artificial Intelligence (AI) in their activities.	5- point ratio scale (1- strongly disagree; 5- strongly agree)	Adapted from Lam & Law (2019); Nam et al. (2021)
	RA2	Digital technology solutions would improve the quality of the hotel's operations.	5- point ratio scale (1- strongly disagree; 5- strongly agree)	
	RA3	Digital technologies would enable hotels to perform operations quickly.	5- point ratio scale (1- strongly disagree; 5- strongly agree)	
	RA4	The hotel is trying to implement the Internet of Things (IoT) in its activities.	5- point ratio scale (1- strongly disagree; 5- strongly agree)	
	RA5	Digital technologies would give greater control over the hotel's operations	5- point ratio scale (1- strongly disagree; 5- strongly agree)	
Technological	TC1	Digital technologies would fit well with the way the hotel operates.	5- point ratio scale (1- strongly disagree; 5- strongly agree)	

compatibility	TC2	Digital technologies would fit into employees' working styles.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
	TC3	Digital technologies would be completely compatible with current hotel operations.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
Organizational readiness				
Perceived benefits	EMB1	Digital technologies have a positive effect on the development of new products.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	Adapted from: Anser et al. (2020); Ezzaouia et al. (2020)
	EMB2	The application of digital technologies makes easier hotel services access for users.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
	EMB3	Hotel employees accept digital technologies in carrying out business activities.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
Training programmes	TP1	Hotel employees are willing to educate themselves to acquire knowledge and skills related to digital technologies.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	Author's work
	TP2	Hotel managers and employees are continuously educated using modern methods and digital tools.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	

	TP3	The hotel cooperates with institutions regarding the provision of digital training for employees.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
Top management support	TS1	Top managers perceived the new trends of digital transformation.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	Adapted from Adapted from Molina-Castillo et al., (2023); Wang (2016)
	TS2	Top managers tend to create an internal digital platform for the control and development of the entire hotel system.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
Environmental readiness				
Market orientation	MO1	Digital technologies enable easier networking with partners.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	Adapted from Baker (2012); Ezzaouia et al. (2020)
	MO2	The partners of hotels are demanding the use of digital technologies in doing business with them.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
	MO3	The application of digital technologies helps to compete in the market.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	

	MO4	Digital transformation represents a competitive advantage in the tourist market	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
Consumer satisfaction impact (CS)	CS1	Implementing digital technology efforts creates better interaction with guests.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	Adapted from Acampora et al., (2022); Wang et al. (2016)
	CS2	Digital technologies in hotels significantly provide better service to guests.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
Digital technology adoption				
Strategic initiatives for digital technologies adoption	STR1	The existence of strategic initiatives affects digital applications in the hotel.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	Adapted from (Wynn & Jones, 2022; Zentner et al. (2022)
	STR2	Digital technologies create added value in the hotel business system.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	
	STR3	The continuous improvement of digital technologies in the hotel organization is valued.	5- point ratio scale (1-strongly disagree; 5-strongly agree)	

Source: Authors' work

The survey questionnaire, which was sent via e-mail to hotels, tried to get the opinions and attitudes of hotel managers at the top and middle management levels about the readiness to implement digital technologies in hotel organizations. The concept of the questions in the questionnaire itself includes a part that refers to sociodemographic and technical facts about the respondents, such as age, gender, workplace, location of the hotel where they work, and hotel category, while the second part of the questionnaire, which is also larger, is related to claims about the possibilities of implementing digital technologies in organizations concerning the technological, organizational, and environmental aspects of readiness. Table 1 presents the statements that sought to obtain the opinions of the interviewed hotel managers formed according to a Likert scale of 1 to 5 agreement with the statement in Google Forms. It collected 103 forms from respondents who expressed their degree of agreement with the statements made and thus gave their own opinions about the adoption of digital technologies in the hotel where managers are working. The answers obtained became the basis for this as well as future research that will be conducted.

The TOE framework (Technology-Organization-Environment) was used in the research, which aims to determine the readiness of hotel organizations with regard to the technological, organizational, and environmental aspects of hotel business. This framework can emphasize the factors that are important for the implementation of digital technologies in hotels concerning the different components of the hotel systems (Nikopoulou et al., 2023).

Table 2: Sociodemographic characteristics

Position	Frequency	%	Cumulative %
Hotel Manager, CEO	45	43.69	43.69
Sales Manager	15	14.56	58.25
Financial Manager, CFO	16	15.53	73.78
CIO	16	15.53	89.31
CTO	11	10.69	100
Σ	103	100	-
Hotel Categorization	Frequency	Percentage	Cumulative %
***	30	29.13	29.13
****	44	42.72	71.85
*****	29	28.15	100
Σ	103	100	-

Source: Authors' work

Table 2 presents the characteristics of the managers at different levels of management in hotel organizations according to employment position and categorization level of the hotel where they work. Among the examined managers, almost half of them are employed as hotel managers (CEOs), 16 managers each stated that they are financial or information managers, 15 of them work as sales managers and there are 11 technological managers in the sample. In five-star hotels, 29 of 103 examined managers work in this category. Most of the surveyed managers work in four-star hotels (42.72%) and 30 of all are employed in three-star hotels.

4.2. Methods of Analysis

In this research, statistical analyses of descriptive statistics, correlation, and structural equation modeling methods (SEM) were used. Data analysis using descriptive statistics provides an overview of the frequencies, mean values, and standard deviations of variables (Cooksey, 2020). Correlation was used to analyze the relationship between variables and their significance at the level of 5% (Senthilnathan, 2019). The method of structural equations is used in research because of the nature of the research, the design of the hypothesis, and to determine the relevance of the observed model (Hair et al., 2013). Also, a factor analysis (CFA) was performed to check the uniqueness of the latent variables and their ability to differentiate by testing their discriminant validity (Alhija, 2010). Cronbach alpha values are predicted to indicate the reliability of the data in the research (Taber, 2018).

SEM is a statistical method that allows researchers and studies to test and confirm or deny complex relationships between different variables. It is a really valuable method that is widely used in different spheres from social science and economics to other fields of science (Tarka, 2018). In order to verify the validity of the research, a confirmatory factor analysis (CFA) was conducted to substantiate the justification of conducting the research (Alhija, 2010). Latent variables in the model were verified using factor loadings and average variance extracted (AVE) for factors that were divided into technological, organizational, and environmental readiness of hotel organizations to implement digital technologies in the research. Analyzing the validity of the model, indicators of goodness of model fit were used, which are values such as the Chi-square index, non-normed fit index (NNFI), comparative fit index (CFI), root mean square error (RMSE), and standardized root mean square (SRMR). The method was implemented in JASP's software using R-code for the observed research model.

5. RESULTS

To obtain research results, the results of descriptive statistics analysis, correlation analysis with Spearman's coefficient, and structural equation modeling were presented. For

the conduction of the SEM analysis, CFA was performed in order to obtain information about the validity of the observed model. Furthermore, the existence of data reliability and normality of distribution in the observed sample of surveyed hotel managers were explained using Cronbach's alpha and Kolmogorov Smirnov Z test. Collinearity between the variables in the model was checked using the variance inflation factor (VIF).

5.1. Measurement Model

The descriptive statistics analysis values are given in Table 3. The average values of the observed variables are above 3, which implies that the hotel managers rated the statements given in the questionnaire with higher ratings. Coefficients of variation are below 30% except for a set of variables from the construct RA which are higher than 30%. Such values of the coefficient of variation for most variables indicate a high degree of data dispersion around the mean (Cookseyto, 2020). For testing the normality of the data, the Kolmogorov Smirnov Z test is used to provide an insight into whether the obtained data deviate significantly. The values of all variables are greater than the critical value of 0.141 at the level of 5% significance, which indicates the rejection of the null hypothesis that the data are normally distributed. In addition, Cronbach's alpha was measured in the research to determine consistency in the sample (Taber, 2018). The values of Cronbach's alpha are greater than 0.5, which reflects a high level of data reliability in the observed sample.

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Table 3 Descriptive Analysis

VARIABLE	N	AVERAGE	VAR.COEFF	ST.DEV	KOLMOGOROV SMIRNOV Z	CRONBACH ALPHA
RA1	103	3,116504854	42,02%	1,309420467	0,166344769	0,861
RA2	103	3,194174757	40,47%	1,292684814	0,141936624	
RA3	103	3,155339806	41,37%	1,305383041	0,147950267	
RA4	103	3,262135922	39,37%	1,284418686	0,153123020	
RA5	103	3,194174757	40,94%	1,307619585	0,149999127	
TC1	103	3,825242718	26,38%	1,008961635	0,206799116	0,874
TC2	103	3,844660194	27,31%	1,049801475	0,228435798	
TC3	103	3,40776699	37,57%	1,280449657	0,182192737	
EMB1	103	4,067961165	23,80%	0,968054158	0,248472334	0,925
EMB2	103	4,203883495	22,08%	0,928086279	0,288781921	
EMB3	103	3,883495146	25,95%	1,007746413	0,214399129	
TP1	103	3,902912621	25,87%	1,009802087	0,209699628	0,701
TP2	103	4,077669903	23,60%	0,962292170	0,247385275	
TS1	103	3,961165049	25,10%	0,994375738	0,219675401	0,939
TS2	103	3,45631068	37,56%	1,298069508	0,176153078	
TS3	103	3,961165049	25,10%	0,994375738	0,219675401	
MO1	103	4,106796117	22,23%	0,912827904	0,242674252	0,809
MO2	103	4,058252427	23,99%	0,973685249	0,239865877	
MO3	103	3,844660194	27,31%	1,049801475	0,228435798	
MO4	103	4,00000000	24,39%	0,97542622	0,234533668	
CS1	103	3,980582524	26,19%	1,04259369	0,232784727	0,973

CS2	103	4,058252427	23,99%	0,973685249	0,239865877	0,692
STR1	103	4,019417476	28,79%	1,157336937	0,260329829	
STR2	103	3,40776699	36,21%	1,234117689	0,178659842	
STR3	103	4,02374339	35.21%	1.110893572	0.256387291	

Source: Authors' work

For analyzing the correlation between the observed variables, Spearman's correlation coefficient analysis was performed to determine the direction and strength between the manifested variables. The results of the correlation analysis are given in Table 4 All values of the Spearman correlation coefficient are positive, which indicates a positive direction between the observed variables. The correlation coefficient values range mostly between 0.3 and 0.6, which present moderate correlation, except for the variables from constructs EMB and MO. Spearman's coefficients between these constructs have a weaker correlation with other variables.

Table 4 Correlation analysis

	RA	TC	EMB	TP	TS	MO	CS	STR
RA	1	0.642* *	0.549**	0.437**	0.448**	0.512* *	0.385* *	0.611* *
TC	0.642* *	1	0.439**	0.526**	0.439**	0.374	0.334* *	0.519* *
EMB	0.549* *	0.439* *	1	0.465** *	0.401**	0.309*	0.315	0.573* *
TP	0.437* *	0.526* *	0.465** *	1	0.459** *	0.277	0.293	0.484*
TS	0.448* *	0.439* *	0.401**	0.459** *	1	0.299* *	0.203*	0.446* *
MO	0.312* *	0.374	0.309*	0.277	0.299**	1	0.188	0.229
CS	0.385* *	0.334* *	0.315	0.293	0.203*	0.188	1	0.163*
STR	0.611* *	0.519* *	0.573**	0.484*	0.446**	0.229*	0.163*	1

Source: Authors' work

Table 5 shows t values, R Squared, and loadings of latent variables obtained by confirmatory factor analysis. All t values are greater than the 1.96 critical value for a

significance level of 5%, indicating data significance. All variables are significant at the level of 5%, except for two variables in the market orientation construct, MO2 and MO4. This explains the exclusion of the mentioned variables from further SEM analysis. All constructs had values lower than 5 which implies no evidence of multicollinearity among factors. The VIF value of MO is on the edge of 5 because two variables in that construct are not significant at the 5% level of significance.

Table 5 Factor loading estimates, t values, and average variance extracted values

Factor	Indicator	Estimate	t-value	p-value	R Squared	VIF	AVE
RA	RA1	1.079	7.329	.001	0.593	3.957	0.654
	RA2	1.089	7.765	.001	0.614		
	RA3	1.022	7.221	.001	0.574		
	RA4	1.103	7.911	.001	0.641		
	RA5	1.052	7.417	.001	0.606		
TC	TC1	1.026	5.553	.001	0.543	4.348	
	TC2	1.004	5.844	.001	0.582		
	TC3	1.360	6.404	.001	0.551		
EMB	EMB1	1.033	3.658	.001	0.439	4.026	0.698
	EMB2	0.866	3.704	.001	0.474		
	EMB3	1.319	4.525	.001	0.502		
TP	TP1	1.097	5.505	.001	0.384	3.724	

	TP2	0.980	5.602	.001	0.397		
TS	TS1	1.043	5.519	.001	0.556	3.029	
	TS2	1.379	5.770	.001	0.521		
	TS3	1.115	6.002	.007	0.533		
MO	MO1	1.038	6.264	.001	0.478	4.993	0.691*
	MO2	0.899	6.917	.093	0.403		
	MO3	0.933	6.732	.001	0.399		
	MO4	1.112	6.664	.428	0.375		
CS	CS1	1.076	3.229	.001	0.331	4.751	
	CS2	0.931	4.572	.001	0.302		

** after exclusion of MO2 and MO4*

Source: Authors' work

5.2. Structural Model

Confirmatory factor analysis (CFA) gave values of factor loadings greater than 0.4 and AVE values greater than 0.5. Exceeding the values of the corresponding thresholds for factor loadings and AVE implies the validity of the model in this research (Table 5). The SEM equation was generated using the R code method from the JASP's statistical software application, utilizing the lavaan model for data analysis. Table 6 represents the values of the research goodness of fit with a Chi-square of 210.871 and 104 degrees of freedom, hence it does not reject the null hypothesis at the 5% level of significance which indicates the association of variables in the model (Hu & Bentler, 1998). Comparative fit index (CFI) and Goodness of fit index (GFI) have values close to 1 which indicates a good fit. The NFI value is higher than 0.9, which reflects an acceptable fit (Hu & Bentler, 1998). Standardized

root mean square (SRMR) is an absolute measure of fit and value less than 0.08 is generally considered a good fit (Hu & Bentler, 1998). The satisfactory values of the SEM analysis indicators reflect the overall goodness of fit for the accepted model (Hair et al., 2013).

Table 6 Research model fit

Indicator	Estimation	Note
χ^2	210.871	χ^2 is significant
Df	104	
p-value	.001	
χ^2/df	2.047	Close to 2; Good fit
CFI	0.934	> 0.9; Acceptable fit
GFI	0.966	> 0.95; Good fit
NNFI	0.928	> 0.90; Acceptable fit
RMSEA	0.074	< 0.08; Acceptable fit
SRMR	0.067	< 0.08; Good fit

Source: Authors' work

The methods implemented in this research to analyze the attitudes of hotel managers toward digital technology adoption at management levels are optimal because they provide results that present the decisions of testing the hypotheses and the relationships between different groups of variables in the constructs. By analyzing descriptive statistics, Cronbach Alpha, Kolmogorov Smirnov Z test, an attempt is made to obtain a descriptive representation of the average and positional statistical values of the variables in the constructs, their degree of dispersion and normality of distribution, and the consistency of the respondents' attitudes in the questionnaire (Jajić et al. 2022). The Cronbach alpha values for the variables indicated reliability in the sample, while the values of the Kolmogorov Smirnov Z test were higher than the critical value for the observed number of interviewed managers, hence there is no assumption about the normality of the data. By processing the research data presented in Table 7 for SEM analysis, it is established that the data are suitable for conducting such an analysis and the results are favorable for the interpretation of the decision on the hypotheses (Hair et al., 2013).

Table 7: Path coefficients effects

Hypothesis	Path Coefficient	Standard error	t value	p value	Conclusion
Technological readiness					
H1a	0.135	0.028	0.130	0.001	accepted
H1b	0.591	0.238	0.240	0.001	accepted
Organizational readiness					
H2a	0.262	0.117	0.195	0.021	accepted
H2b	0.056	0.528	0.665	0.003	accepted
H2c	0.459	0.173	0.591	0.007	accepted
Environmental readiness					
H3a	0.641	0.263	0.872	0.206	rejected
H3b	0.379	0.183	0.156	0.554	rejected

Source: Authors' work

The results of the research (Table 7) present the acceptance of five of the seven hypotheses established in this research. Considering the coefficient of determination (R^2), there is a high degree of determination for the dependent variable of strategic implementation of digital technology (STR), and 84% of the total variability is explained in this model. The relationship between the independent variables RA and TC with the dependent variable STR is positive and moderately strong, which explains that the greater the relative advantages and technological compatibility, the greater the strategic activities for the implementation of digital technologies in the hotel industry. Hypothesis H1 (H1a and H1b) is accepted, according to which hotels contain technological readiness for the implementation of ICTs in the hotel organization. This confirms findings that the relative advantages of the technological aspect in the hotel enable the innovation of the system and the transition to smart solutions in business, which today greatly affect the efficiency of providing services to guests (Anser, Yousaf, Usman, et al., 2020b). Furthermore, the

comprehensiveness of the hotel's technological readiness for digital transformation is particularly influenced by system compatibility, which manifests itself as a basis for the technological ability of the infrastructure and employees for the possible implementation of digital technologies (Wynn & Jones, 2022b).

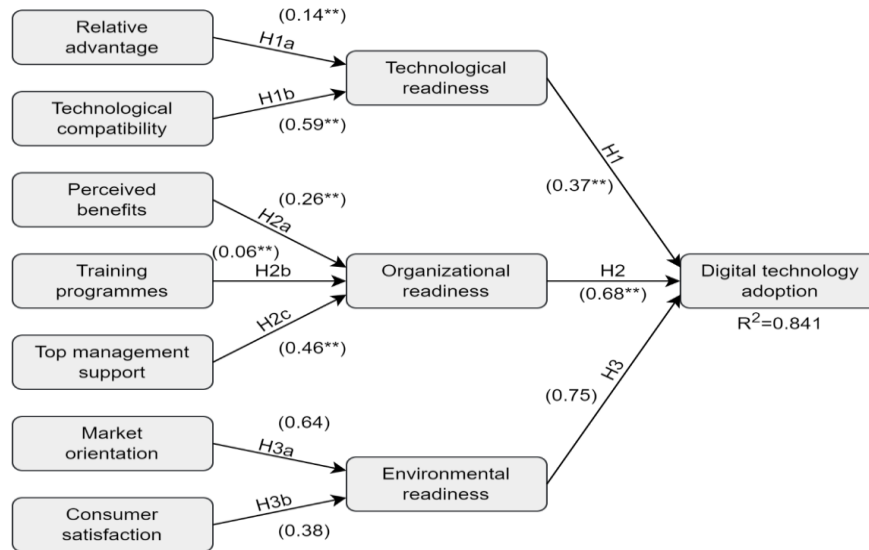


Figure 2. Results of SEM analysis

Hypothesis H2 (H2a, H2b, and H2c) about the hotel's organizational readiness to implement digital technologies related to EMB, TP, and TS was accepted. Further to the confirmation of hypothesis H2 related to organizational readiness, the findings from (Masoud & Basahel, 2023b) explain that the perceived benefits (especially internal) of the hotel organization strongly influence the climate in which business is conducted, which affects the willingness to make decisions in innovation. In addition, (Pascucci et al., 2023b) postulate that an attitude of hotel management that is supportive and open to the possibility of implementing digital technologies is important for employees and possibilities for making guests satisfied. (Ivanov et al., 2020; Nikopoulou et al., 2023) add that the productivity of work in the hotel is strongly and positively influenced by the continuous training of employees, especially in the form of coping with working with digital technology. There is a positive and moderate relationship between the variables of perceived benefit, management support, and employee training programmes with the variable of digital technology implementation strategies, and this explains that a better perception

of benefits, i.e. greater management efforts for support and training towards hotel employees is reflected in stronger strategic implementation activities of the management such technologies.

In Hypothesis H3 related to the aspect of the environment that affects the willingness to introduce digital technologies in hotels, the variable market orientation (MO) and the effect of consumer satisfaction (CS) are combined. The hypothesis H3 (H3a and H3b) is rejected in the research, which means that there is no influence of the hotel organization's environmental readiness on the adoption of digital technologies. The relationship between consumer satisfaction and the market orientation of the organization itself with the variable of implementation of digital technologies is also positive but with a weaker intensity compared to the organizational and technological aspect of readiness. Better market orientation and more satisfied guests certainly increase the potential tendency to implement digital technologies in hotels. By rejecting hypothesis H3, which refers to the hotel's environmental readiness for the implementation of digital technologies, findings that a good market position develops the possibility for digital transformation in hotel organizations were not confirmed (Wahab et al., 2022a). Also, this research does not confirm that one of the most important components of business in the hospitality sector, such as guest satisfaction, affects the hotel's readiness to implement digital technologies (Kim & Kim, 2022). However, the rejection of hypothesis H3 indicates a similarity with the author's findings (Baquero, 2023b) that the guest satisfaction factor is not among the most crucial for the implementation of digital technologies in the hotel industry.

6. CONCLUSION

In this research, a model of the potential implementation of digital technologies in hotel organizations was analyzed using the TOE (Technological-Organizational-Environmental) framework, which tried to show those variables that influence the readiness of hotel organizations for the possible adoption of digital technologies. The model was constructed that combines the three aspects of the hotel's readiness for the mentioned activities of applying technologies in its business system, namely technological, organizational, and environmental readiness for the application of digital technologies. A thorough review of the literature on the topic of the research was carried out, and based on the processing of the data of the surveyed managers at the top and middle levels of hotel management, the observed model was established for analyzing the readiness of the hotel for the implementation of digital technologies, and this model was also accepted. The research answered three research questions, where the first related to the discovery of technological

factors that would influence the hotel's readiness to implement digital technologies, while the second research question dealt with the influence of organizational factors, i.e. how the variables from the organizational aspect would affect the readiness to implement digital technologies technology. The third research question engaged with the influence of environmental variables of the hotel organization on digital technology adoption. To justify the research questions, research hypotheses were set to determine the factors that influence the adoption of digital technologies in the hotel industry. After the analysis of descriptive statistics and correlation using Spearman's coefficient, the testing of the set hypotheses was carried out using the analysis of structural equation modeling (SEM). According to the research results, the variables related to technological readiness RA and TC have a positive and moderately strong relationship with the variable digital technology implementation strategy, which indicates that better relative advantages and a higher level of technological compatibility would increase strategic initiatives for the implementation of digital technologies in hotel organizations. Also, from the organizational aspect of readiness, the variables EMB, TP, and TS have a positive and moderate connection with the implementation strategy of digital technologies, hence better perceptive benefits and the support of the hotel management itself, i.e. greater efforts to train employees, could lead to stronger strategic activities for the introduction of such technologies. Furthermore, the variables related to the environmental aspect of the hotel's readiness to implement digital technologies, namely CS and MO, have a positive, but still gentle connection with the implementation strategy of digital technologies. This certainly means that a better market orientation of the hotel and greater guest satisfaction would have a positive effect on strategic initiatives for the introduction of digital technologies in the hotel, but not at a strong intensity.

In this research, two of the three main hypotheses were confirmed at a significance level of 5%, using SEM analysis. About individual variables, that is, factors that are combined in three different contexts (technological, organizational, and environmental) of the hotel's readiness to implement digital technologies, five of seven auxiliary hypotheses were confirmed at a significance level of 5%. The first hypothesis H1, which refers to technological readiness and includes auxiliary hypotheses H1a and H1b, i.e. factors of relative advantages (RA) and technological compatibility (TC), is confirmed. This indicates the findings of the authors (Anser, Yousaf, Usman, et al., 2020b) that hotels strive to take advantage of the established relative advantages of the implementation of digital technologies to influence, first of all, the effectiveness of work and certainly the improvement of the quality of the business system as a whole, which raises the readiness of the hotel, and this is ultimately realized through the relevant strategic initiatives that the

management is considering. Furthermore, technological compatibility creates a basis for a more successful and painless adaptation to the potential application of digital technologies in hotel organizations (Wynn & Jones, 2022b). In this research, the second main hypothesis H2 (H2a, H2b, H2c) was accepted, which is related to the organizational aspect of the hotel's readiness, and includes the assumption that the effects of top support management (TS), employee training programs (TP) and internal perceived benefits (EMB) could influence the readiness of hotel organizations to implement digital technologies. In this way, this research builds on the finding that perceived benefits in the organization positively affect the climate that is created in the era of digital transformation, and as such establishes a good basis for a potential decision of the hotel management to implement digital technologies (Masoud & Basahel, 2023b). In addition, the support of hotel management towards managers and employees is one of the most crucial determinants that affect openness to change and improvement of the adaptation process when applying digital technologies in hotels (Ivanov et al., 2020; Nikopoulou et al., 2023). Also, the continuous training of hotel employees and managers related to newer technologies by the top management encourages and develops permanent strategic initiatives that aim to improve work productivity in the hotel business, and this certainly affects the readiness to implement digital technologies (Pascucci et al., 2023b).

Considering the hypothesis related to the environmental aspect of the hotel's readiness to implement digital technologies, the impact of which was measured by factors such as market orientation (MO) and consumer satisfaction (CS), the results showed that H3 (H3a and H3b) is rejected. Such a research result related to H3 did not confirm previous findings that a good market position develops the possibility for digital transformation in hotel organizations (Wahab et al., 2022b). Also, the results do not suggest that one of the most important factors in the hotel business, such as guest satisfaction, affects the hotel's readiness to implement digital technologies (Kim & Kim, 2022). However, the rejection of H3 can be related to the finding that the guest satisfaction factor is not among the most crucial for the implementation of digital technologies in the hotel industry (Baquero, 2023b).

6.1. Research Limitations and Future Recommendations

This research can provide good guidelines and recommendations for hotel organizations, which are the aspects or factors that could affect the readiness for the potential application of digital technologies in their business systems. The limitation of this research lies in the fact that it was based on a specific research framework, namely the TOE framework, which tried to unify three important aspects of the hotel business. It is recommended that the business aspects determined by the TOE framework be upgraded

with aspects such as sustainability or system security. Moreover, there is often a level of subjectivity when filling out questionnaires by hotel managers, especially with CEOs, hence certain indicators and variables regarding the degree of agreement with the statement do not seem realistic. The sample of 103 surveyed hotel managers is potentially not sufficient to give general conclusions about the readiness of hotel organizations to implement digital technologies. A recommendation for future research is a potential survey of the organization's employees at lower management levels, who are nevertheless the segment that would have the most contact with digital technologies and perform business tasks with the help of such technologies. However, this research aims to provide insight into the case for a specific industry in the hospitality sector and provide opportunities for further research. For future research, it would be useful to investigate which categories of hotels regarding the number of stars present a greater degree of readiness for implementation of digital technologies. This type of research can be applied to boutique hotels or themed hotels such as heritage hotels, hotels in rural areas, and green hotels, because of the hotel's focus on sustainable development, which can be more significant with digital transformation.

REFERENCES

- Acampora, A., Preziosi, M., Lucchetti, M. C., & Merli, R. (2022). The Role of Hotel Environmental Communication and Guests' Environmental Concern in Determining Guests' Behavioral Intentions. *Sustainability*, 14(18), Article 18. <https://doi.org/10.3390/su141811638>
- Anser, M. K., Yousaf, Z., Khan, M. A., Voo, X. H., Nassani, A. A., Alotaibi, S. M., Abro, M. M. Q., & Zaman, K. (2020). The impacts of COVID-19 measures on global environment and fertility rate: Double coincidence. *Air Quality, Atmosphere & Health*, 13(9), 1083–1092. <https://doi.org/10.1007/s11869-020-00865-z>
- Anser, M. K., Yousaf, Z., Usman, M., & Yousaf, S. (2020). Towards Strategic Business Performance of the Hospitality Sector: Nexus of ICT, E-Marketing and Organizational Readiness. *Sustainability*, 12(4), Article 4. <https://doi.org/10.3390/su12041346>
- Baker, J. (2011). The Technology–Organization–Environment Framework. In *Information Systems Theory* (pp. 231–245). https://doi.org/10.1007/978-1-4419-6108-2_12
- Baquero, A. (2023). Is Customer Satisfaction Achieved Only with Good Hotel Facilities? A Moderated Mediation Model. *Administrative Sciences*, 13(4), Article 4. <https://doi.org/10.3390/admsci13040108>
- Birkel, H., Hohenstein, N.-O., & Hähner, S. (2023). How have digital technologies facilitated supply chain resilience in the COVID-19 pandemic? An exploratory case study. *Computers & Industrial Engineering*, 183, 109538. <https://doi.org/10.1016/j.cie.2023.109538>
- Bonfanti, A., Vigolo, V., & Yfantidou, G. (2021). The impact of the Covid-19 pandemic on customer experience design: The hotel managers' perspective. *International Journal of Hospitality Management*, 94, 102871. <https://doi.org/10.1016/j.ijhm.2021.102871>
- Buhalis, D., & Moldavska, I. (2021). In-room Voice-Based AI Digital Assistants Transforming On-Site Hotel Services and Guests' Experiences. In W. Wörndl, C. Koo, & J. L. Stienmetz (Eds.), *Information and Communication Technologies in Tourism 2021* (pp. 30–44). Springer International Publishing. https://doi.org/10.1007/978-3-030-65785-7_3
- Buhalis, D., O'Connor, P., & Leung, R. (2022). Smart hospitality: From smart cities and smart tourism towards agile business ecosystems in networked destinations Smart hospitality. *International Journal of Contemporary Hospitality Management*. <https://doi.org/10.1108/IJCHM-04-2022-0497>
- Carneiro, T., Picoto, W. N., & Pinto, I. (2023). Big Data Analytics and Firm Performance in the Hotel Sector. *Tourism and Hospitality*, 4(2), Article 2. <https://doi.org/10.3390/tourhosp4020015>
- Chaidi, I., Drigas, A., & Karagiannidis, C. (2021). ICT in special education. *Technium Social Sciences Journal*, 23, 187–198. <https://doi.org/10.47577/tssj.v23i1.4277>

- Cheng, X., Xue, T., Yang, B., & Ma, B. (2023). A digital transformation approach in hospitality and tourism research. *International Journal of Contemporary Hospitality Management*, 35(8), 2944–2967. <https://doi.org/10.1108/IJCHM-06-2022-0679>
- Collado-Agudo, J., Herrero-Crespo, Á., & San Martín-Gutiérrez, H. (2023). The adoption of a smart destination model by tourism companies: An ecosystem approach. *Journal of Destination Marketing & Management*, 28, 100783. <https://doi.org/10.1016/j.jdmm.2023.100783>
- Cooksey, R. W. (2020). Descriptive Statistics for Summarising Data. Illustrating Statistical Procedures: Finding Meaning in Quantitative Data, 61–139. https://doi.org/10.1007/978-981-15-2537-7_5
- Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: Empirical analysis building on the TOE framework. *Computers in Industry*, 109, 1–13. <https://doi.org/10.1016/j.compind.2019.03.007>
- Cui, L., Wu, H., Wu, L., Kumar, A., & Tan, K. H. (2023). Investigating the relationship between digital technologies, supply chain integration, and firm resilience in the context of COVID-19. *Annals of Operations Research*, 327(2), 825–853. <https://doi.org/10.1007/s10479-022-04735-y>
- Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluoto, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., & Wang, Y. (2021). Setting the future of digital and social media marketing research: Perspectives and research propositions. *International Journal of Information Management*, 59, 102168. <https://doi.org/10.1016/j.ijinfomgt.2020.102168>
- Eze, S., Chinedu-Eze, V., Bello, A., Inegbedion, H., Nwanji, T., & Asamu, F. (2019). Mobile marketing technology adoption in service SMEs: A multi-perspective framework. *Journal of Science and Technology Policy Management*, 10. <https://doi.org/10.1108/JSTPM-11-2018-0105>
- Ezzaouia, I., & Bulchand-Gidumal, J. (2020). Factors influencing the adoption of information technology in the hotel industry. An analysis in a developing country. *Tourism Management Perspectives*, 34, 100675. <https://doi.org/10.1016/j.tmp.2020.100675>
- Faqih, M. (2019). THE INFLUENCE OF PERCEIVED USEFULNESS, SOCIAL INFLUENCE, INTERNET SELF-EFFICACY AND COMPATIBILITY ON USERS' INTENTIONS TO ADOPT E-LEARNING: INVESTIGATING THE MODERATING EFFECTS OF CULTURE. *IJAEDU- International E-Journal of Advances in Education*, 5, 300–320. <https://doi.org/10.18768/ijaedu.593878>
- Garbin Praničević, D., & Mandić, A. (2020). ICTs in the hospitality industry: An importance-performance analysis among small family-owned hotels. *Tourism*, 68, 221–234. <https://doi.org/10.37741/t.68.2.9>

- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning*, 46(1–2), 1–12. <https://doi.org/10.1016/j.lrp.2013.01.001>
- Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424–453. <https://doi.org/10.1037/1082-989X.3.4.424>
- Infante-Moro, A., Infante-Moro, J. C., & Gallardo-Pérez, J. (2021). Key Factors in the Implementation of the Internet of Things in the Hotel Sector. *Applied Sciences*, 11(7), Article 7. <https://doi.org/10.3390/app11072924>
- Ivanov, S., Seyitoğlu, F., & Markova, M. (2020). Hotel managers' perceptions towards the use of robots: A mixed-methods approach. *Information Technology & Tourism*, 22(4), 505–535. <https://doi.org/10.1007/s40558-020-00187-x>
- Jaganathan, M., Ahmad, S., Ishak, K., Mohd Nafi, S. N., & Uthamaputhran, L. (2018). Determinants for ICT adoption and problems: Evidence from rural based small and medium enterprises in Malaysia. *International Journal of Entrepreneurship*, 22.
- Jajić, I., Spremić, M., & Miloloža, I. (2022). Behavioural Intention Determinants of Augmented Reality Technology Adoption in Supermarkets/Hypermarkets. *International Journal of E-Services & Mobile Applications*, 14(1), 1–22. <https://doi.org/10.4018/IJESMA.289632>
- Jaremen, D. E. (2016). Advantages from ICTS usage in hotel industry. *Czech Journal of Social Sciences, Business and Economics*, 5, 6–17. <https://doi.org/10.24984/cjssbe.2016.5.3.1>
- Khan, M. Y. H., & Hossain, A. (2018). The Effect Of Ict Application On The Tourism And Hospitality Industries In London. <https://essuir.sumdu.edu.ua/handle/123456789/71670>
- Kim, J. J., Lee, M. J., & Han, H. (2020). Smart Hotels and Sustainable Consumer Behavior: Testing the Effect of Perceived Performance, Attitude, and Technology Readiness on Word-of-Mouth. *International Journal of Environmental Research and Public Health*, 17(20), 7455. <https://doi.org/10.3390/ijerph17207455>
- Kim, Y.-J., & Kim, H.-S. (2022). The Impact of Hotel Customer Experience on Customer Satisfaction through Online Reviews. *Sustainability*, 14(2), Article 2. <https://doi.org/10.3390/su14020848>
- Kiş, N. (2019). A Strategic Approach to Sustainable Tourism Development Using the A'WOT Hybrid Method: A Case Study of Zonguldak, Türkiye. *Sustainability*, 11(4), Article 4. <https://doi.org/10.3390/su11040964>
- Kljajic-Dervic, M., & Dervic, S. (2017). Successful Leadership and Motivation Lead to Employee Satisfaction. *MIC 2017: Managing the Global Economy; Proceedings of the Joint International Conference, Monastier Di Treviso, Italy, 24–27 May 2017*, 569–580.

- Koo, C., Mendes-Filho, L., & Buhalis, D. (2019). Smart tourism and competitive advantage for stakeholders. *Tourism Review*, 74, 1–5. <https://doi.org/10.1108/TR-02-2019-208>
- Lam, C., & Law, R. (2019). Readiness of upscale and luxury-branded hotels for digital transformation. *International Journal of Hospitality Management*, 79, 60–69. <https://doi.org/10.1016/j.ijhm.2018.12.015>
- Leung, D., Lo, A., Fong, L., & Law, R. (2015). Applying the Technology-Organization-Environment framework to explore ICT initial and continued adoption: An exploratory study of an independent hotel in Hong Kong. *Tourism Recreation Research*, 40, 1–16. <https://doi.org/10.1080/02508281.2015.1090152>
- Leung, X. Y., Lyu, J., & Bai, B. (2020). A fad or the future? Examining the effectiveness of virtual reality advertising in the hotel industry. *International Journal of Hospitality Management*, 88, 102391. <https://doi.org/10.1016/j.ijhm.2019.102391>
- Marušić, Z., Aleksić, A., Pejić Bach, M., Omazić, M. A., & Zoroja, J. (2019). Determinants of Innovation in Hotel and Travel Agency Service Industry: Impact of Information and Communication Technologies and Enterprise Readiness. *Interdisciplinary Description of Complex Systems : INDECS*, 17(1-B), 209–225. <https://doi.org/10.7906/indecs.17.1.19>
- Masoud, R., & Basahel, S. (2023). The Effects of Digital Transformation on Firm Performance: The Role of Customer Experience and IT Innovation. *Digital*, 3(2), Article 2. <https://doi.org/10.3390/digital3020008>
- Mihalic, T., & Buhalis, D. (2013). ICT as a new competitive advantage factor – case of small transitional hotel sector. *Economic and Business Review*, 15, 33–56. <https://doi.org/10.15458/2335-4216.1183>
- Mndzebele, N. (2013). The Effects of Relative Advantage, Compatibility and Complexity in the Adoption of EC in the Hotel Industry. *International Journal of Computer and Communication Engineering*, 2, 473–476. <https://doi.org/10.7763/IJCCE.2013.V2.229>
- Molina-Castillo, F.-J., Meroño-Cerdán, A.-L., Lopez-Nicolas, C., & Fernandez-Espinar, L. (2023). Innovation and Technology in Hospitality Sector: Outcome and Performance. *Businesses*, 3(1), Article 1. <https://doi.org/10.3390/businesses3010014>
- Nam, K., Dutt, C. S., Chathoth, P., Daghfous, A., & Khan, M. S. (2021). The adoption of artificial intelligence and robotics in the hotel industry: Prospects and challenges. *Electronic Markets*, 31(3), 553–574. <https://doi.org/10.1007/s12525-020-00442-3>
- Nguyen, T. H., Le, X. C., & Vu, T. H. L. (2022). An Extended Technology-Organization-Environment (TOE) Framework for Online Retailing Utilization in Digital Transformation: Empirical Evidence from Vietnam. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(4), Article 4. <https://doi.org/10.3390/joitmc8040200>
- Nikopoulou, M., Kourouthanassis, P., Chasapi, G., Pateli, A., & Mylonas, N. (2023). Determinants of Digital Transformation in the Hospitality Industry: Technological,

- Organizational, and Environmental Drivers. *Sustainability*, 15(3), Article 3. <https://doi.org/10.3390/su15032736>
- Orsini, K. (2018). Croatia's Tourism Industry: Beyond the Sun and Sea. <https://doi.org/10.2765/380567>
- Pascucci, F., Savelli, E., & Gistri, G. (2023). How digital technologies reshape marketing: Evidence from a qualitative investigation. *Italian Journal of Marketing*, 2023(1), 27–58. <https://doi.org/10.1007/s43039-023-00063-6>
- Pech, M., & Vrchota, J. (2022). The Product Customization Process in Relation to Industry 4.0 and Digitalization. *Processes*, 10(3), Article 3. <https://doi.org/10.3390/pr10030539>
- Rita, P., Oliveira, T., Estorninho, A., & Moro, S. (2018). Mobile services adoption in a hospitality consumer context. *International Journal of Culture, Tourism and Hospitality Research*, 12, 00–00. <https://doi.org/10.1108/IJCTHR-04-2017-0041>
- Rodríguez-Sánchez, J.-L., González-Torres, T., Montero-Navarro, A., & Gallego-Losada, R. (2020). Investing Time and Resources for Work–Life Balance: The Effect on Talent Retention. *International Journal of Environmental Research and Public Health*, 17(6), 1920. <https://doi.org/10.3390/ijerph17061920>
- Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, 47(9), 1554–1567. <https://doi.org/10.1016/j.respol.2018.08.011>
- Shahadat, M. M. H., Nekmahmud, Md., Ebrahimi, P., & Fekete-Farkas, M. (2023). Digital Technology Adoption in SMEs: What Technological, Environmental and Organizational Factors Influence in Emerging Countries? *Global Business Review*, 09721509221137199. <https://doi.org/10.1177/09721509221137199>
- Spremić, M. (2017). Digitalna transformacija poslovanja. <https://www.bib.irb.hr/934725>
- Swamy, L. N. (2020). The Digital Economy: New Business Models and Key Features. *International Journal of Research in Engineering, Science and Management*, 3(7), Article 7.
- Taber, K. S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tarka, P. (2018). An overview of structural equation modeling: Its beginnings, historical development, usefulness and controversies in the social sciences. *Quality & Quantity*, 52(1), 313–354. <https://doi.org/10.1007/s11135-017-0469-8>
- Troisi, O., Visvizi, A., & Grimaldi, M. (2023). Digitalizing business models in hospitality ecosystems: Toward data-driven innovation. *European Journal of Innovation Management*, 26(7), 242–277. <https://doi.org/10.1108/EJIM-09-2022-0540>

- Vagnani, G., & Volpe, L. (2017). Innovation attributes and managers' decisions about the adoption of innovations in organizations: A meta-analytical review. *International Journal of Innovation Studies*, 1(2), 107–133. <https://doi.org/10.1016/j.ijis.2017.10.001>
- Vo, N., Hung, V. V., Tučková, Z., Pham, N. T., & Nguyen, L. (2021). Guest Online Review: An Extraordinary Focus on Hotel Users' Satisfaction, Engagement, and Loyalty. *Journal of Quality Assurance in Hospitality & Tourism*, 23, 1–32. <https://doi.org/10.1080/1528008X.2021.1920550>
- Wahab, H., Rady, A., & Hussien, H. (2022). The Impact of Information and Communication Technologies (ICTs) on Enhancing Performance in Hurghada Travel Agencies and Hotels.
- Wang, Y.-S., Li, H.-T., Li, C.-R., & Zhang, D.-Z. (2016). Factors affecting hotels' adoption of mobile reservation systems: A technology-organization-environment framework. *Tourism Management*, 53, 163–172. <https://doi.org/10.1016/j.tourman.2015.09.021>
- Waqanimaravu, M., & Arasanmi, C. (2020). Employee training and service quality in the hospitality industry. *Journal of Foodservice Business Research*, 23, 1–12. <https://doi.org/10.1080/15378020.2020.1724850>
- Wynn, M., & Jones, P. (2022). IT Strategy in the Hotel Industry in the Digital Era. *Sustainability*, 14(17), Article 17. <https://doi.org/10.3390/su141710705>
- Xu, X. (2019). Examining the Relevance of Online Customer Textual Reviews on Hotels' Product and Service Attributes. *Journal of Hospitality & Tourism Research*, 43(1), 141–163. <https://doi.org/10.1177/1096348018764573>
- Zentner, H., Spremić, M., & Zentner, R. (2022). Effect of Management's Competencies and Digital Skills on Digital Business Model Maturity for SMEs. *Interdisciplinary Description of Complex Systems: INDECS*, 20(5), 514–532. <https://doi.org/10.7906/indecs.20.5.2>
- Zhu, J., Wang, Y., & Cheng, M. (2021). Digital Transformation in the Hospitality Industry.

E-Democracy for Smart Cities in Bangladesh: A New Chapter and a New Path

Md. Hasan Ali¹, Md. Shurhab Ali², Md. Jahidul Islam³

Abstract

Introduction: Smart Bangladesh is a master plan and a successful technology-based system. Hence, a vibrant e-democracy is essential for a well-functioning smart city in Bangladesh. The theoretical basis of “e-democracy for smart cities” is presented in this article.

Aim: The four pillars are defined as the goals, objectives, and concrete roadmap for the implementation of Smart Bangladesh. These are Smart Citizens, Smart Economy, Smart Government, and Smart Society, which will be implemented by the 2041 Program Action Plan. If these four sectors of the country can be fully developed as technology-based smart sectors, nothing will be left to transform into a smart Bangladesh. It will be a massive campaign that requires adequate investment and the recruitment of appropriate manpower, as well as setting specific goals and reaching those goals with a proper and realistic roadmap.

Methody: This paper has studied in detail the relationship between smart cities and e-democracy. Basic democratic principles are also stated, and then the culture of democracy as it has evolved over the centuries is studied. Apart from discussing the present country's constitutional provisions and ancient Greek models of democracy, democracy in the subcontinental panchayat system is also studied in the paper. Along with that, the advantages and disadvantages of democracy have been discussed.

Results: E-democracy defining e-democracy models are investigated, and e-democracy typology as well as five models of e-democracy are hypothesized.

Originality and value: The paper concludes with an overview of e-democracy in large urban agglomerations, enumerating the various tools used in e-democracy.

Key Words: E-Democracy, Smart Cities, Artificial Intelligence, Smart Bangladesh.

Jel Codes : G00, G21

1. INTRODUCTION

Smart city refers to an urbanization where modern technologies are used to provide better human-friendly services to citizens while ensuring maximum utilization of a city's resources while ensuring minimum environmental impact.

But a 2019 United Nations special report on freedom of expression said governments often justified its use on the grounds of national security and public order. But it's

¹ Mphil, Islamic University, Theology and Islamic Studies, Al-Quran, Kusthia, Bangladesh

² Honors, University of Dhaka, Social Science, Political Science, Dhaka, Bangladesh

³ Honors, National University, Science, Mathematics, Dhaka, Bangladesh

unreasonable and arbitrary application will undermine citizens' freedom of expression. Therefore, there is a need for a legal system of independent and strong judicial approval to determine justification in matters of national security and public order. It should be only for national needs and not in the interest of any government or any ruling group.

In continuation of the successful implementation of Digital Bangladesh Vision 2022, the government is now working to build an innovative and knowledge-based economy called Smart Bangladesh by 2041 with a state-of-the-art power grid, a green economy, skill development, recognition of freelancing professions, and urban development. In which it is said that a specific canvas must be created for changing the mindset in building smart Bangladesh and coordination between everyone's actions. To create people who are science-minded, technology-friendly, used to using technology, and skilled in technology innovation, they should be humane and creative. But e-democracy advocates a model of the Internet in which online speech is censored at will by the state, citing reasons such as national security and social harmony as justifications for this move.

2. LITERATURE REVIEW

'Sabar Dhaka App' has been developed to build a smart city, through which 1 lakh, 28 thousand, and 767 complaints made by citizens on various issues have been resolved. DNCC has installed 48,000 smart lights that can be controlled from mobile phones. Electricity is being saved by controlling the light of these lights as per requirements. Online tax collection has started. 1 lakh and 28 thousand houses have been brought under the scope of the survey through drones. Digital car parking is being arranged at 2,350 locations through the biometric attendance of city corporation officials, an online trade license, and IoT. All civil service activities are being modernized gradually. Through 333, it is now possible to solve the complaint immediately.

A Research and Innovation Center for Science and Engineering has already been set up at BUET to research various technologies of the fourth industrial revolution. Initiatives have been taken to use IoT devices for smart agriculture as one of the components of smart villages to develop technologies useful in agriculture, power, and other sectors for the development of remote villages in the country.

Smart Bangladesh in 2041 will be a cost-effective, sustainable, intellectual, knowledge-based, and innovative Bangladesh. Thoughtful opinions, advice, and recommendations from stakeholders will guide us in the future. How much security will these four technologies give us in ensuring smart healthcare, smart transportation, smart utilities, urban administration, public safety, agriculture, internet connectivity, disaster management for implementing smart cities and smart villages, artificial intelligence, robotics, microchip design and manufacturing, and cyber security? A big question about that certainly remains. There are many debates going on around the world about the use of AI. The emphasis is placed on ensuring legal frameworks or regulations in a democratic world to ensure the use of technology for human welfare and to prevent its

misuse for harm or ill-being. This technology is already being used in different ways in developed, developing, and underdeveloped countries. And due to the difference between good and bad, the issues of ensuring a legal framework and accountability also arise on an urgent basis. At least 75 countries in the world are using AI surveillance technology, of which 56 countries are doing it through smart city platforms, 64 countries are using facial recognition systems, and 52 countries are using smart policing. (Carnegie 2019). China has entered into AI technology supply agreements with 36 countries participating in the Belt and Road Initiative (BRI). But not only China, but the United States, Japan, France, Germany, and Israel are also very active in providing this technology. But this technology is being used for surveillance everywhere, from liberal democracies to authoritarian countries; its misuse is happening in non-democratic authoritarian countries. (Carnegie 2019) Zimbabwe's government has used AI technology to make mobile phone SIM registration mandatory in a surveillance system that began during Robert Mugabe's 37-year rule. (Privacy International)

Increased surveillance of electronic communications. The country's mobile network, from 2G to 4G, was added in 2020 as part of the Smart Sustainable Cities project. China's Hikvision is providing surveillance camera network deployment and facial recognition technology. Hong Kong is an example of how the use of such technology without ensuring the necessary protection of personal information can pose a threat to civil liberties. During the pro-democracy movement in Hong Kong, the agitators therefore resorted to covering their faces by tying umbrellas or handkerchiefs to hide their identities. The smart lampposts there were for city traffic control signaling and air quality monitoring. But protesters realized it had surveillance cameras. With the help of this technology, access to many government institutions and services is controlled. Authorities there have used surveillance technology as a tool to suppress Uyghurs. China has developed the Integrated Joint Operations Platform (IJOP), which combines CCTV footage, facial recognition devices, and Wi-Fi surveillance. As a result, a model of smart policing is being created. (Human Rights Watch)

Authoritarian governments are misusing AI technology for surveillance to establish tight control over citizens. Although state surveillance is not inherently illegal, governments are using it as a digital tool to suppress freedom of expression and association in order to curtail individual freedoms for the purpose of political repression, with Bangladesh as one example (UN Human Rights Agency). The need for technology cannot be denied. But goals and objectives need to be clear. It is very important to understand the appearance of a smart country in the examples of smart police and smart cities without citizens' consent-based governance, democratic norms, and rule of law.

2.1. Digital Security Laws

The total number of digital security laws across the country until January 31, 2023, is 7001(National Parliament). An average of three cases are being filed every day under this law. The number of cases this year is 60 percent higher than last year (Police

Headquarters). People of various classes, professions, and ages, including children, have been arrested this year for posting 'offensive' posts, sharing posts, drawing cartoons or caricatures, communicating via email, and chatting among themselves on social media. Among those arrested are 38 journalists.

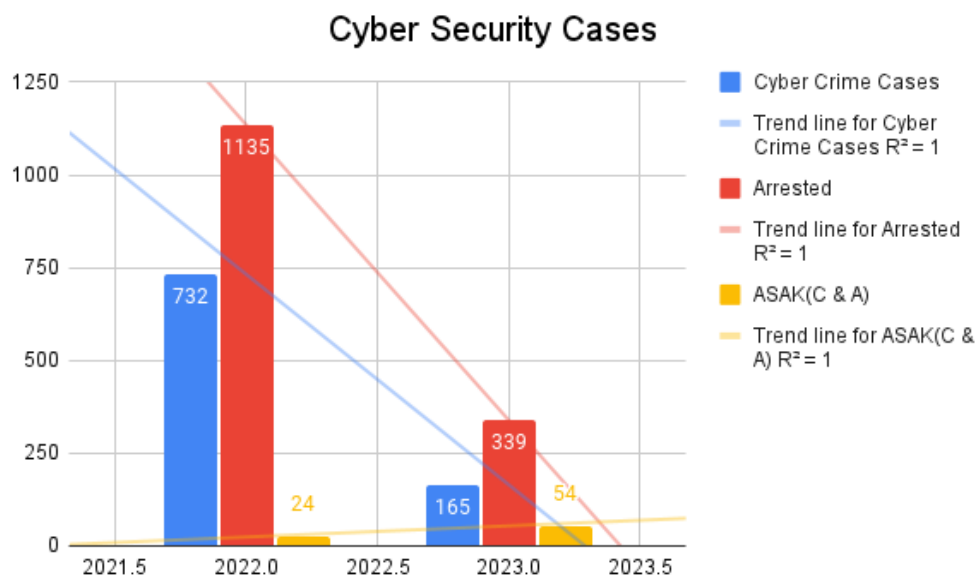


Figure 1. Cyber Security Cases

Figure 1. Alleged cybercrime. Last year, 1135 people were arrested in 732 cases under this law. In the first two months of this year, 339 people have been arrested in 165 cases. The Law and Arbitration Center (ACCA) maintains case statistics based on news published in 10 newspapers. Last year, the human rights organization collected information on 24 cases. In the first six months of this year, this number stood at 54.

Rashtrachinta wrote on his Facebook wall, "I want to call a thief a thief, a vote thief a vote thief, a robber a robber, a murderer a murderer, and a corrupt person a corrupt person." Repeal the Digital Security Act.'

After reviewing 50 cases, it was found that in the first six months of this year, six cases were filed against the Father of the Nation, the President, and the Prime Minister. Apart from this, 32 cases have been filed under the Digital Security Act for insulting the judge, forgery, and the allegations of obscenity and blasphemy with the lover's picture. The rest are cases under sections 25, 26, 29, and 31. The main purpose of this law is to harass people. When allegations of theft of relief are made, instead of taking action against the thief, the person who is talking about the theft is caught. None of the cases in this section are used to protect women (lawyer Jyotirmoy Barua).

2.2. Flawed E-Democracies

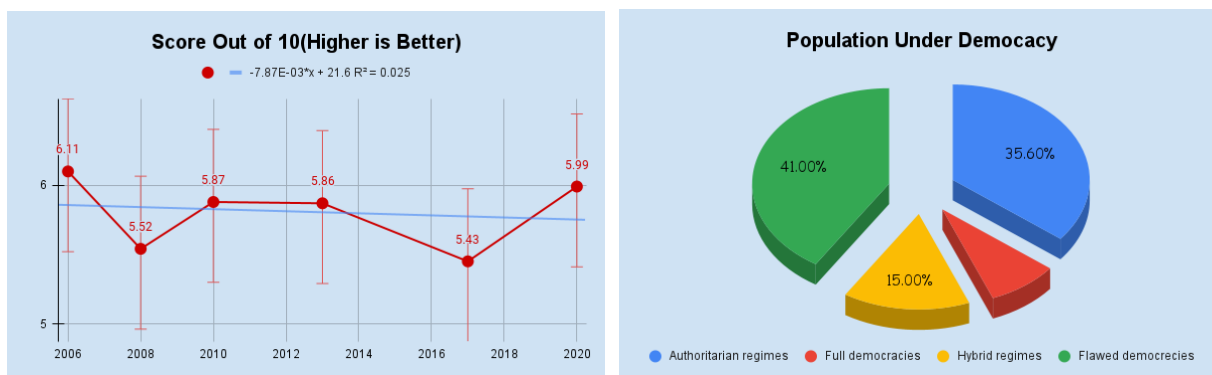


Figure 2. Majority people live in flawed democracies.

According to the Democracy Index report, only about half (49.4%) of the world's population lives in a democracy of some sort in 75 countries. Only 8.4% of the world's population lives in 23 countries defined as having full democracy. More than one-third (35.6%) of the global population lives under authoritarian rule, with a large share being in China. And 15% of the world's population lives in hybrid regimes—35 countries, including Bangladesh(ADI).

3. RESEARCH METHODOLOGY

This research method uses a computer or digital system. Identifies public safety challenges and opportunities for e-democracy transformation in data analytics and smart city building. A fuzzy estimation system in digital software creates a smart city forecasting tool that considers governance and e-democratic management. An e-democratic smart city transformation framework has been developed using modern technology.

3.1. Research Hypothesis

There are four pillars to building a smart Bangladesh: smart citizens, smart economies, smart governments, and smart societies. Every employee will be smart. Everyone will learn to do everything online; the economy will be an e-economy, where the entire money management will be done on digital devices.

'Education, health, and employability' will all be through e-governance. Digital devices will be used in everything, including e-education and e-health. By 2041, we will be able to do that. But in the case of e-democracy, the sound of smart cities and smart societies has arisen due to the advancement of technology. These adjectives are prevalent, especially in the question of using artificial intelligence (AI) in various fields of public life, the state, and society. There is little dispute that opposition to the

advancement of technology is suicidal. The debate is only on the implementation of the e-democratic process.

3.2. Explanation of The Research

Due to the lack of an e-democratic system, almost two-thirds of the people in the country are forced to skip one meal. If not for the lack of accountability, the disparity would not have been evident in this way. Before raising other questions about smart states, one must think about the rights of e-democracies, ensuring public safety, and food security. If not, many questions will remain about smart cities and smart Bangladesh.

On the one hand, as the proliferation of technology grows exponentially and its relationship with democracy grows, now is the real time to enact regulatory laws on digital democracy. The items are as follows:

3.3. Analysis

3.3.1. Vision 2041

The smart Bangladesh concept will not make sense if only technology is integrated with citizen services. E-democracy means transparency and accountability in education, health, freedom of speech, democracy, rule of law, freedom of voting, independent judiciary, etc. As can be seen in the figure, Bangladesh continues to spend 2 percent of GDP annually instead of 6 percent on the education sector instead of following the guidelines of UNESCO in implementing Vision 2041. Even at this low cost of education, there are various discriminatory practices. Bangladesh's expenditure on the health sector is 1 percent of GDP. In developed countries, it is 6–7 percent.

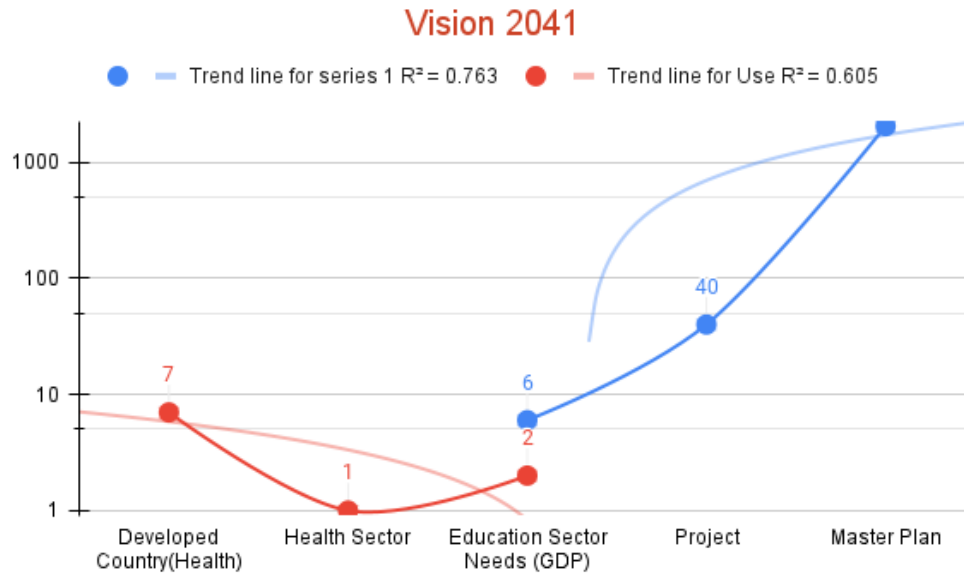


Figure 3. Vision 2041

3.3.2. Validity of the Research

Sustainable development in any state is not possible without ensuring freedom of speech and the press. It is well known that freedom of expression is essential to the creation of new knowledge. On the other hand, it is natural that the newspaper will discuss and criticize various inconsistencies occurring at the public-private level. According to the constitution Bangladesh is a democratic state in Bangladesh where the people will choose the leader according to their opinion, philosophy and choice, the government will decide. These issues are currently severely lacking in Bangladesh. Amartya Sen, in his book 'Poverty and Famine', has given an example of how a lack of democracy and rule of law can devastate a country, and there he has identified the weakness of the distribution system rather than lack of production as the cause of the famine in Bangladesh in 1974. At the root of this distributive problem was a lack of rule of law and pseudo-democracy.

3.3.3. Results

Demographic characteristics of the respondent include age, sex, education, employment status, place of residence, academic background, education, and occupation

of the household head. This information has a significant impact on the results of the study when it affects the process of social learning as an active member of the family and society. The results of the survey show that the majority of respondents are male, and female respondents constitute 40 percent of the total respondents. The female population is about half of the total population of Bangladesh, and the study also expected the response to be 50-50. However, the study found that in smart cities in e-democracies, three times more people suffer from insecurity as well as deprivation of civil rights.

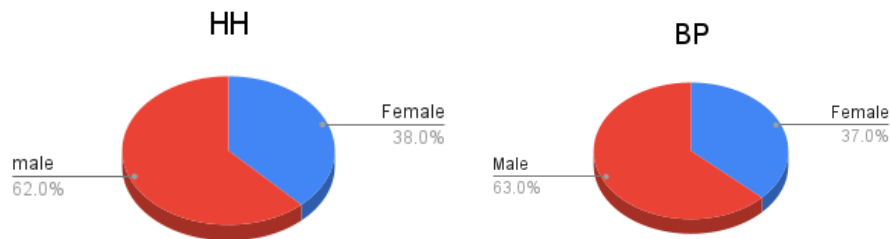


Figure 4. Questionnaire respondents by gender

4. CONCLUSION

One of the main challenges in building a smart Bangladesh is ensuring the independence of the judiciary. Although the judicial system of the country is independent on paper, there has been evidence of the influence of political parties on it at various times. With the development of e-courts in Smart Bangladesh, it is ensured that citizens get the right to fair and just justice. Only then will e-democracy come back to public safety. It will be a big challenge to implement the dream that the government has started to see to create a smart Bangladesh, but it will be a lot easier. It is very difficult to implement a modern, timely universal citizenship scheme in a country with a 'divide and rule' system of governance. We are all keen to see how the government implements e-democracy to deliver a smart state for all, beyond the political perspective.

REFERENCES

Nunes, S.A.; Ferreira, F.A.; Govindan, K.; Pereira, L.F. Cities go smart! A system dynamics-based approach to smart city conceptualization. *J. Clean. Prod.* 2021, 313, 127683.

- Lu, H.-P.; Chen, C.-S.; Yu, H. Technology roadmap for building a smart city: An exploring study on methodology. *Futur. Gener. Comput. Syst.* 2019, 97, 727–742.
- Lee, J.; Lee, H. Developing and validating a citizen-centric typology for smart city services. *Gov. Inf. Q.* 2014, 31, S93–S105.
- Bertot, J.; Estevez, E.; Janowski, T. Universal and contextualized public services: Digital public service innovation framework. *Gov. Inf. Q.* 2016, 33, 211–222.
- Zhou, W.; Jia, Y.; Peng, A.; Zhang, Y.; Liu, P. The effect of iot new features on security and privacy: New threats, existing solutions, and challenges yet to be solved. *IEEE Internet Things J.* 2018, 6, 1606–1616.
- Nasution, L. (2020). Hak kebebasan berpendapat dan berekspresi dalam ruang publik di era digital. Adalah: Buletin Hukum Dan Keadilan. 4, 37–48.
- Natale, S., and Ballatore, A. (2014). The web will kill them all: new media, digital utopia, and political struggle in the Italian 5-star movement. *Media, Culture Society.* 36, 105–121.
- Pavan, E., and Felicetti, A. (2019). Digital media and knowledge production within social movements: insights from the transition movement in Italy. *Social Media Society.* 5, 4.
- Reiter, F., and Matthes, J. (2021). Correctives of the mainstream media? A panel study on mainstream media use, alternative digital media use, and the erosion of political interest as well as political knowledge. *Digital J.* 0, 1–20.
- Siagian, M., and Yuliarti, M. S. (2021). Papua's Internet ban 2020: politics, information democracy, and digital literacy. *Jurnal Komunikasi.* 37, 304–316.
- Wan, J.; Chen, M.; Xia, F.; Li, D.; Zhou, K. From Machine-to-Machine Communications towards Cyber-Physical Systems. *Comput. Sci. Inf. Syst.* 2013, 10, 1105–1128.
- Gubbi, J.; Buyya, R.; Marusic, S.; Palaniswami, M. Internet of Things (IoT): A vision, architectural elements, and future directions. *Future Gener. Comput. Syst.* 2013, 29, 1645–1660.
- Al Ridhawi, I.; Otoum, S.; Aloqaily, M.; Jararweh, Y.; Baker, T. Providing secure and reliable communication for next generation networks in smart cities. *Sustain. Cities Soc.* 2020, 56, 102080.
- Li, S.; Da Xu, L.; Zhao, S. 5G Internet of Things: A survey. *J. Ind. Inf. Integr.* 2018, 10, 1–9.
- Smith, A., and Martín, P. P. (2021). Going beyond the smart city? Implementing technopolitical platforms for urban democracy in Madrid and Barcelona. *J. Urban Technol.* 28, 311–330.

- Storer, H. L., and Rodriguez, M. (2020). #Mapping a movement: social media, feminist hashtags, and movement building in the digital age. *J. Community Pract.* 28, 160–176.
- Sundberg, L. (2019). Electronic government: towards e-democracy or democracy at risk? *Saf. Sci.* 118, 22–32.
- Treré, E. (2015). Reclaiming, proclaiming, and maintaining collective identity in the YoSoy132 movement in Mexico: an examination of digital frontstage and backstage activism through social media and instant messaging platforms. *Inf. Commun. Soc.* 18, 901–915.
- Vaccari, C., and Valeriani, A. (2018). Digital political talk and political participation: comparing established and third wave democracies. *SAGE Open.* 8, 2.
- Vittori, D. (2020). Membership and members' participation in new digital parties: bring back the people? *Comparat. Eur. Polit.* 18, 609–629.
- Vlachokyriakos, V., Dunphy, P., Taylor, N., Comber, R., and Olivier, P. (2014). BallotShare: an exploration of the design space for digital voting in the workplace. *Comput. Human Behav.* 41, 433–443.
- Waluyo, D. (2018). Makna jurnalisme dalam era digital: suatu peluang dan transformasi meaning of journalism in the digital era: an opportunity and transformation. *Jurnaldiakom.Kominfo.Go.Id.* 1, 33–42.
- Waluyo, D. (2019). Pemahaman komunikasi politik pada era digital. *Diakom.* 2, 160–167.
- Wells, C. (2014). Civic identity and the question of organization in contemporary civic engagement. *Policy Internet.* 6, 209–216.
- Yang, K. P., Chou, C., and Schwarz, G. M. (2021). Cyber democracy for better board representation? The effect of e-voting on excess control in an emerging economy. *Aust. J. Manag.* 46, 761–786.

Transformation of the practice of accounting for lease relations

Saule Saparbayeva¹, Bazhan Turebekova²

Abstract

Introduction: In the process of integrating countries into the world economy modern accounting, reporting and quality audit systems ensure openness and transparency of the organization's activities of all ownership forms. The development of an accounting system is an important condition for creating a prosperous and dynamically developing economy. At the same time, the reforming of accounting system is a lengthy process, so the transition from practice of using one accounting method to another should take place in stagaly. Today, Kazakhstan is intensively moving in this direction. An important role in this process is given to international financial reporting standards as its effective toolkit. It is the quality of management and transparency of information that have become the criteria that investors and creditors are guided through process of choosing objects for investment.

Aim: the goal of study is determining the process of implementation of IFRS 16 in Kazakhstani accounting practice in order to improve accounting and audit of rental relations in the country.

Method: The study used the fundamental concepts and approaches presented in the papers of both domestic and foreign authors and content analysis was adopted. Legislative and regulatory acts and methodological materials to govern accounting and financial reporting, international methodological materials on accounting for leases, international financial reporting standards and regulatory acts of Kazakhstan Republic relating to the organization and accounting of lease relations were considered.

Findings: The main issue in the accounting of lease relations should be considered the correct classification of leases for the purposes of the financial reporting of entities, regardless of the form of the concluded lease agreement, into financial and operating leases.

Originality and value: implementation of IFRS 16 is the field that has been essential for management of business and has gap in literature, there is an opportunity to open an unexplored field of research.

Key Words: IFRS 16, leases, practice of accounting for lease

Jel Codes: M 48, M 41, M 42

1. INTRODUCTION

In Kazakhstan, leasing is becoming an increasingly popular financial instrument. When it comes to developing small and medium-sized businesses, entrepreneurs increasingly

¹ PhD, L. Gumilyov Eurasian National University, Faculty of Economics, Accounting and Analysis Department, Kazakhstan

² PhD, al Farabi Kazakh National University, High School of Economics, Management Department, Kazakhstan

prefer leasing to credit. The need for leasing with the growth of production and the need to update fixed assets will grow, and leasing will become more and more in demand. The reason for the growing popularity of leasing is that it is a very simple financial transaction. Lease allows company to involve the necessary property in economic circulation without significant one-time investments, and also provides an opportunity to receive income by renting out temporarily unused objects, while retaining ownership of them. The special historical role of rent is that, on the one hand, it contributes to the emergence of new forms of ownership, and on the other hand, it certainly leads to overcoming them, as well as to a genuine democratization of economic relations.

2. LITERATURE REVIEW

Renting, in its essence, affects the basic relations of society and in its development naturally leads to an evolutionary change in the social status of an employee and his formation as an independent entrepreneur - owner. It more fully meets the requirements of a harmonious combination of personal, collective and public interests and makes it possible to overcome the alienation of the worker from the means of production, labor from capital, executive functions from management.

The special historical role of rent is that, on the one hand, it contributes to the emergence of new forms of ownership, including private property, and on the other hand, it certainly leads to overcoming them, to a genuine democratization of economic relations. In the process of leasing, self-development of state property takes place, and under certain economic conditions, its transformation into common, joint or shared property. By investing their money and labor in the improvement and quantitative multiplication of the fixed means of production, the tenants become not only the owners, but also the owners of such increments. As a result, during the lease, the resolution of the existing contradiction, the duality of collective property, which belongs to all employees together and simultaneously to each separately, is achieved (2020, *Zuzana Kubaščíková*).

The possibility and necessity of widespread rental of real estate in a diversified economy was originally embedded in the very variety of ownership's types and forms of business organization. World practice shows that at each historical stage, rent has always been adequately included in the dominant production relations, contributing to a more efficient use of the accumulated potential.

The US continues to lead the world in the use of leasing. This country accounts for almost 40% of world leasing volume. The European leasing market is formed by the Euroleasing Association (Leaseurope), which includes 25 European countries. Leasing has become widespread in France, where the term "credit-by" is more commonly used. Currently, France is developing leasing of aircraft and helicopters, ships and barges, handling equipment, containers, computers, medical equipment, printing, large industrial equipment.

Of particular interest to Kazakh entrepreneurs is the dynamics of leasing development in post-socialist countries. There is a dynamic development of leasing in the countries

of Eastern Europe, especially in Hungary and the Czech Republic. Here, the share of leasing in investments accounts for more than 15%, these countries occupy the 26th and 27th places respectively in the world classification in terms of the volume of leasing operations, ahead of such countries as Norway and Denmark.

The evolutionary formation of a market economy in modern Kazakhstan, if we do not take into account the positive aspects, is missed precisely because of the underestimation of the lease, which causes a gradual change in property relations (Романенко И.В. 2005). The emergence of the institution of leasing is explained by objective factors. Quite often, a situation arises when the owner of the property does not feel the need to use it for a certain period of time, but this need may subsequently arise. Therefore, the alienation of the thing would be unreasonable. At the same time, there are persons who, not being the owners of such a thing, periodically need to use it (Иоффе О.С. 2005).

Leasing as a rent of property, that is, the provision by the owner (title owner) of property for possession and / or use to another person has existed since time immemorial. But financial lease or leasing in the interpretation of Kazakh law originated in the 50s of the last century in the United States and from there it passed to the countries of the Old World.

As features of the development of the lease, it could be specified as the following:

1. Keeping the common understanding of tenancy and the basic provisions governing it unchanged.
2. The emergence of a trend to strengthen the protection of the rights of the tenant is noticeable. It can be noted that many pre-revolutionary provisions and approaches regarding property lease are relevant to this day.

According to Art. 540 of the Civil Code of Kazakhstan Republic (Special Part) dated July 1, 1999 No. 409-I (as amended and supplemented as of November 24, 2015) "Property Lease Agreement":

1. Under a property lease agreement, the landlord undertakes to provide the tenant with property for a fee for temporary possession and use.
2. In the cases and in the manner established by this Code, the tenant shall have the right to dispose of the leased property.
3. Contracts of property lease also include leasing contracts, rental contracts, as well as other types of contracts related to the transfer of property for temporary use for a fee.

The purpose of the lease is to ensure the transfer of property for temporary use, while the use implies the extraction of its useful properties from the thing, and most importantly, the acquisition of results and income.

Land plots and other isolated natural objects, enterprises and other property complexes, buildings, structures, equipment, vehicles and other things that do not lose their natural properties in the process of their use (non-consumable things) can be leased (Горфинкель В.Я. 2006).

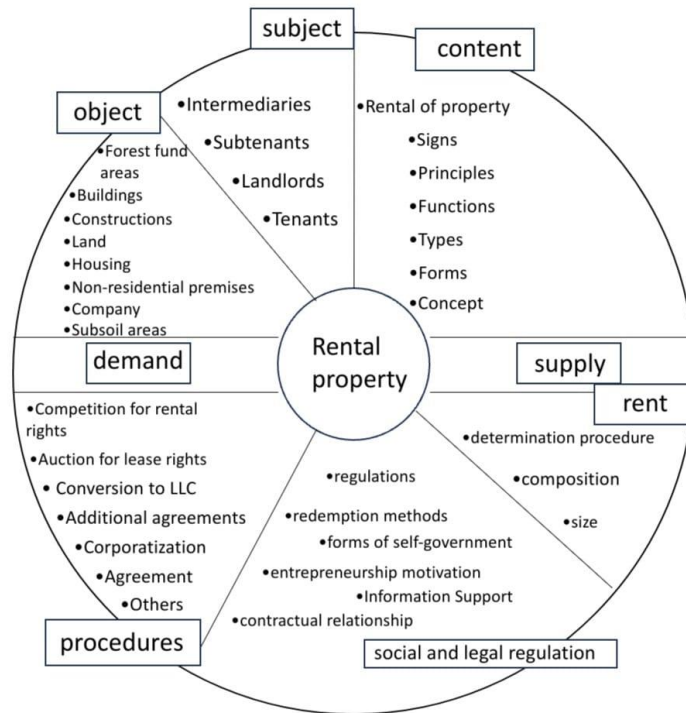


Figure 1. Property rental system

An insulated consideration of the lease in isolation from its material content, i.e. productive forces, or from its own form, which characterizes production relations, does not allow a company to reveal the economic essence of this economic system. Genuine rent takes place in those cases when the applied form of production leads to the emergence of a common joint and private forms of ownership of the means of production and the results of labor (see Figure 2). At the same time, any type of property does not exclude the rental form of its use (Волков О.И. 2009).

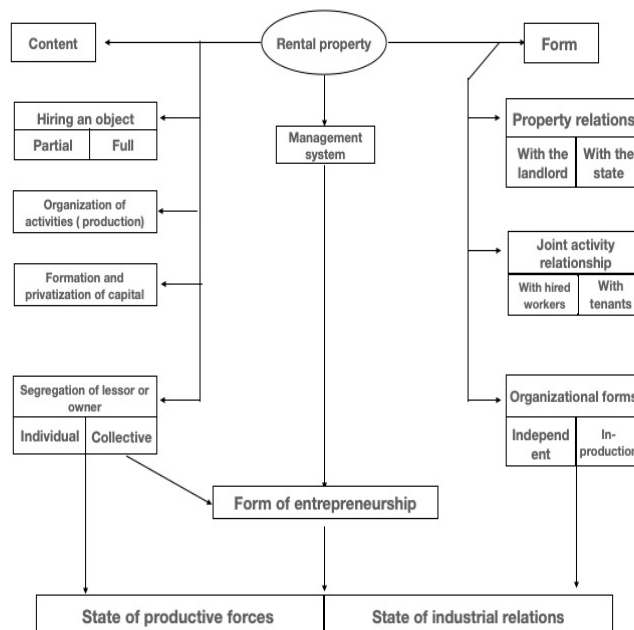


Figure 2. Relationship between content and form of lease

For an aggregated assessment, the value of property can be defined as the sum of the residual value of fixed capital, working capital and financial assets. Having information about the value of the property, it is possible to evaluate the leased elements of fixed capital and set the rent fee (Даулетбеков А.Д. 2002)

Rental benefits:

- an agreement on the basic relations between the tenant and the landlord, their full equality, and hence their sustainable nature;
- a fixed rent that allows the tenant to develop and receive a higher income;
- complete independence of the tenant in the organization of production, remuneration, labor regulations;
- possibility of improvement and increment of fixed assets, with subsequent reimbursement of costs, as well as redemption (especially in leasing).

The tenant, using the leased property, saves his own funds and receives income from this, and the actual activities carried out on the basis of the operation of the leased property.

Lease - provision by the lessor to the tenant for a fee of property for temporary use. The form of the lease determines the essence of the transaction. A lease is qualified on the basis of the extent to which the risk and reward associated with the right to use the leased

property are transferred to the lessee or remain with the lessor (Сейдахметова Ф.С. 2001).

3. RESEARCH METHODOLOGY

The theoretical and practical basis of the study was the fundamental concepts and approaches presented in the works of both domestic and foreign authors. The information base of the study includes legislative and regulatory acts and methodological materials governing accounting and financial reporting, international methodological materials on accounting for leases, international financial reporting standards and regulatory acts of Kazakhstan Republic relating to the organization and accounting of lease relations. Statistical and analytical materials, periodicals, monographs, Internet editions of official websites were used as the information base of the work.

4. RESULTS

Renting is an important tool used by many organizations. It helps organizations to use fixed assets without resorting to large initial investments of cash. In conditions when organizations lack working capital, rent is widely used. The current economic situation in Kazakhstan, according to experts, favors leasing.

The form of leasing reconciles the contradictions between an enterprise that does not have funds for modernization and a bank that is reluctant to provide this enterprise with a loan, since it does not have sufficient guarantees for the return of invested funds. The leasing operation is beneficial to all involved: one party receives a loan, which is paid in stages, and the necessary equipment; the other side is a loan repayment guarantee, since the object of leasing is the property of the lessor or the bank financing the leasing operation, until the last payment.

With the development and expansion of the scale of leasing activities and the entry of leasing companies into international markets, it becomes necessary to adopt uniform accounting principles and disclose information about leasing operations. Therefore, a competent and correct reflection of rental relations in the financial statements is of great importance for all stakeholders of the organization (Радостовец В.К. 2002).

An important role in improving the accounting of lease relations in the real sector of the economy was played by the adoption of the new IFRS 16 Lease, which replaced IAS 17 Lease. With the introduction of a new standard for accounting for leases, the main directions for the development of accounting for lease relations were determined, including:

- creation of a unified model for accounting for lease agreements in the statement of financial position of the lessee, which allowed to increase transparency and comparability;
- elimination of differences in accounting for finance and operating leases.

IFRS 16 adopted in Kazakhstan on 1 January 2019. The reason for replacing IAS 17 with IFRS 16 was several factors. This article discusses the main changes and differences between IFRS 16 and IAS 17.

The new standard, IFRS 16, removed the distinction between finance and operating leases for a lessee, that is greatly facilitated the accounting for leases, and it also reformed the concept of accounting for leases. The new concept of a lease introduced in the new standard is the right to use the leased object during the lease term and the lease obligation, which is the obligation to pay rent. The purpose of the new IFRS 16 is to define the rules for recognition, measurement, and disclosure of information about leases.

One of the main factors that led to the creation of a new standard is the elimination of off-balance sheet financing. Under IAS 17, lessees were required to classify a lease as either a finance lease or an operating lease it was labor intensive for the lessee. The new standard has made this job much easier, and now tenants do not need to classify leases in process of keeping records of them.

Under the previous standard, if a lease was classified as an operating lease, then it was recognized only as lease payments and is shared an expense in the income statement, i.e. the lessee did not report it as an asset or liability on the balance sheet. In some cases, the operating lease was not canceled as an expense, and continued to be accounted for, and sometimes even in the long term and it was a liability (asset) for the lessee. Since this liability was displayed in the notes of the financial statements, and therefore it is hidden from the users of the financial statements, because in most cases users do not pay attention to the note, since they need the main items of the balance sheet, income statement, etc. Only auditors notice this. This commitment is considered non-compliance. The new standard eliminates this discrepancy and prescribes that lease agreements be taken into account on the balance sheet.

Moving on to the definition of a lease, as that too has been changed. There is a similarity with the old definition, but there are still some differences.

Under IFRS 16, from the perspective of the lessee, once an agreement meets the definition of a lease, they are all recognized in the same way, with the practical exception of short-term and low-value leases. The concept and distinction between finance and operating leases is retained in the new standard only from the perspective of lessors. In IAS 17, a lease was classified as either an operating lease or a finance lease, depending on the definition of the lease, i.e. whether all the risks and rewards of ownership are transferred or not. A finance lease is a lease that transfers all the risks and rewards incidental to ownership of an asset, and this is the main difference from an operating lease. From a lessee's point of view, regarding IFRS 16 distinguish between operating and finance leases does not consider. If the lessee had short-term leases, then under the new standard, the lessee accounts for them as operating leases while in accordance with IAS 17 they were accounted, because it accounted at off-balance sheet. A lease agreement in which the underlying asset has a low value is also possible to account into same way. Examples of low-value assets include personal computers, phones, laptops,

tablets, and small pieces of office furniture. These things can be applied on an individual lease basis.

This means that if some contracts were previously accounted for as leases under IAS 17 Leases, they can be accounted for in the same way under the new standard, although the accounting methodology may change.

IFRS 16 provides detailed guidance on a lease agreement to determine whether the agreement is a lease agreement or a service agreement. In the old standard, it did not matter which contract was taken into account: for rent or for services. The reason for this was very simple, these two types of contracts were accounted for in the same way, that is, as an expense in the income statement. However, after the introduction of the new standard, the accounting for some types of operating leases is changing. It is needed to be able to distinguish which contract we are dealing with.

There are some illustrations with following examples. The company wants to rent a warehouse space to store its goods and would like to sign a three-year contract. The owner of this warehouse offers the company 2 options:

1. The company will occupy a certain area of X cubic meters of this warehouse, but this place will be determined by the owner of this warehouse based on actual use and available space.
2. The company will occupy plot No. 1 X cubic meters in the sector of this warehouse. This site will be completely assigned to the company, and no one except the organization itself will be able to use it during the term of the lease agreement.

In accordance with the new IFRS 16 standard, when evaluating, it is necessary to determine whether these contracts contain a lease. When defining, attention is paid to the asset, that is, to its definition. Further, in accordance with the new standard, these contracts will be accounted for as follows:

The first contract does not contain any lease because the underlying asset cannot be identified. The reason is that the company uses only a certain amount, as the warehouse owner (supplier) can change from one place to another. The entity will account for the lease payments as an expense in the income statement.

In the second contract, the underlying asset can be identified, since the organization leases plot No. 1 with a volume of X cubic meters. Accordingly, this agreement contains a lease, which means the recognition of a certain asset or liability on the balance sheet of the enterprise.

This example shows clear differences between the definitions of a lease. These differences allow company to see a clear difference between the new and the old standard, as well as the reason why it was decided to introduce the new IFRS 16 standard. IFRS 16 introduces a new requirement - lease payments that must be met. The reason for the change was that when assets were leased under an operating lease under the old standard, the lessor listed them as services (maintenance, repairs, cleanup, etc.) In the old standard, the lessor did not care about such services because he include all payments as part of the rent, which was showed as an expense on the income statement.

The change in the new standard was that it became necessary to separate the lease payments into those that include and do not include a lease component. The reason for this is that it is necessary:

- Account for the lease's component as a lease under the new IFRS 16 if it would qualify; as well as
- Recognize the service's component as an expense in the income statement.

One of the biggest differences between the two standards is the accounting for operating leases. Under the new standard, users of financial statements can clearly determine operating leases and have the information they need. The transparency of the balance sheet allows users to have a useful basis for comparison with other entities, while in the old standard it was difficult to compare businesses that rent with those that buy.

Turning to the interaction with lessors, the accounting of the lessor has not changed much in the new standard. As operating leases lose their off-balance sheet accounting, the types of arrangement preferred by lessees are changing to reflect the new standard. Lessors (organizations) benefit from using operating leases as a price increase tool, so they focus more on the benefits of operating leases than accounting leases.

The old standard IAS 17 focuses on the type of lease. Because operating leases were not recognized on the balance sheet, many lessees used this type of lease to avoid recognition and increase the competitive prices offered by operating leases.

IFRS 16 focuses more on the types of transactions, and therefore has less impact from an accounting point of view. Although lease accounting declassifies operating leases and finance leases for lessees, lessor accounting remains largely unchanged and the operating differences between operating leases and finance leases remain. Businesses may be looking for more inventive ways to lease to continue getting the most out of their assets.

Here's the biggest change: Lessees (those who lease an asset) don't need to classify a lease at inception and determine whether it is a finance lease or an operating lease. The reason is that IFRS 16 prescribes a single accounting model for each lease for lessees. A lessee needs to recognize a right-of-use asset and a corresponding liability in its statement of financial position. The asset is depreciated and the liability is amortized over the lease term.

This model is very similar to accounting for finance leases under IAS 17. Operating leases is needed to account for in the same way.

There are 2 exceptions to this rule:

- Lease of assets for less than 12 months (short-term lease), and
- Leasing of low value assets (such as computers, furniture, etc.).

The new accounting model will be illustrated and included in the contract, taking into account the requirements of IAS 17 using example with the warehouse example above.

There are some data was given:

- Annual lease payments of CU10,000 including cleaning services, all payable in arrears (at the end of the year);
- The relevant discount rate is 5%;

- Lease term is 3 years.

Let's explain this contract in accordance with IAS 17 and IFRS 16.

In accordance with IAS 17, company must first classify the lease. It may depend on the economic life of the warehouse, rent payments, etc. company appreciate that this lease is valid.

Therefore, accounting is very simple:

- In the beginning company do nothing;
- At the end of each year, it is simply recorded CU10,000 of rental expense in profit or loss.

Under IAS 16 there is no need for classification as one accounting model applies to all leases. So, 3 steps are needed to follow:

- 1) recognize a lease in accordance with IFRS 16;
- 2) determine if there is any other element besides the lease element and separate the cleanup element from the lease element:
 - \$8,571 refers to the lease element;
 - \$1,429 refers to the cleaning element.

This simple table illustrates an example:

year	Lease liabilities (at the beginning of the year)	Added interest of 5%	Excluding amounts paid	Lease liabilities (end of year)
1	23 341	1 167	– 8 571	15 937
2	15 937	797	– 8 571	8 163
3	8 163	408	– 8 571	0
Total	-	2 372	– 25 713	-

The determination requires first recognizing the right to use the warehouse in an amount equal to the lease liability, plus some other items such as initial direct costs.

The lease liability is calculated at the present value of the lease payments over the lease term. In this case, it is necessary to calculate the present value of 3 payments in the amount of 8,571 C.U. (only the lease element) in the amount of 5%, which is 23,341 C.U.

The accounting entry will show:

- Right-of-Use Debit Asset: CU23,341.
- Credit lease liabilities: CU 23,341.

Subsequently, when making a payment at the end of the reporting period, company must:

- Recognize the depreciation of the right-of-use asset over the lease term, in this case CU7,780. (23 341/3 C.U.) per year (linear depreciation was taken into account);
- Recognize a remeasurement of the interest-bearing lease liability, eliminate amounts paid and take into account any changes in the lease.

Summary of accounting entries under IFRS 16:

When	What	How many	Dt	Ct
At the beginning of the year	Right-of-use asset + lease liability	23 341	Right-of-Use Asset	Rental obligations
At the end of the year	Interest	1 167	Interest expenses	Rental obligations
	Rent	10 000		Bank account
		8 571	Rental obligations	
		1 429	Cleaning service costs	
	Depreciation	7 780	Depreciation	Right-of-Use Asset

As a result of the comparison under IAS 17, the impact on profit or loss for 1 year was CU10,000 because the full lease payment was recognized in profit or loss.

In accordance with IFRS 16, the impact on profit or loss for 1 year was:

- Interest of CU1 167, plus
- Depreciation CU 7 780 plus
- Expenses for cleaning services 1 429 CU.
- Total CU 10 376

This is actually more first year expenses under IFRS 16 than under IAS 17. The reason is because the new model has changed the cost structure: there is higher interest at the start of the lease but lower costs at the end lease when the lease liability is amortized.

In general, both models have the same impact on profit or loss over the life of the lease:

Type of expenses	IAS 17	IFRS 16	Note
Rental expenses	30 000	–	3*10 000
Interest expenses	–	2 372	Table above
Depreciation	–	23 341	3*7 780
Cleaning service costs	–	4 287	3*1 429
Total	30 000	30 000	

Considering the difference between the new and the old standard as an example, it could be concluded that, despite the difference in accounting for rent, both models have the same impact on profit. However, as already mentioned, several factors still influenced the replacement of the old standard with the new one. The new changes make accounting for leases easier, and balance sheet account comparability and transparency are

improved, allowing users of financial statements to see the full picture of an entity's performance.

As a result of the implementation of a large-scale state program to reform the system of accounting, state audit and financial control in order to increase the efficiency of the use of public resources, there is a need for significant transformations in the existing practice of accounting for lease relations both in the real and in the public sectors of the economy. It should be noted that state regulation of the sphere of rental relations is connected with the state policy pursued in this area, since the dynamic development of rental activities can lead to a revival of the economic situation in the country's market, give an investment impetus to the beginning growth, expand effective demand, create interest among enterprises in the rise business activity.

IASB Chairman on the adoption of IFRS 16 Hans Hoogervorst commented as follows: “These new reporting requirements bring leasing reporting into the 21st century, putting an end to the guess work that has taken place in calculating a company's often highly significant lease liabilities. The new standard will provide much-needed transparency to leasing assets and liabilities of companies so that off-balance sheet leasing financing will no longer hide in the shadows. It also means improved comparability between companies that rent and companies that borrow or buy.”

In addition to the standard itself, the IFRS Board also released a separate report, “Effects Analysis”, that is an analysis of the relative costs and benefits of applying the standard. The researchers came to the conclusion that the benefits of it clearly outweigh the costs, and it is this logic that is used in determining the need for a transition to a new standard. The standard significantly changes the current accounting for lease transactions. For example, it abolishes the division into operating and finance leases, obliges all leased assets and liabilities to be recorded on the balance sheet, and introduces a new definition of leases. The introduction of the new standard will have a significant impact on the organization of accounting for a huge number of organizations.

In modern conditions, the development of rental relations is difficult to imagine without state support in the form of such a mechanism as the legal framework. But the most important problem in the implementation of rental activities is that the regulatory framework for accounting and taxation of operations under lease agreements does not reflect all situations that arise in practice.

As noted above, the new document cancels IAS 17 and three related interpretations – IFRIC 4 “Determining whether an agreement contains features of a lease”, SIC 15 “Operating Leases – Incentives” and SIC 27 “Analysis of the essence of transactions that have the legal form of a lease”. However, early application of the new standard is also permitted, but only for entities using IFRS 15 Revenue from Contracts with Customers. The previous standard, IAS 17 Leases, did not allow investors and other users of financial statements to get a clear picture of the status of leased assets and liabilities from the entity of interest. This was especially true for industries such as air travel, retail and transportation services. It has also been found that listed companies that apply this IFRS

have more than \$3.3 trillion worth of lease agreements today, and more than 85% of this value is not even reflected in the balance sheets.

This is because, until now, leases have been allowed to be classified either as finance leases (in which case they should be reported on the balance sheet) or operating leases (in which case the information is disclosed only in the notes to the financial statements). The distinction, meanwhile, is rather abstract, making it difficult for investors to compare companies. This also meant that investors and other reporting users had to additionally evaluate the effect of the presence of off-balance sheet lease liabilities, which, however, in practice in most cases meant an overestimation of the real value of the leased property in the eyes of a non-professional appraiser. The IFRS 16 standard solved this problem by requiring all leasing to be reflected only on the balance sheet as assets and liabilities.

In European countries, the risks of assessing leasing operations are carried out according to various criteria. And this is primarily due to extensive experience in the leasing market. European companies, thanks to their many years of experience, are able to develop almost ideal mathematical formulas that take into account almost all types of risks. In the United States, a finance lease is practiced as a transaction in which substantially all risks and rewards are transferred from the lessor to the lessee. In the UK, the description of a finance lease is the same as in the US, but without any detail. In Spain, only those transactions are considered finance leases, the terms of which provide for the possibility of a subsequent purchase of the leased equipment. In Sweden, finance leases are those transactions in which the subsequent purchase of the leased equipment is a mandatory condition.

The lease classification adopted by IAS 17 Leases was based on the distribution of the risks and rewards of ownership of the leased asset between the lessor and the lessee. Risks include the possibility of losses due to downtime or obsolescence or fluctuations in profitability due to changing economic conditions. Benefits relate to the expectation of profit from operations over the economic life of the asset and income from appreciation or the realization of residual value.

Since the transaction between the landlord and the tenant is based on the lease agreement concluded by them, it is advisable to use agreed definitions. The use of these definitions in relation to the differing circumstances of a lessor and a lessee may result in them classifying the same type of lease differently. For example, this can happen if the landlord benefits from a residual value guarantee provided by a party unrelated to the tenant.

The application of the new standard leads to an increase in assets and liabilities on the balance sheet, a deterioration in the ratio of equity and debt capital and a decrease in capital adequacy ratios. The changes affected both the nature of the expense and the recognition model. The new standard affects almost all commonly used financial ratios such as equity ratio, current ratio, asset turnover, interest coverage ratio, earnings before interest and taxes, operating income, net income, net income per share, earnings per invested capital, return on equity and cash flows from operating activities. These changes

will affect the organization's relationships with various stakeholders, such as banks and lenders, investors and analysts, and employees. Their consequences lead organizations to reassess future decisions regarding the choice between renting and buying.

In addition to the impact on accounting and finance, the pervasive nature of the change may require organizations to transform business processes in many areas, including finance and accounting, IT, purchasing, taxation, legal, operations, corporate real estate, and human resources.

In order to assess the impact of the introduction of the new standard and the scope of future changes, a comparative analysis of the main lease accounting provisions was carried out in accordance with IAS 17 Leases and IFRS 16 Leases. The results are presented in table 4.

Table 4 Comparative analysis of the methodological and methodical aspects of accounting for leases in accordance with IAS 17 Leases and the new IFRS 16 Leases

Methodological aspects of accounting for leases in accordance with IAS 17 Leases	Methodological aspects of accounting for leases in accordance with the new standard IFRS 16 Leases
Scope of application	
Applies to accounting for all types of leases, except for: - leases related to the extraction or use of minerals, oil, natural gas and similar non-renewable resources; - licensing agreements for items such as feature films, videotapes, theatrical productions, manuscripts, patents, and copyrights.	Applies to all leases except: - leases relating to the exploration or use of minerals, oil, natural gas and similar non-renewable resources; - intellectual property licenses provided by the lessor and subject to IFRS 15 Revenue from Contracts with Customers; - leases of lessee-held biological assets to which IAS 41 Agriculture applies; - concession agreements falling within the scope of IFRIC 12 Service Concession Agreements; - rights acquired by the lessee under license agreements subject to IAS 38 Intangible Assets (for items such as motion pictures, video recordings, plays, manuscripts, patents and copyrights).
Tenant accounting	
The lessee accounts for lease transactions either as an operating lease, with the leased assets off-balance sheet, or as a finance lease, with the leased assets shown on the balance sheet. Financial lease assumes that the leased funds are taken into account on the	All leases with terms greater than 12 months (excluding leases of low-value items) must be presented as assets and liabilities on the lessee's balance sheet. The asset (right-of-use) and the lease liability are initially measured at the present value of the lease payments. The

<p>balance sheet of the lessee - in the asset, lease liabilities - in liabilities. The amount capitalized at the beginning of the lease term must be equal to the present value of the minimum lease payments, based on the market value of the leased item. It is calculated by subtracting the costs of maintenance, insurance and taxes from the amount of rental payments, i.e. rental costs.</p> <p>In calculating the present value of the minimum lease payments, the discount factor is the implied lease interest rate, if it can be determined; if not, the alternative rate of interest that the lessee would have to pay to borrow the funds needed to acquire the asset is used.</p> <p>Under operating leases, lease payments are recognized on a systematic basis each reporting period (excluding costs of services such as insurance and maintenance accounted for by the lessor) in the Statement of Financial Performance</p>	<p>cost of the right to use the leased asset recognized on the balance sheet includes:</p> <ul style="list-style-type: none"> - an initial estimate of the lease liability; - any lease payments made before or on the start date of the lease, net of any rental incentives received; - estimated costs, - any initial direct cost to the tenant. <p>At the commencement date of the lease, the lessee measures the lease liability at the present value of the lease payments not made at that date. Lease payments must be discounted using the rate of interest implied in the contract, if it is practicable to determine it. Otherwise, the tenant uses the calculated interest rate.</p> <p>With regard to short-term leases or leases of low-value objects, the lessee does not recognize any assets in the form of rights to use the leased objects. Lease payments are recognized as an expense on a straight-line basis or using another systematic accrual basis.</p>
Lessor accounting	
<p>From the lessor's perspective, a lease can be presented as either a finance lease or an operating lease. For the lessor, financed lease assets are not shown as fixed assets, but as accounts receivable equal to the net investment in the lease. The net value of such accounts receivables should be determined by the present value of the minimum lease payments, whether guaranteed or not. The lessor accounts for rental income as interest income. It is assumed that all profit is a return on investment.</p>	<p>The rules for accounting for leases from the lessor have not changed significantly. As before, it must separate all leases into finance leases and operating leases and apply different accounting rules for the two types of leases.</p> <p>The criteria for identifying finance and operating leases have also not changed. A lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership of the asset. Otherwise, the lease is classified as an operating lease.</p>

Note - the table was compiled by the author

The effect of the new international standard on accounting for leases in practice affected Kazakhstani enterprises, entailed a number of major transformations and consequences.

It has become necessary for lessees to recognize an interest-bearing lease liability in the statement of financial position, and at the same time to recognize a corresponding new asset. In other words, the tenant became richer in assets, but at the same time, the volume of his debt obligations also increased.

The implications of the new standard are not limited to the statement of financial position. The accounting for the lease has also changed over the period of its validity. In particular, companies in the early stages of a lease now recognize large amounts of expenses (due to finance costs) on all leases, even if the annual rent is constant.

In the accounting of lease relations, great importance is given to the issue of classifying the types of lease, which are formed from the essence of lease transactions. In domestic civil law, the issues of lease classification are also considered from a legal point of view, while world accounting practice requires that this issue be approached from an economic point of view. The IFRS principle of substance over legal form can be a subject of misunderstanding by regulatory authorities for a long time. Its essence is such that, whatever the legal form of the event, it is evaluated according to its principles of recognition and disclosure.

CONCLUSION

The results of the study provide a basis for the following conclusions and proposals for improving the accounting and audit of rental relations in Kazakhstan Republic.

The economic essence of lease relations is the transfer by the lessor to the tenant of the right to use the property. The main issue in the accounting of lease relations should be considered the correct classification of leases for the purposes of the financial reporting of entities, regardless of the form of the concluded lease agreement, into financial and operating leases.

For a full reflection in the accounting of rental relations, it is necessary to reform the accounting system in the main areas:

- improving the quality of information generated in accounting and financial reporting for the purposes of correct and reliable analysis of the financial position of economic entities;
- strengthening the quality control of financial reporting in order to increase accountability and control, the completeness of the information provided;
- improvement of information support for the system of external and internal audit and accountability of all entities of the real sectors in order to increase the efficiency of resource use.
- organizing of an effective advanced training system and development of a system of national certification of specialists in the field of accounting and reporting.

Directions for improving accounting and internal audit of rental relations in Kazakhstan Republic are associated with many factors. These include:

development of the legal framework for regulation the lease accounting; approval of norms and methods for calculating depreciation; enhance the procedure for accounting

of revaluation of fixed assets and their indexation; development of measures for economic incentives and control of the targeted use of depreciation charges of leased fixed assets; identify clear criteria for the recognition of a lease, depending on its classification.

Measures should also be taken to preserve and improve the institution of providing tax benefits for any type of leasing. For this purpose, it is necessary to ensure the identity of the approach in the definition of the terms “financial leasing” and “remuneration for financial leasing” both in tax and civil legislation. Since terminological discrepancies are clearly seen in certain legal acts, a number of provisions contained in them must either be excluded or adopted in an updated version.

The strategy for the development of leasing in Kazakhstan requires not only a generalization of the theory and practice accumulated in various regions of the country, but a comprehensive analysis of the forms and methods of organizing leasing in activities in foreign countries, and especially in industrialized countries.

REFERENCE

Denis-Adrian Levanti The Effects of IFRS 16 „Leases” Adoption on the Banking Sector: The Case of Credit Institutions in Romania//The 8th International Scientific Conference IFRS: Global Rules and Local Use – Beyond the Numbers 2020 October 8–9, 2020, Prague P. 74-91 <https://www.mup.cz/data/files/IFRS2020-sbornik.pdf>

Zuzana Kubaščíková, Miloš Tumpach, Zuzana Juhászová Earnings Management and the Asymmetry in Distribution of Earnings: Slovak Evidence (2020) P 65-72

Романенко И.В. Экономика предприятия/ 3-е изд., перераб. и доп.- М.: Финансы и статистика, 2005.- 264 с.:ил.

Иоффе О.С. Обязательственное право. [Текст] – М., Юридическая литература. 2005. - С.304.

Самозванцев А.М. Теория собственности в Древней Индии. [Текст] – М., Юрилитиздат. 2007. – С. 86.

Civil Code of Kazakhstan Republic 1 June 1999 у. № 409-I (Special Part) (with changes and additions on 24.11.2015 г.)

Горфинкель В.Я. Экономика предприятия: учебник / под ред. В.Я. Горфинкеля, В.А. Швандара.- 4-ое изд., перераб. и доп.- М.: ЮНИТИ, 2006.- 672 с.

Волков О.И. Экономика предприятия (фирмы): 3-е изд., перераб. и доп.- М.: ИНФРА-М, 2009.- 604с.

Т.А. Слепнева. Экономика предприятия: учебник / Т.А. Слепнева, Е.В. Яркин.- М.: ИНФРА-М, 2006.- 458с.- (Высшее образование).

Нурпеисов Э. Налогообложение и бухгалтерский учет арендных отношений // Вестник предпринимателя. - 2002. -N2

Даулетбеков А.Д. Бухгалтерский и налоговый учет текущей аренды основных средств // Бизнес класс. - 2002. -N4

IFRS 16 Leases, Project Summary and Feedback Statement, January 2016

Сейдахметова Ф.С. Бухгалтерский учет в современных условиях: Учебное пособие. - Алматы: LEM, 2001 – 187с.

Нурсеитов Э.О. Бухгалтерский учет в организациях: учебное пособие. - изд. 2-е перераб. - 2009.

Гражданский кодекс Республики Казахстан от 1 июля 1999 года № 409-І (Особенная часть) (с изменениями и дополнениями по состоянию на 24.11.2015 г.)

Закон Республики Казахстан от 26 июля 2007 года № 310-ІІІ «О государственной регистрации прав на недвижимое имущество» (с изменениями и дополнениями по состоянию на 24.11.2015 г.)

Международный стандарт финансовой отчетности (IAS) 17 «Аренда» (2013 года)

Библиотека Бухгалтера и Предпринимателя /№7 (288) / БИКО, Алматы, июль 2014 г.

Кодекс Республики Казахстан от 10 декабря 2008 года № 99-ІV «О налогах и других обязательных платежах в бюджет (Налоговый кодекс)» (с изменениями и дополнениями по состоянию на 14.01.2016 г.)

Спиридонов С. А. Проблемы практического применения МСФО (IAS) 17 «Аренда», Журнал «МСФО на практике», 2012.

Низков А. Ф. Новый стандарт по аренде: учет стал проще, Журнал «МСФО на практике», 2016.

Радостовец В.К. Финансовый и управленческий учет на предприятии -Алматы: НАН «Центраудит», 2002 г.

Трансформация финансовой отчетности из КСБУ (Local GAAP) в МСФО (IFRS), msfo, buh-nauka.com.

Концепция развития системы бухгалтерского учета и аудита в Республике Казахстан на 2012-2014 гг. с.39-42

Жакупов Г.С. Зулгарина И.А. «Проблемы перехода на международные стандарты финансовой отчетности»

Бюджетный гид (2015 г.), составленный ОО “Центр Поддержки Правовых и Экономических Реформ”, Фондом Сорос-Казахстан в рамках программы «Прозрачность государственных финансов».

Practice adapting ChatGPT as teaching materials to promote social interaction in Pancasila and civic education classes

Ahmad Al Yakin¹, Luis Cardoso² Idi Warsah³ Abdul Latief⁴ Muthmainnah⁵
Aco Nasir⁶

Abstract

Introduction and Aim: This research explores the integration of ChatGPT as a teaching tool to facilitate independent learning and increase social interaction in Pancasila and citizenship education classes. This research aims to determine the effectiveness of using ChatGPT in encouraging active engagement and collaborative learning among students in these classes.

Method: The research methodology is mixed methods approach involves applying ChatGPT as an educational resource so that students can interact with an AI-based chatbot to seek guidance, clarification, and information related to Pancasila and citizenship education subjects. Data collection includes quantitative assessments such as surveys, observations, and content analysis to measure the extent of self-directed learning and the quality of social interactions facilitated by ChatGPT.

Findings: This study evaluates the impact of ChatGPT on students' independent learning abilities and their willingness to participate in social interactions in a learning environment. These findings aim to provide valuable insights into the potential of AI-based educational tools to encourage independent learning and collaborative engagement in the context of Pancasila and citizenship education classes.

¹ Assistant professor, Universitas Al Asyariah Mandar, Teacher Training and Education Faculty, Department Pancasila and Civic education, Indonesia

² Associate professor, Polytechnic Institute Portalegre and centre for comparative studies of the university of Lisbon, Portugal

³ Assistant professor, Universitas Al Asyariah Mandar, Teacher Training and Education Faculty, Department Pancasila and Civic education, Indonesia

⁴ Associate professor, Institute Agama Islam Negeri Curup, Pascasarjana IAIN Curup, Indonesia

⁵ Assistant professor, Universitas Al Asyariah Mandar, Teacher Training and Education Faculty, Indonesian Language Studi Program, Indonesia

⁶ Assistant professor, Universitas Al Asyariah Mandar, Teacher Training and Education Faculty, Indonesian Language Studi Program, Indonesia

Originality and value: This research contribute to the ongoing discourse regarding innovative teaching methods and the role of AI in encouraging active learning and social interaction, ultimately benefiting students' educational experiences in this important subject.

Keywords: ChatGPT, self-directed learning, social interaction, Pancasila and citizenship education, AI in education.

Jel Codes: YY 22, G21

I. INTRODUCTION

Sociology plays an integral role in the field of the social sciences. Within the broader scope of social science, sociology provides important insights into various aspects of human society. It explores interaction, conflict, social norms, deviance, stratification, and social change (Lyle, 2017). Social interaction, as referred to in sociology, includes reciprocal activities involving individuals with other individuals, one individual with groups, and groups with other groups. This is an inherent and inseparable part of human life because individuals and groups cannot avoid the need for interaction. Human activities that repeat themselves in pursuit of their needs eventually become institutionalized and embedded in the individual. Thus, interaction has a fundamental role in forming relationships between individuals, groups, and social entities (Scott, 2023).

In today's digital era, social contact and interaction have grown. While physical contact remains important, technology has facilitated interaction through various means, such as the telephone and messaging Alaimo and Kallinikos(2019). This transformation highlights the adaptability of human interactions to changing circumstances. Social interactions have two main forms: associative (positive) interactions and dissociative (negative) interactions. These interactions contribute to the formation of social institutions. Social institutions arise from endless human efforts to fulfill various needs while adhering to applicable norms. Various institutions have emerged to meet various human needs (Setiadi & Kolip, 2013; Syaharuddin et al., 2021).

Sociology plays an integral role in the field of the social sciences. Within the broader scope of social science, sociology provides important insights into various aspects of human society. It explores interaction, conflict, social norms, deviance, stratification, and social change (Moretti 2002; Borup et al., 2006). Social interaction, as referred to in sociology, includes reciprocal activities involving individuals with other individuals, one individual with groups, and groups with other groups. This is an inherent and inseparable part of human life because individuals and groups cannot avoid the need for interaction. Human activities that repeat themselves in pursuit of their needs eventually become institutionalized and embedded in the individual. Thus, interaction has a fundamental role in forming relationships between individuals, groups, and social entities.

In the current digital era, social contact and interaction are increasingly growing. While physical contact remains important, technology has facilitated interaction through various means, such as the telephone and messaging Zapletal et al. (2023). This

transformation highlights the adaptability of human interactions to changing circumstances. Social interactions have two main forms: associative (positive) interactions and dissociative (negative) interactions. These interactions contribute to the formation of social institutions. Social institutions arise from endless human efforts to fulfill various needs while adhering to applicable norms. Various institutions have emerged to meet various human needs (Kleinlein, 2023).

Social interaction in the classroom is also very necessary. Social interaction in the classroom is not just academic learning but also personal and social development. It prepares students for a well-rounded and successful future by equipping them with academic knowledge and essential interpersonal skills Rebele and Pierre, (2019). A lack of social interaction in an educational setting can pose several challenges, including reduced student motivation and limited feedback Kasperski and Blau (2023); Lim et al (2016).

Student motivation can be increased through their interactions with their classmates. This research looks at the possibility of students showing high interest during their learning process when they have the opportunity to interact with teachers and classmates actively. Because they feel more involved, students may be more eager to provide feedback, ask questions, and dig deeper into class material. Students may become disinterested and unmotivated to learn if they do not have opportunities for social connections. Additionally, social relationships serve as a feedback mechanism in the classroom. Students benefit greatly from real-time comments and criticism on their work from both teachers and classmates. For their development and understanding, this feedback loop is critical. It's possible that students won't get as much feedback on their work if they don't have much face-to-face contact with teachers and classmates.

Therefore, this research is very important to carry out because, based on the results of observations during two weeks of meetings, it is known that pre-service teachers in tertiary institutions were found to have a low level of social interaction during new technology courses in education in the Pancasila and Citizenship Education study programmes, which may make them not actively share ideas and interrupt discussion activities inside and outside the classroom. The social part of education that this research will examine, such as pre-service teachers talking to each other about what they have learned, building on each other's ideas, and asking questions throughout class, can be considered in pre-service teacher training.

A slow and passive classroom environment is created because students feel they have no ideas and feel that the material provided really needs space for collaboration and real action, which can have a negative impact on their learning and well-being if this is not allowed to happen. Important social skills, such as communication, teamwork, and empathy, can only be developed through meaningful social interactions, which in turn can only be built through academic learning. Students' development in these areas is critical to their success in life and the workplace. Students may have fewer opportunities to practice these skills if they do not engage in frequent conversations with each other,

so this research provides a solution to increasing such social interactions by integrating ChatGPT during learning.

To address this problem, educators must consider strategies for incorporating social interactions into the learning environment. This can include encouraging class discussions, group activities, online forums, and providing opportunities for peer collaboration. By encouraging social interaction, educators can help students stay motivated, receive valuable feedback, engage in active discussions, and develop important life skills. Therefore, based on the gaps found, this research aims to increase students' social interactions in class by using ChatGPT as media and technology for studying Pancasila and citizenship education courses at universities.

2. LITERATURE REVIEW

Effective classroom interactions between teachers and students are pivotal for the achievement of various learning objectives. Within the realm of education, the fluid and adept interaction of teachers with their students in conveying information holds significant sway Davis and Arend (2023). When teachers excel in their interactions, the learning process becomes more accessible and comprehensible for students. Conversely, if teachers struggle to engage effectively, the learning experience can become convoluted and challenging for students to embrace Rawal, (2023). Therefore, the ability to communicate and engage proficiently in the learning environment is a paramount skill that educators must possess.

Furthermore, educational institutions are often characterized by a rich tapestry of diversity, Huang, (2023). encompassing differences in religion, race, ethnicity, social position, and more. This diversity within educational settings serves as a catalyst for critical thinking, mutual support among students, and the cultivation of respect for one another's unique backgrounds and perspectives. It is anticipated that this diversity not only enriches the educational experience but also fosters an environment where students learn to think critically, collaborate effectively, and demonstrate respect for the diverse world in which they live.

ChatGPT is having a significant impact on social interactions by increasing digital engagement, facilitating human-machine conversations, influencing education, recognizing social and cultural diversity, and encouraging ethical discourse about the evolving nature of human relationships in the era of artificial intelligence Rathore, (2023). The importance of social interaction remains the most important thing in the digital era for several main reasons, as stated by Doeveling and Sommer (2023) even though digital communication is commonplace, humans have an inherent need for social interaction. This fosters emotional connection, empathy, and a sense of belonging.

McHaney, (2023) engaging in social interactions, both online and offline, has a positive impact on mental health. This helps reduce feelings of isolation, depression, and anxiety. Social interaction is essential for learning and personal development. This enables knowledge sharing, collaboration, and the exchange of diverse perspectives, which enhances critical thinking Muthmainnah, et al (2022). For further social

interaction in the digital era, networking through social platforms is very important for career growth. This facilitates opportunities, job prospects, and professional relationships.

Digital platforms allow people from different backgrounds to interact, encouraging cultural understanding and tolerance. Increased collaboration in digital spaces encourages innovation and creativity. Sharing ideas and feedback can lead to the development of new solutions and products. Additionally, online communities thrive on social interaction, bringing together individuals with similar interests, goals, or objectives. Qureshi et al. (2023); Roque-Hernández et al. (2023) social interactions play an important role in online education as they encourage student engagement, discussion, and peer learning. Although digital interactions are different from face-to-face interactions, they are still valuable. Maintaining relationships with distant friends and family has become easier through digital means. The digital era has created a hybrid world where physical and digital interactions are intertwined. Balancing these interactions is essential for a full life. Therefore, social interaction is still needed in the digital era. While technology provides new avenues to connect, it must complement, not replace, the fundamental human need for social engagement.

2.1. The importance of social Interaction in the classroom

Social interaction theory in the classroom is based on the idea that students learn and develop through their interactions with teachers, peers, and the learning environment Hurst et al (2023). Social interaction theory is closely related to social constructivism, a learning theory that emphasizes the role of social interaction in the construction of knowledge Hill, et al. (2009). According to this theory, students actively engage with others to build an understanding of concepts and develop problem-solving skills. A key idea in social interaction theory is ZPD, which Lev Vygotsky developed Albay (2019). This refers to the gap between what students can do independently and what they can do with guidance and support. Teachers play an important role in enhancing students' learning by aiding that helps them bridge this gap.

The forms of interaction that occur in the classroom, such as peer interaction, are a fundamental aspect of social interaction theory. Such strategies as designing classes with collaborative learning, group discussions, and peer teaching harness the power of peer interaction. When students work together, they can exchange ideas, challenge each other's thinking, and collectively build knowledge Henderson and Cunningham (2023).

In addition to interactions with peers, effective teacher-student interactions are critical to facilitating learning. Teachers provide guidance, feedback, and support to students, helping them navigate the learning process. Positive teacher-student relationships can create a safe and supportive classroom environment. Therefore, communication is the essence of social interaction. Effective communication, both verbal and nonverbal, is essential for conveying ideas, clarifying concepts, and resolving misunderstandings. Language development is closely related to social interaction because students learn language through communication with other people.

The social interactions created in the classroom promote collaborative problem solving as a means of improving critical thinking and problem-solving skills. By working together on complex tasks, students can utilize diverse perspectives and approaches to reach solutions Hwang and Chen (2023). So, feedback is created when teachers provide feedback to guide student progress, and students often receive feedback from peers during collaborative activities Zamora et al (2023); Li and Zhang (2023). Social interaction theory in the classroom emphasizes the importance of collaborative learning, peer interaction, and supportive teacher-student relationships Alshuraiaan, (2023). It recognizes that learning is a social process influenced by cultural and contextual factors, and it encourages active engagement and knowledge construction through interaction.

Social interaction in the classroom is very important because it can improve learning Liu, et al. (2023); B Gehlbach et al. (2023), and Kasperski and Blau (2023) social interaction activities in the classroom help students develop their communication and interpersonal skills. Engaging in discussions, group projects, and peer teaching will foster a deeper understanding of the course material. Social interaction activities are carried out by talking to colleagues about new material and ideas being constructed so that they can gain a deeper understanding of the material.

According to Bedwell et al. (2023), students can learn valuable social skills, including dispute resolution, collaboration, and teamwork, in the classroom. These abilities are essential for academic and professional development. According to McKay and Sridharan (2023), students are more likely to develop meaningful relationships when they have the opportunity to communicate with each other actively during the learning process. This encourages students to form long-term friendships, which can result in a class atmosphere that is friendlier, more comfortable, and more inclusive. These kinds of relationships may help students feel like they have a place in the world. Rice-Bailey and Chong (2023) Students' verbal and nonverbal communication skills benefit from practice with teachers and classmates, according to Chen et al. (2023). Learning to communicate effectively is a skill that will benefit students in many aspects of life outside the classroom.

2.2 ChatGPT as a Social Interaction Media

Hennig-Thurau et al. (2023) argue that students' mental health benefits from the resulting social connections. This reduces the detrimental impact of loneliness, isolation, and anxiety on education. Better mental health and academic performance are two outcomes of being surrounded by positive people, and social interaction is one activity that can prevent these effects.

Interaction with classmates and teachers is also important for the development of language (communication) and social skills, as shown by Barman and Jena (2023). Improved communication skills with language are gained through interaction, and students can hone their linguistic and social skills through repeated practice. The value of students' interactions with each other in the classroom is more than just a method to increase students' interest in learning. It helps students succeed inside and outside the

classroom by encouraging their intellectual, social, and emotional growth (Taylor et al., 2017).

ChatGPT-mediated social interaction is an interesting blend of technology and interpersonal communication. OpenAI's ChatGPT, a state-of-the-art language model with potential broad use in areas such as education and society, has received a lot of attention recently. According to Olasik (2023), ChatGPT acts as a text-based conversation partner for its users. This paves the way for serious discussions, investigations, and even small talk on any topic.

To gain a deeper understanding of the material, colleagues engage in social interaction activities by discussing new ideas and material. According to Bedwell et al. (2023), students can learn valuable social skills, including dispute resolution, collaboration, and teamwork, in the classroom. These abilities are essential for academic and professional development. According to McKay and Sridharan (2023), students are more likely to develop meaningful relationships when they have the opportunity to communicate with each other actively during the learning process. This encourages students to form long-term friendships, which can result in a class atmosphere that is friendlier, more comfortable, and more inclusive. These kinds of relationships may help students feel like they have a place in the world Rice-Bailey and Chong (2023); Chen et al. (2023). Students' verbal and nonverbal communication skills benefit from practice with teachers and classmates, according to Chen et al. (2023). Learning to communicate effectively is a skill that will benefit students in many aspects of life outside the classroom.

2.2 ChatGPT as a Social Interaction Media

Hennig-Thurau et al. (2023) argue that students' mental health benefits from the resulting social connections. This reduces the detrimental impact of loneliness, isolation, and anxiety on education. Being around positive people results in better mental health and academic performance, and social interaction is one activity that can counteract these effects.

According to Barman and Jena (2023), interaction with peers and teachers is also crucial for the development of language (communication) and social skills. Improved communication skills with language are gained through interaction, and students can hone their linguistic and social skills through repeated practice. The value of students' interactions with each other in the classroom is more than just a method to increase students' interest in learning. It helps students succeed inside and outside the classroom by encouraging their intellectual, social, and emotional growth (Taylor et al., 2017).

ChatGPT-mediated social interaction is an interesting blend of technology and interpersonal communication. OpenAI's ChatGPT, a state-of-the-art language model with potential broad use in areas such as education and society, has received a lot of attention recently. According to Olasik (2023), ChatGPT acts as a text-based

conversation partner for its users. This paves the way for serious discussions, investigations, and even small talk on any topic.

Meanwhile, Motlagh et al. (2023) and Woithe and Filipec (2023) argue that ChatGPT can be used as a tutoring tool in educational environments by functioning as a learning medium and technology, enabling students to more easily understand difficult concepts and access them as learning resources. It can enhance the educational experience by responding to questions, explaining topics, summarising, and providing learning tools. Additionally, ChatGPT helps create new knowledge by providing clarifications and examples. Researchers and educators can engage in conversations with ChatGPT to explore a variety of topics and perspectives Baidoo-Anu and Ansah (2023)

The ethics and influence of AI in the classroom by conducting human-machine interactions. The integration of ChatGPT into education and society has benefits and challenges. While it offers accessibility to information and support, concerns regarding bias, privacy, and limitations of AI also arise. The development of technology that enables ChatGPT to generate appropriate emotional responses during social interactions is further blurring the lines between human and AI interactions. ChatGPT has emerged as a tool that facilitates social interaction, learning, and knowledge exchange. Its versatility and potential applications continue to expand, with ongoing discussions regarding the ethical, affective, and social implications of human-AI interactions. This research then emphasizes the benefits of ChatGPT to close the learning gaps that arise in the classroom during the study of Pancasila and citizenship education courses.

3. RESEARCH METHODOLOGY

In the context of this research, a significant educational transformation occurred at Al-Asyariah Mandar University. This transformation, which is referred to as curricular reform in the Pancasila and Citizenship Education Study Program, is part of a broader initiative known as digital education reform. An evaluation of pre-service teachers' practices related to social interaction is carried out for one semester. Additionally, support personnel are trained to help teachers implement the curriculum effectively in their classrooms.

It should be noted that the preservice teachers program adheres to the principles established by Eshelman and Hogue (2023) and emphasizes a collaborative and hands-on approach. Teachers are encouraged to be actively involved in putting the curriculum into practice by providing the necessary resources and materials. For this principle to be achieved, the social contribution of interaction in the classroom is very important to implement.

3.1. Research Design

This research methodology outlines the main components of research, including the research subject, setting, sample size, data collection instruments, and analytical approach Fugard and Potts, (2015); Hatch, (2023). Providing a clear framework for conducting experiments on new technology courses in learning in the Pancasila and

citizenship education study program at Al Asyariah Mandar University and analysing the data obtained.

The research design for this study was a mixed methods approach, combining quantitative and qualitative elements Leko et al. (2023). This mixed methods approach increases the validity and richness of research findings, providing a more holistic view of pre-service teachers' behaviors and experiences during group discussions, idea sharing, concept understanding, and reflection in the classroom. The following is an explanation of the research design as follows.

3.1.1. Quantitative Aspect.

Survey data was obtained from questionnaire survey data. The quantitative component involves the use of surveys or questionnaires to collect structured data. Pre-service teachers participating in this study were asked to complete a questionnaire. These questionnaires will most likely contain closed-ended questions with predetermined answer choices. The aim is to collect quantitative data about various aspects related to pre-service teacher interactions in group discussions, sharing ideas, understanding concepts, and reflective practice. This data can be analysed statistically to identify trends, patterns and relationships.

3.1.2. Qualitative Aspect.

Observation of social interactions in the classroom. The qualitative aspect of this research involved direct observation of pre-service teachers' social interactions in the classroom as seen in figures 2, 3 and figure 4. The researchers observed and documented how the teachers engaged in group discussions, shared ideas, understood concepts, and reflected their learning experience. Qualitative data collection methods may include field notes, audio or video recordings, and transcripts of classroom interactions.

The combination of quantitative and qualitative data allows for a comprehensive understanding of pre-service teachers' interactions and experiences in the context of group discussions and reflective practice. Quantitative data from surveys can provide numerical insights and statistical analysis, while qualitative data from observations can provide deep insight into the quality and nature of those interactions.

This research design combines quantitative survey data with qualitative classroom observations to investigate and analyze pre-service teachers' social interactions and reflective practices during group discussions and idea sharing in an educational context. The overall aim of this research methodology is to provide a structured framework for conducting experiments related to the use of ChatGPT as a learning tool that can contribute to improving the social interaction of pre-service teachers in new technology courses in the field of Pancasila and citizenship education at Al Asyariah Mandar University. Additionally, it emphasises the importance of collecting and analysing data as part of the research process.

3.2. Sample

The subjects of this research consisted of prospective teachers. These prospective teachers were deliberately selected as research samples. A total of 20 respondents from the prospective teacher population participated in this research. A total of 20

respondents from the prospective teacher population participated in this research. As many as 60 percent are female and 40 percent are male. The age range of respondents is 25–30 years, as much as 80%, and 30-35 years, as much as 20%.

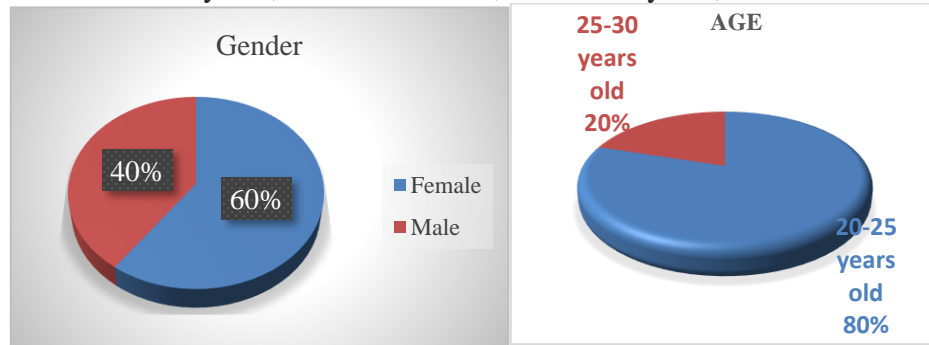


Figure 1. Respondents demographic

Figure 1 shows information regarding the demographics of study participants regarding prospective educators. Preservice teachers are the focus of this research. These pre-service teachers were selected as research samples carefully, using a method called purposive sampling. Twenty people from the group of prospective educators took part in this research. Sixty percent of those who participated were women, while only forty percent were men. The age range of these respondents was 25–35 years, and their gender distribution was displayed graphically. Most of the respondents were between 25 and 30 years old, namely 80% of the total respondents. Twenty percent of those who participated were between 30 and 35 years old.

3.3. Research Setting

This research was conducted in the context of a new technology in a learning course. Specifically, research was conducted at Al-Asyariah Mandar University. Using ChatGPT as a teaching resource can be a valuable addition to an educational toolkit.

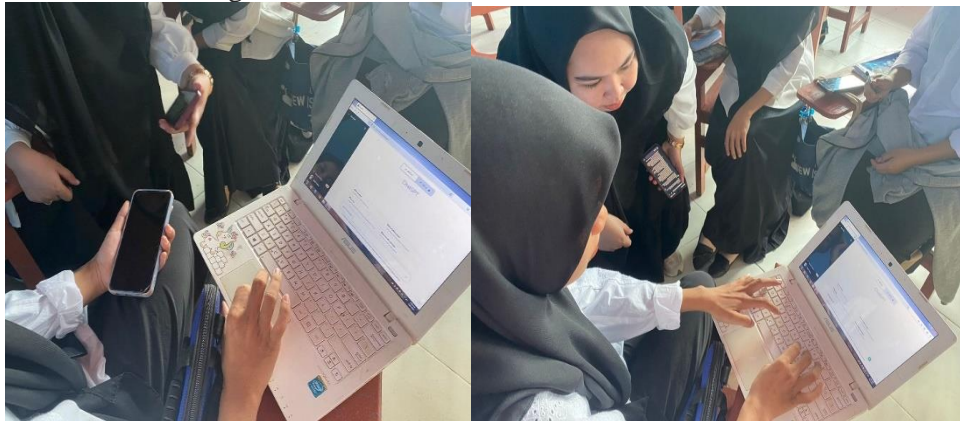


Figure 2. ChatGPT as resource in the classroom and social interaction

This study uses ChatGPT as a teaching tool, with the premise that ChatGPT can produce useful pedagogical content including readings, problem solving, conclusions and class discussion topics. Additionally, this research shows that prospective educators use ChatGPT as a metasearch engine. Continue to find reliable sources, references, and explanations on various topics. This can help simplify the research process. In the classroom, ChatGPT can be used to initiate discussions on a variety of topics, encourage critical thinking and debate among students, guide students on how to search, evaluate, and synthesize information from ChatGPT-generated content, and help educators develop strong research skills.



Figure 3. ChatGPT produce discussion in group.

Lecturers function to provide supervision to pre-service teacher's students when using ChatGPT with critical oversight, ensuring the accuracy and appropriateness of the content produced, and teaching students to critically evaluate AI-generated information. One strategy used by lecturers is to ask pre-service teacher students to access Google Scholar and Google Play Book so that the accuracy of the information remains valid.



Figure 4. Students generate their reflection on feedback session.

3.5. Data Collection Instrument

Questionnaires and direct observation during the learning process using ChatGPT are the main methods for collecting data in this research. To obtain data from the results of questionnaires that have been distributed, which can be measured using a Likert scale,

Malhotra (2006). To complement the quantitative data from the questionnaire, qualitative interpretation through observation was carried out to see the social interaction activities that occurred during the learning process with social indicators of interaction, namely discussion, sharing ideas, constructing new concepts with the group team, and the reflection process.

3.5.1. Questionnaire

Questionnaires were used as data collection instruments in this research. The purpose of this questionnaire is to collect quantitative data. Specifically, questionnaires are designed to collect data related to a Likert scale, which usually ranges from 5 (strongly agree) to 1 (strongly disagree) Alabi and Jelili (2023). Likert scale responses are often used to measure participants' attitudes, opinions, or perceptions quantitatively. This method allows researchers to obtain structured and numerical data from participants.

3.5.2. Observation

Apart from questionnaires, observations were also carried out as part of the data collection process. Data from qualitative observations adds depth to this research. In contrast to quantitative data obtained through questionnaires, qualitative data is obtained through data obtained from classroom observations. All research components that are social interactions are observed, recorded, and documented by the researcher. Information obtained through observing individual actions is a valuable addition to information obtained through questionnaires.

This research combines the use of a Likert scale questionnaire to collect structured quantitative data, in-depth observation, and participant observation to obtain in-depth qualitative information. This dual approach allows researchers to gain a comprehensive understanding of the research subject by incorporating both quantitative and qualitative aspects into data analysis.

3.6. Data analysis

Data collected through questionnaires and observations were analysed quantitatively. Quantitative analysis was carried out using the Statistical Package for the Social Sciences (SPSS) application. SPSS is used to process and analyse the collected data statistically.

Table 1. The classification of questionnaire score from students' responses

Score	Classification
5	Very good
4	Good
3	Fairly
2	Low
1	Very low

A score of 1 represents the lowest quality or performance, characterised as very low. This data provides a scoring framework with associated classifications that allow

for the assessment of performance or quality, ranging from very good to very low with intermediate categories in between.

3.6.1. Students Response on ChatGPT

Table 2. Preservice teachers' response on ChatGPT to promote social interaction.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1. I'm new to ChatGPT and have never used it before.	20	1.00	5.00	3.6000	1.27321
2. I am interested in using AI chatbots during my studies.	20	3.00	5.00	4.5000	.68825
3. ChatGPT can increase social interaction in the classroom (interaction with group friends and lecturers).	20	3.00	5.00	4.4500	.68633
4. I enjoy using ChatGPT for educational purposes.	20	3.00	5.00	4.6500	.58714
5. I believe ChatGPT can facilitate student-teacher interactions	20	1.00	5.00	4.2500	1.01955
6. ChatGPT is used for group discussions in class and providing ideas and thoughts.	20	3.00	5.00	4.4500	.68633
7. ChatGPT produces interesting concepts to study.	20	3.00	5.00	4.4000	.68056
8. I use ChatGPT to provide personalized feedback while studying.	20	4.00	5.00	4.4500	.51042
9. ChatGPT can help with learning and communication skills.	20	2.00	5.00	4.3500	.81273
10. ChatGPT can be integrated into group projects or collaborative learning as a learning resource.	20	3.00	5.00	4.4000	.68056
11. ChatGPT can help students participate better in class discussions.	20	3.00	5.00	4.4000	.75394
12. ChatGPT can be used to encourage critical thinking during learning.	20	4.00	5.00	4.5500	.51042
13. I feel comfortable interacting with ChatGPT.	20	3.00	5.00	4.4500	.60481

14. I believe ChatGPT can be used to maintain or improve social relationships in the classroom through discussion activities, sharing ideas, and learning resources	20	3.00	5.00	4.5000	.60698
15. I enjoy using ChatGPT in class because it helps increase motivation to interact in class	20	3.00	5.00	4.6000	.59824
16. I feel that ChatGPT has an impact on improving the quality of social interactions during learning.	20	3.00	5.00	4.4000	.59824
17. I believe AI chatbots like ChatGPT are useful in providing immediate feedback during learning.	20	4.00	5.00	4.6000	.50262
18. I faced challenges in understanding responses from AI chatbots like ChatGPT.	20	1.00	5.00	3.5500	1.46808
19. I feel an increase in efficiency in classroom interaction when using ChatGPT.	20	4.00	5.00	4.5000	.51299
20. I recommend ChatGPT to be used as teaching materials, learning resources and as a learning tool during the learning process.	20	4.00	5.00	4.4500	.51042
Valid N (listwise)	20				

The results of this statistical data provide insight into how users view and utilise ChatGPT in an educational context, especially in social interactions in the classroom. Table 2 provides descriptive statistics for a survey involving 20 respondents who shared their opinions and experiences regarding ChatGPT and its use in improving social interaction in the classroom. In the first statement regarding new users, it is known that around 20% of respondents stated that they were new to ChatGPT and had never used it before. Regarding statements regarding interest in AI chatbots, the data results show that most respondents (around 90%) expressed interest in using AI chatbots, such as ChatGPT, during their study period.

Most respondents (around 90%) believe that ChatGPT can improve social interactions in the classroom, including interactions with peers and teachers. In terms of using ChatGPT, a high percentage (around 95%) enjoy using ChatGPT for educational purposes. Around 85% of respondents stated that they believed that ChatGPT could facilitate interaction between students and teachers. About 90% of respondents reported that ChatGPT is used for group discussions in class, generating ideas and thoughts. As for the question regarding interest in concepts, around 85% of respondents stated that they thought that ChatGPT produced concepts that were interesting to study. In a

statement regarding personalisation when learning, most respondents (around 90%) use ChatGPT to provide personalised feedback when learning.

Questionnaire question number eight asked about ChatGPT's role in improving learning and communication skills. Table 2 shows that around 85% believe that ChatGPT can help learn and improve communication skills. The next statement is integration into group projects. It is known that the majority (around 90%) believes that ChatGPT can be integrated into group projects and collaborative learning. Apart from that, it can improve class discussions; namely, around 90% believe that ChatGPT can help students participate more effectively in class discussions. Furthermore, ChatGPT supports encouraging critical thinking, with a high percentage (around 95%) believing that ChatGPT can encourage critical thinking during learning; this skill really supports the interaction process.

Statements regarding comfort in interacting with most respondents (around 90%) felt comfortable interacting with ChatGPT, and respondents claimed that ChatGPT could improve social relationships, which was reinforced by around 90% believing that ChatGPT could be used to maintain or improve social relationships in the classroom. The majority (around 90%) respondents enjoy using ChatGPT in class because it helps increase motivation to interact, and most respondents (around 90%) feel that ChatGPT has a positive impact on improving the quality of social interactions during learning. The next statement regarding the usefulness of providing feedback is that around 90% believe that AI chatbots such as ChatGPT are useful in providing direct feedback during learning.

Some respondents (around 10%) faced challenges in understanding responses from AI chatbots like ChatGPT. However, a high percentage (around 95%) felt an increase in efficiency in classroom interactions when using ChatGPT. Besides that, approximately 90% respondents recommended ChatGPT be used as teaching materials, learning resources, and as a learning tool during the learning process. The results of this statistical data provide insight into how users view and utilise ChatGPT in an educational context, especially in social interactions in the classroom.

Table 3. The mean score of ChatGPT as teaching materials

Report		
ChatGPT and Social Interaction.		
Mean	N	Std. Deviation
87.5000	20	9.98156

The provided summary statistics report data for variables labelled ChatGPT and social interaction. Below is a summary of the key statistics for this variable.

The average score in Table 3 shows ChatGPT and social interaction is 87.5000. It represents the average value of the data points in this variable. The sample size for ChatGPT and social interaction is 20. This indicates that there are 20 data points or observations included in the analysis. The standard deviation for ChatGPT and social

interaction is 9.98156. This statistic measures the degree of variability or spread in a data set. A higher standard deviation indicates that the data points are spread more widely than the mean.

As seen on Table 3 ChatGPT and social interaction variables have a mean of 87.5000 and a sample size of 20, with the category of improvement occurring and being classified as good when applied in class, which is strengthened by the standard deviation results of 9.98156. This information provides insight into the central tendency (mean) and degree of variability (standard deviation) in the data set, which is important for understanding the characteristics of these variables from a statistical perspective.

3.6.2. Increasing social interaction through ChatGPT

The results of this study show that, on average, pre-service teachers have a good view of ChatGPT, which can help improve social interaction in the classroom during learning, an adequate understanding of how to use AI in the classroom, and a strong intention to make this view a reality. Because educators have been given direction in the form of professional development, the results are in line with what was expected. In theory, the social interactions supported by ChatGPT during classroom learning are facilitated, which in turn increases teachers' acceptance of ChatGPT and, furthermore, their intention to utilise ChatGPT in the classroom, as shown by Figure 2. Respondents access ChatGPT as a learning resource.

Pre-service teachers felt that AI-ChatGPT technology was a great asset for their learning and that it was easy to apply. Fast access and significant responses to topics during learning increased motivation to discuss and interact with group friends on Figure 3. They felt that there is sufficient support for the use of ChatGPT in the classroom from both organisations and technicians. Apart from that, they felt they had studied AI-TK (technology knowledge), AI-TPK (technology pedagogical knowledge), and AI-TPACK (technology pedagogical content knowledge). They will most likely continue to learn ChatGPT and use it for other educational purposes, such as creating questions, quizzes, and resumes. Based on the results of this research, educators maintain better use of the ChatGPT application when learning new technology in Pancasila and citizenship education study programmes.

The findings show that instructors' performance expectations are the most important element in determining their social interactions with ChatGPT. Teachers who have high performance expectations have a strong belief that integrating ChatGPT will make them better educators and can help them access information as described in table 2, questions 10 and 12. Respondents think that the information provided by ChatGPT can improve their skills. interact and be critical of information. This shows the need for lecturers to help educators understand the value of ChatGPT in the classroom if they want to encourage the integration of ChatGPT learning as a learning medium and technology at the university level. Pre-service teachers can use the ChatGPT application with the aim of practicing authentic communication anytime and anywhere (Mahe, 2023). Apart from that, this can alleviate the main obstacles to interacting at Al Asyariah Mandar University, namely obstacles to interacting and sharing ideas and concepts . It is hoped

that the social interaction of teachers using ChatGPT will increase as they realise the benefits of technology for education, and this increase in social interaction will also occur in everyday life both at the school where they teach, in the community, and in the school environment. their family environment.

It can be predicted that pre-service teachers who use ChatGPT and citizenship education educators will be interested in using ChatGPT because of its convenience, the information provided can provide ideas for discussions, and scientific ethics remain under control by accessing valid information via Google Scholar, as seen in Figure 4. Previous research on increasing ideas and discussions through the ChatGPT intervention (Whalen and Mouza 2023; Bozkurt et al., 2023) found a similar pattern. The findings show that classroom discussions and interactions can be improved using ChatGPT. According to previous research (Grassini, 2023); Mogavi et al (2023), educators are concerned that the impact of excessive use of ChatGPT may cause students to rely too much on digital resources, which could have a negative impact on the preservation of more conventional approaches to teaching education, and the efforts required to adapt to new technologies will increase their workload and reduce their efficiency. In this study, researchers found that teachers' social interactions looked active because of how simple the use of ChatGPT technology was, which functioned as a practical learning resource (teaching material).

Predicting teachers' social interactions using AI directly also depends on the teaching model designed by the lecturer. With confidence in their ability to combine ChatGPT as teaching material with pedagogy and topic knowledge, lecturers are more likely to implement the use of ChatGPT in the classroom. This is similar to research conducted by Chan et al (2023); Sullivan et al. (2023); Gimpel et al. (2023) regarding the use of ChatGPT technology in the classroom to increase learning motivation. As can be observed, after implementing ChatGPT, they tend to continue using ChatGPT to help in finding ideas to discuss with their team, as shown by figure 2. This shows that respondents are confident and aware of how ChatGPT can improve education in general, also for social interaction.

This study found that most pre-service teachers had never had access to information about ChatGPT before the pilot, so they were enthusiastic and looking for ways to incorporate course information into related technology skills within the course design framework. Therefore, instructors should investigate and revise course content to equip pre-service teachers with additional learning materials that they can access with ChatGPT to increase learning efficiency, enabling them to engage in feedback and social interactions more actively and, in turn, reduce their learning anxiety when in contact with new information. Apart from that, the instructor still asks pre-service teachers to connect the information obtained in Google Scholar.

This research also increases the expanded role of pre-service teachers beyond just gaining learning experience by developing ChatGPT-based learning materials, but also directing active participation in their own education. During learning activities, pre-service teachers can save their time by searching for appropriate resources using

ChatGPT and holding discussions to create new concepts such as connecting material content obtained through ChatGPT and Google Scholar, which will of course increase engagement, learning achievement, and learning quality compared to a purely theoretical approach. By using ChatGPT as a multimodal educational experiment, this research provides pre-service teachers with the necessary knowledge and expertise in the field of technology to try AI-integrated learning.

Based on the findings this study highlight the positive impact ChatGPT has on prospective teachers and the potential benefits it offers for education. Pre-service teachers generally have a favourable view of ChatGPT, which has the potential to increase social interactions in the classroom during lessons. They have a good understanding of how to integrate AI, such as ChatGPT, into the classroom, and they express a strong intent to put it into practice. Professional development opportunities have guided educators in their use of ChatGPT, aligning outcomes with expectations.

We observe pre-service teachers consider AI-ChatGPT technology to be an asset for their learning. ChatGPT's ease of access and ability to provide substantial responses to a variety of topics has increased their motivation to engage in discussions and interactions with peer's figure 2. They believe that educational institutions and engineers provide sufficient support for ChatGPT integration in the classroom. Pre-service teachers have also studied AI-related aspects, demonstrating their commitment to learning and using ChatGPT for various educational purposes. Instructors' expectations play an important role in determining their interactions with ChatGPT. Teachers with high performance expectations believe that integrating ChatGPT can improve their teaching and increase their access to information. ChatGPT is seen as a tool to improve skills, encourage interaction, and encourage critical thinking among educators.

ChatGPT can increase social interaction between prospective teachers, both in educational environments and in everyday life. It is predicted that the convenience and information provided by ChatGPT will encourage discussion and maintain ethical standards in education. Classroom discussions and interactions can be enhanced with the use of ChatGPT, although there are concerns about over-reliance on digital resources. Instructors who are confident in integrating ChatGPT into their teaching model are more likely to adopt it in the classroom. ChatGPT simplifies the process of brainstorming ideas and continues to be used for this purpose after implementation. Pre-service teachers, who previously had little exposure to ChatGPT, were enthusiastic about implementing it into their education. Instructors are encouraged to revise course content to provide additional learning materials accessible via ChatGPT, increasing learning efficiency and reducing anxiety when interacting with new information.

Research Limitations

This experimental study did not investigate other general courses as it only focused on the use of ChatGPT in deep learning courses to survey social interactions that occur in the classroom. Because the research respondents were pre-service teachers at Al Asyariah Mandar University, a number of contextual variables, including location, socio-economic status, school size, and academic year, played a role in drawing

conclusions regarding these findings. This research technique and research beliefs only apply to the experimental class and not to other experimental approaches or other universities. There may be temporary obstacles to drawing conclusions from research findings because the experimental learning was only carried out for 4 weeks and lasted 100 minutes.

Our research shows that incorporating ChatGPT lessons into professional teacher education classes is feasible and that an approach that combines theoretical study with hands-on application is optimal for teaching these concepts. Although new technology courses in learning can be taught in class with the help of teaching platforms, not all pre-service teachers will easily understand them. Researchers presented ChatGPT operations in class and then gave them to pre-service teachers to execute as part of a teaching experiment while instructors supervised them or gave them instructions. The author of this study reflects on his experience as an experimental ChatGPT instructor and its impact on social interactions, and the results, both practical and enlightening, serve to provide opportunities for pre-service teachers to prepare new concepts in reflection activities and present the results of discussions with their group friends. In class, instructors guide preservice teachers through each step of the operating process, and then students work in groups to run the assembly and complete it under the instructor's supervision. Pre-service teachers in theoretical and practical aspects can benefit from using ChatGPT and reviewing material before, during, and after class, which results in increased social interaction.

4. CONCLUSION

This research contributes positively to education by encouraging social interactions, enhancing learning experiences, and supporting pre-service teachers and instructors in a variety of educational contexts. The main objective of this paper is to examine the expected social interactions related to learning activities by using ChatGPT as teaching materials and sources of information. Through a synthesis of literature findings that explore the potential and benefits of ChatGPT during learning, it really helps pre-service teachers to actively interact through discussion activities, sharing ideas, constructing concepts, connecting information, and reflecting on material accurately. Additionally, this paper provides a comprehensive analysis of the ChatGPT tools currently available and accessible using smartphones and laptops. Working in groups is the best way to hone human-to-human and human-to-machine social interactions, which are expected to increase your sense of competence in expressing concepts and ideas about the material. Participants' sense of agency increases when their tasks and responsibilities are well defined.

Additionally, the findings suggest that participation in groups is associated with social interaction. Social interaction reasoning is likely to increase when interacting with ChatGPT technology involving generalisation and learning motivation aimed at stimulating pre-service teachers' interaction during learning. The pedagogical aim of this paper is to assist pre-service teachers in creating learning activities that involve social

interaction in the classroom and improving existing ones that will assist pre-service teachers in acquiring the abilities mentioned above. We also propose that the results of this research can be used as a basis for creating teaching models that encourage strong growth of each social skill in ChatGPT-based classes.

References

- Alabi, A. T., & Jelili, M. O. (2023). Clarifying likert scale misconceptions for improved application in urban studies. *Quality & Quantity*, 57(2), 1337-1350.
- Alaimo, C., & Kallinikos, J. (2019). Social media and the infrastructuring of sociality. In *Thinking infrastructures* (Vol. 62, pp. 289-306). Emerald Publishing Limited.
- Albay, E. M. (2019). Analyzing the effects of the problem-solving approach to the performance and attitude of first year university students. *Social Sciences & Humanities Open*, 1(1), 100006.
- Alshuraiaan, A. (2023). Exploring the Relationship between Teacher-student Interaction Patterns and Language Learning Outcomes in TESOL Classrooms. *Journal of English Language Teaching and Applied Linguistics*, 5(3), 25-34.
- Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, 7(1), 52-62
- Barman, M., & Jena, A. K. (2023). Effect of interactive video-based instruction on learning performance in relation to social skills of children with intellectual disability. *International Journal of Developmental Disabilities*, 69(5), 683-696.
- Bedwell, W. L., Fiore, S. M., & Salas, E. (2014). Developing the future workforce: An approach for integrating interpersonal skills into the MBA classroom. *Academy of Management Learning & Education*, 13(2), 171-186.
- Borup, M., Brown, N., Konrad, K., & Van Lente, H. (2006). The sociology of expectations in science and technology. *Technology analysis & strategic management*, 18(3-4), 285-298.
- Bozkurt, A., Xiao, J., Lambert, S., Pazurek, A., Crompton, H., Koseoglu, S., ... & Jandrić, P. (2023). Speculative futures on ChatGPT and generative artificial intelligence (AI): A collective reflection from the educational landscape. *Asian Journal of Distance Education*, 18(1).
- Chan, C. K. Y., & Lee, K. K. (2023). The AI generation gap: Are Gen Z students more interested in adopting generative AI such as ChatGPT in teaching and learning than their Gen X and Millennial Generation teachers?. *arXiv preprint arXiv:2305.02878*.

Chen, X., Cheng, G., Zou, D., Zhong, B., & Xie, H. (2023). Artificial Intelligent Robots for Precision Education. *Educational Technology & Society*, 26(1), 171-186.

Davis, J. R., & Arend, B. D. (2023). *Facilitating seven ways of learning: A resource for more purposeful, effective, and enjoyable college teaching*. Taylor & Francis.

Doeveling, K., & Sommer, D. (2023). 80 Mediatized emotions, digitalized communication and globalization. *Language and Emotion. Volume 3*, 3, 1690.

Eshelman, T. C., & Hogue, M. (2023). Pre-Service Teacher Perceptions on Tpack Instructional Design Micro-Course: A Case Study in the Northeastern United States. *Turkish Online Journal of Educational Technology-TOJET*, 22(1), 161-180.

Fugard, A. J., & Potts, H. W. (2015). Supporting thinking on sample sizes for thematic analyses: a quantitative tool. *International journal of social research methodology*, 18(6), 669-684.

Gehlbach, H., Mascio, B., & McIntyre, J. (2023). Social perspective taking: A professional development induction to improve teacher–student relationships and student learning. *Journal of Educational Psychology*, 115(2), 330.

Gimpel, H., Hall, K., Decker, S., Eymann, T., Lämmermann, L., Mädche, A., ... & Vandrik, S. (2023). *Unlocking the power of generative AI models and systems such as GPT-4 and ChatGPT for higher education: A guide for students and lecturers* (No. 02-2023). Hohenheim Discussion Papers in Business, Economics and Social Sciences.

Grassini, S. (2023). Shaping the future of education: exploring the potential and consequences of AI and ChatGPT in educational settings. *Education Sciences*, 13(7), 692.

Hatch, J. A. (2023). *Doing qualitative research in education settings*. State university of New York press.

Henderson, R. W., & Cunningham, L. (2023). Creating interactive sociocultural environments for self-regulated learning. In *Self-regulation of learning and performance* (pp. 255-281). Routledge.

Hennig-Thurau, T., Aliman, D. N., Herting, A. M., Cziehso, G. P., Linder, M., & Kübler, R. V. (2023). Social interactions in the metaverse: Framework, initial evidence, and research roadmap. *Journal of the Academy of Marketing Science*, 51(4), 889-913.

Hill, J. R., Song, L., & West, R. E. (2009). Social learning theory and web-based learning environments: A review of research and discussion of implications. *The Amer. Jrnl. of Distance Education*, 23(2), 88-103.

Huang, M. C. (2023). Anthropological dimensions of modern educational culture: theoretical analysis. *Journal of Contemporary Philosophical and Anthropological Studies*, 1(1).

Hurst, B., Wallace, R. R., & Nixon, S. B. (2013). The impact of social interaction on student learning. *Reading Horizons*.

Hwang, G. J., & Chen, P. Y. (2023). Effects of a collective problem-solving promotion-based flipped classroom on students' learning performances and interactive patterns. *Interactive Learning Environments*, 31(5), 2513-2528.

Kasperski, R., & Blau, I. (2023). Social capital in high-schools: teacher-student relationships within an online social network and their association with in-class interactions and learning. *Interactive Learning Environments*, 31(2), 955-971.

Kasperski, R., & Blau, I. (2023). Social capital in high-schools: teacher-student relationships within an online social network and their association with in-class interactions and learning. *Interactive Learning Environments*, 31(2), 955-971.

Kleinlein, E. (2023). Asynchronous narrative audio-messages: An internet-based qualitative method for data collection in international research. In *Postdigital Participation in Education: How Contemporary Media Constellations Shape Participation* (pp. 199-230). Cham: Springer Nature Switzerland.

Leko, M. M., Hitchcock, J. H., Love, H. R., Houchins, D. E., & Conroy, M. A. (2023). Quality indicators for mixed-methods research in special education. *Exceptional Children*, 89(4), 432-448.

Li, M., & Zhang, M. (2023). Collaborative writing in L2 classrooms: A research agenda. *Language Teaching*, 56(1), 94-112.

Lim, Y. M., Lee, T. H., Yap, C. S., & Ling, C. C. (2016). Employability skills, personal qualities, and early employment problems of entry-level auditors: Perspectives from employers, lecturers, auditors, and students. *Journal of Education for Business*, 91(4), 185-192.

Liu, C., Wan, P., Hwang, G. J., Tu, Y. F., & Wang, Y. (2023). From competition to social interaction: a mobile team-based competition approach to promoting students' professional identity and perceptions. *Interactive Learning Environments*, 31(2), 1158-1172.

Lyle, K. (2017). Shaping the future of sociology: The challenge of interdisciplinarity beyond the social sciences. *Sociology*, 51(6), 1169-1185.

- Maher, D. (2023). Blended Learning for Pre-Service Teachers. In *Handbook of Research on Innovative Frameworks and Inclusive Models for Online Learning* (pp. 256-274). IGI Global.
- Malhotra, N. K. (2006). Questionnaire design. *The handbook of marketing research: Uses, misuses, and future advances*, 83.
- McHaney, R. (2023). *The new digital shoreline: How Web 2.0 and millennials are revolutionizing higher education*. Taylor & Francis.
- McKay, J., & Sridharan, B. (2023). Student perceptions of collaborative group work (CGW) in higher education. *Studies in Higher Education*, 1-14.
- Mogavi, R. H., Deng, C., Kim, J. J., Zhou, P., Kwon, Y. D., Metwally, A. H. S., ... & Hui, P. (2023). Exploring user perspectives on chatgpt: Applications, perceptions, and implications for ai-integrated education. *arXiv preprint arXiv:2305.13114*.
- Moretti, S. (2002). Computer simulation in sociology: What contribution?. *Social Science Computer Review*, 20(1), 43-57.
- Motlagh, N. Y., Khajavi, M., Sharifi, A., & Ahmadi, M. (2023). The Impact of Artificial Intelligence on the Evolution of Digital Education: A Comparative Study of OpenAI Text Generation Tools including ChatGPT, Bing Chat, Bard, and Ernie. *arXiv preprint arXiv:2309.02029*.
- Olasik, M. (2023). “Good morning, ChatGPT, Can We Become Friends?” An Interdisciplinary Scholar’s Experience of ‘Getting Acquainted’ with the OpenAI’s Chat GPT: An Auto Ethnographical Report. *European Research Studies Journal*, 26(2), 269-284.
- Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2023). Factors affecting students’ learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 31(4), 2371-2391.
- Rathore, B. (2023). Future of AI & generation alpha: ChatGPT beyond boundaries. *Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal*, 12(1), 63-68.
- Rawal, S. B. (2023). Exploring Students’ Perceptions on Teachers’ Feedback in the Classroom (A Study of Achham Multiple Campus, Nepal). *The Journal of Social Sciences Studies and Research*, 3(05), 191-201.
- Rebele, J. E., & Pierre, E. K. S. (2019). A commentary on learning objectives for accounting education programs: The importance of soft skills and technical knowledge. *Journal of Accounting Education*, 48, 71-79.

Rice-Bailey, T., & Chong, F. (2023). *Interpersonal Skills for Group Collaboration: Creating High-performance Teams in the Classroom and the Workplace*. Taylor & Francis.

Roque-Hernández, R. V., Díaz-Roldán, J. L., López-Mendoza, A., & Salazar-Hernández, R. (2023). Instructor presence, interactive tools, student engagement, and satisfaction in online education during the COVID-19 Mexican lockdown. *Interactive Learning Environments*, 31(5), 2841-2854.

Scott, J. (2023). *Sociological theory: Contemporary debates*. Edward Elgar Publishing.

Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning.

Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child development*, 88(4), 1156-1171.

Whalen, J., & Mouza, C. (2023). ChatGPT: Challenges, Opportunities, and Implications for Teacher Education. *Contemporary Issues in Technology and Teacher Education*, 23(1), 1-23.

Woithe, J., & Filipec, O. (2023). Understanding the Adoption, Perception, and Learning Impact of ChatGPT in Higher Education: A qualitative exploratory case study analyzing students' perspectives and experiences with the AI-based large language model.

Zamora, A. N., August, E., Fossee, E., & Anderson, O. S. (2023). Impact of transitioning to remote learning on student learning interactions and sense of belonging among public health graduate students. *Pedagogy in Health Promotion*, 9(3), 203-213.

Zapletal, A., Wells, T., Russell, E., & Skinner, M. W. (2023). On the triple exclusion of older adults during COVID-19: Technology, digital literacy and social isolation. *Social Sciences & Humanities Open*, 8(1), 100511.

Predictors and Outcome of Employee Engagement

Akansha Mer¹

Abstract

Introduction: Employee engagement is a vital component of organizational success, transcending traditional notions of job satisfaction.

Aim: This study provides an overview of predictors and outcomes of employee engagement in startup ecosystem.

Method: The current study employed a literature approach. A comprehensive literature search was conducted review to identify empirical and conceptual papers for the present study. the systematic literature review methodology enabled a critical analysis, synthesis, and mapping of the existing literature in this specific context.

Findings: Findings reveal supervisor support, interpersonal relations, learning and growth autonomy, competence, and relatedness, initiate new things and introduce new ideas, job crafting, managerial activities, financial control, creative organizational climate, growth, independence, flexibility, and risk taking are major predictors of employee engagement. Whereas, innovative work behavior and creativity are the major outcomes of employee engagement in startups.

Originality and value: The novelty of the study stems by introducing a new variable i.e., creative organizational climate.

Key Words: employee engagement, startups, and creativity

Jel Codes: M13, O15, L26

1. INTRODUCTION

Employee engagement is a critical factor in the success of any organization, including startups. It refers to the emotional commitment and involvement of employees in their work, which leads to higher productivity, greater job satisfaction, and overall better business outcomes.

Creating a conceptual model for employee engagement in startups involves understanding the key components and factors that influence engagement within this unique context.

Startups are dynamic and fast-paced organizations characterized by innovation, uncertainty, and resource constraints. Employee engagement in this context is crucial because it can drive innovation, foster a positive work culture, and help startups attract and retain top talent, all of which are critical for their growth and success.

¹ Assistant Professor, Banasthali Vidyapith, Faculty of Management Studies, Department of Commerce and Management, Rajasthan, India

In a startup, the entrepreneurial spirit often serves as a catalyst for engagement, inspiring individuals to contribute meaningfully to the company's mission and goals. Small team dynamics foster a sense of belonging and collaboration, while autonomy empowers employees to make impactful decisions. The rapid pace of learning and growth opportunities are additional drivers of engagement, attracting talent eager to expand their skills. Alignment with the startup's values creates a sense of purpose, reinforcing commitment.

However, startups face resource constraints that can challenge engagement efforts. Managing these constraints while maintaining a motivated workforce is essential. Employee engagement in startups is a dynamic interplay of these factors, ultimately impacting the startup's trajectory.

Recognizing the significance of employee engagement in startups is essential for attracting and retaining top talent, as well as for achieving sustainable growth and success.

While conventional corporate settings have extensively studied and tailored employee engagement frameworks, the startup landscape presents a distinctive canvas, inviting an examination into its idiosyncratic factors that foster and inhibit engagement. In this milieu, where roles often transcend boundaries, where autonomy converges with accountability, and where a sense of ownership permeates every facet of operations, the dynamics of engagement assume a unique complexion.

The study sets the stage for a comprehensive exploration of the subject, underscoring the importance of understanding and actively managing employee engagement within the unique context of startups. Thus, the study aims to identify the predictors and outcomes of employee engagement in startups.

2. THE THEORETICAL FOUNDATION OF THE FRAMEWORK

The proposed conceptual framework for work engagement in startups stems from the revised job demands-resources (JD-R) model as outlined by Bakker and Demerouti (2007). Bakker & Demerouti's (2008) JD-R model delineates work conditions into job demands and job resources. Job demands encompass the physical, social, or organizational facets of a job that necessitate sustained physical, psychological, or cognitive effort, incurring associated physiological or psychological costs. These demands include workload, time pressure, job insecurity, role ambiguity, and role conflict. Elevated job demands can induce stress, leading to disengagement and adverse health effects.

Conversely, job resources function to achieve work objectives, mitigate job demands and their associated costs, and foster personal growth and development. Furthermore, personal resources, aligned with resilience, pertain to individuals' perceived ability to effectively control and influence their environment. Examples encompass self-efficacy, optimism, and self-esteem.

Job demands and resources impact work engagement, which subsequently influences positive organizational outcomes, such as enhanced performance. This study identifies job demands, job resources, within startup environments, aligning with the JD-R model. Additionally, the research examines the outcomes of work engagement in startups, following the framework delineated by this model.

4. RESEARCH METHODOLOGY

The study employed Torraco's methodology (2005 & 2016) alongside Callahan's guidelines to conduct a literature review. This approach aimed to locate pertinent studies on work engagement or employee engagement within startup environments. Torraco's method facilitated a comparative analysis of relevant topics and the integration of dispersed information, offering avenues for novel insights and guiding further research directions (Torraco, 2005).

Adhering to Tranfield et al.'s systematic framework (2003), the researcher ensured a transparent and reproducible review process. This systematic methodology allowed for a comprehensive analysis of both empirical and conceptual papers, without imposing specific time constraints on data collection. The primary objective of this literature review is to comprehensively analyze and synthesize existing scholarly literature on “predictors and outcomes of employee engagement in startups”. The review aims to identify predictors and outcomes of employee engagement.

Initially, 200 articles were identified through database searches. After eliminating duplicated and triplicated records (n=32), a thorough screening of titles and abstracts excluded studies not aligned with the research question (n=84). This refinement process left a pool of articles. Further scrutiny led to the removal of 74 additional articles that did not address the antecedents and consequences of work engagement in startup contexts. Ultimately, 10 articles met the screening criteria for inclusion in the review.

The keywords used for the study included the following: startups, new ventures, work engagement, employee engagement, predictors, antecedents, outcomes, consequences.

The researcher further referred to ABDC and scopus indexed journals to ensure the quality of research work.

5. OVERVIEW OF WORK ENGAGEMENT IN STARTUPS

Employee engagement in startups often involves a tight-knit team culture, where everyone wears multiple hats, fostering a sense of ownership. Startups prioritize open communication, empowering employees to voice ideas and concerns. Flexible work arrangements and a focus on individual growth often characterize their approach. Recognition of contributions and alignment with the company's mission are key factors driving engagement. Constant adaptation and innovation are encouraged, fostering a dynamic and engaging work environment.

Table 1 shows the overview of predictors (job resource, personal resources and job demands) and outcomes of employee engagement in startups.

Table 1: Predictors and Outcomes of Employee Engagement in Startups

S. n o	Author (Year)	Setting	Place	Job Resources	Personal Resource	Job Demand	Outcomes
1.	Kulkarni, Mutkekar & Ingalagi (2020)	Startups	India	creating a sense of recognition, training and development	creating organization brand value	-	Work engagement
2.	Gulyani & Sharma (2018)	Startups	India	supervisor support and interpersonal relations, learning and growth opportunities	Self esteem	-	Work engagement and work happiness
3.	Men, Qin & Mitson (2021)	Startups	China	autonomy, competence, and relatedness,	Self esteem	-	Engagement of startup employee
4.	Pukkeeree, Na-Nan & Wongsuwan (2020)	Startups	Thailand	attitudes of willingness, pride, inspiration, initiate new things and introduce new ideas	loyalty and happiness to perform responsibility	-	Employee engagement influences innovative work behavior.
5.	Kwon, & Kim (2020).	Startups	USA	Autonomy, job crafting	Self esteem, self-efficacy	Hindrance demands, Challenge demands	employee engagement and innovative behavior

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

6.	Pollack, Carr, Michaelis & Marshall (2019)	Startups	General		self-efficacy and persistence		employee engagement
7.	Van Gelderen, M., & Jansen (2006)	Startups	Marco	autonomy, self-congruence			employee engagement
8.	Alikhani, Z., & Shahriari, M. (2022)	Startups	General	growth, independence, flexibility, managerial activities, financial control, and risk taking	Self-efficacy, opportunity to generate and reap profits	-	employee engagement
9	Kristiana, Panjaitan, Goeltom, & Prasetya, (2021)		General	autonomy, participatory decision-making, social support and development , opportunities , Compensations and rewards, training opportunities	-	-	Work engagement
10 .	Rajagopal & Rajagopal (2020)	Startups	India	self-congruence, Self-efficacy, opportunity to generate and reap profits, financial control, and risk taking	-	-	Work engagement And creativity

6. PROPOSED CONCEPTUAL FRAMEWORK

This conceptual model aims to provide a framework for understanding and enhancing employee engagement within startup environments. It recognizes that startup employees often face unique challenges and opportunities compared to those in established organizations. The model takes into account various factors and dimensions that contribute to employee engagement in startups, emphasizing the importance of aligning these elements with the startup's mission, values, and goals.

The dynamic and challenging, and work engagement may also be influenced by factors such as risk tolerance, adaptability, and the ability to cope with uncertainty. Startup founders and leaders play a critical role in creating an environment that fosters work engagement, as they set the tone for the company culture and values.

6.1 Job Demands in Startups

Hindrance Demands:

Hindrance demands are job-related stressors or demands that hinder an employee's well-being and job performance. In the context of startups, hindrance demands might include:

Excessive administrative tasks that take time away from more strategic work.

Workplace politics and conflicts. Insufficient resources and support to perform tasks effectively. Unclear or constantly changing job roles and expectations. Lack of work-life balance due to excessive working hours or high-pressure environments. These demands can be detrimental to employee motivation, job satisfaction, and overall well-being. Dealing with hindrance demands can lead to burnout and reduced performance.

Challenging Demands: Challenge demands are job-related stressors or demands that, while potentially stressful, have the potential to lead to personal growth, increased job performance, and positive outcomes. In the context of startups, challenge demands might include: Taking on new and innovative projects that require learning and adaptation.

Opportunities to work on high-impact projects that have the potential for significant success.

Responsibilities that require employees to stretch their skills and abilities, fostering professional development. A dynamic and rapidly changing work environment that encourages problem-solving and creativity.

Challenge demands, when managed effectively, can lead to increased job satisfaction, personal growth, and a sense of accomplishment. Employees may view these demands as opportunities to excel and thrive in their roles.

In summary, hindrance demands represent job demands that hinder well-being and performance, while challenge demands represent demands that, despite being potentially stressful, have the potential to lead to personal growth and positive outcomes. Balancing these two types of demands is crucial in creating a healthy and productive work environment in startups. It's important for employees and employers in startups to

recognize the nature of these demands and work towards minimizing hindrance demands and leveraging challenge demands for growth and success.

6.2 Predictors of Work Engagement in Startups

Job Autonomy: Employees in startups often have more autonomy and responsibility, which can lead to higher work engagement.

Passion for the Business: Employees who are passionate about the startup's mission and goals are more likely to be engaged in their work.

Strong Leadership: Effective and supportive leadership is crucial for fostering work engagement in startups.

Organizational Culture: A positive and innovative culture can encourage employees to be more engaged in their work.

Team Collaboration: Collaboration and strong social connections within small startup teams can promote work engagement.

Learning and Growth: Startups often offer employees opportunities for rapid learning and skill development. The dynamic nature of startups allows individuals to take on various roles and responsibilities, contributing to their growth and engagement.

Competence: In startups, employees often wear multiple hats and handle diverse tasks. Feeling competent in executing these tasks, along with receiving feedback and support, enhances engagement as individuals feel they are making meaningful contributions.

Relatedness: In the close-knit startup environment, a strong sense of camaraderie often develops among team members. This sense of belonging and connection to a shared mission or vision boosts engagement significantly.

Initiating New Things and Introducing Ideas: Startups thrive on innovation. Encouraging employees to contribute new ideas and initiatives creates an environment where everyone feels empowered to make a difference, contributing to higher engagement levels.

Job Crafting: Startups often allow for flexible job roles and responsibilities. Employees can shape their roles based on their strengths and interests, which leads to higher engagement as they feel more aligned with their work.

Managerial Activities: Supportive and inspiring leadership is crucial in startups. Managers who provide mentorship, guidance, and opportunities for growth positively influence employee engagement and commitment.

Financial Control: Startups may involve employees in financial aspects, making them more aware of the company's financial health and their impact. This transparency can foster a sense of responsibility and engagement.

Creative Organizational Climate: Startups inherently value creativity and innovation. Cultivating an environment where ideas are welcomed and where risk-taking is encouraged drives engagement by making employees feel that their contributions matter.

Growth, Independence, Flexibility, and Risk-taking: These attributes are fundamental to the startup culture. Employees are often drawn to startups because of the opportunities for personal and professional growth, the independence to explore ideas, the flexibility in work arrangements, and the willingness to take calculated risks.

6.3 Outcomes of Work Engagement in Startups

Increased Productivity: Engaged employees tend to be more productive, which can be crucial for startups looking to grow and succeed.

Innovative service behaviour: Engaged employees are more likely to generate and implement innovative ideas, which can be a significant advantage for startups.

Creativity: Engaged teams in startups often foster a culture of collaboration and open communication. When team members feel valued and their input is encouraged, they are more likely to share ideas freely, leading to a pool of diverse thoughts that spark creativity.

6.4 Proposed Model

Figure 1 shows the proposed conceptual model of predictors and outcomes of employee engagement in a startup ecosystem.

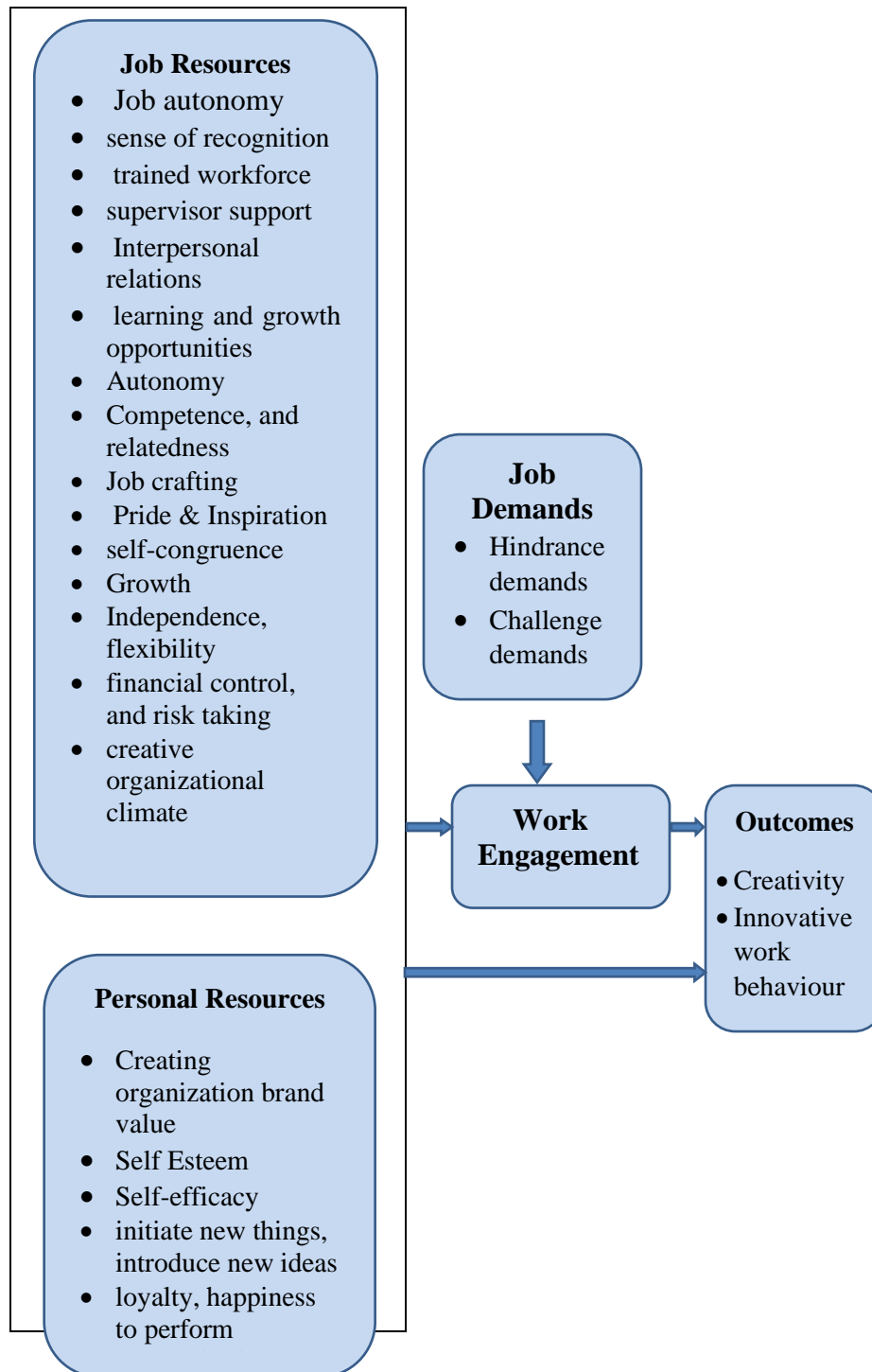


Figure 1. Conceptual model on work engagement in startups

7. MANAGERIAL IMPLICATION

To promote work engagement in a startup, managers can consider the following strategies:

Effective Leadership: Leadership that inspires, supports, and communicates a compelling vision can foster engagement.

Job Design: Managers should ensure that job roles are designed to be challenging, meaningful, and aligned with employees' strengths.

Recognition and Rewards: Managers should recognize and reward employees for their contributions and achievements. This can be especially important in startups, where resources may be limited.

Training and Development: Managers should invest in the professional development of employees, helping them acquire new skills and grow in their roles.

Communication: Managers should keep open, transparent, and regular communication channels to share information, provide feedback, and involve employees in decision-making.

Employee Involvement: Furthermore, managers should encourage employees to be part of the decision-making process and contribute to the company's growth and direction.

8. CONCLUSION

In conclusion, work engagement in startups is a critical factor that can significantly influence the success and growth of these dynamic and innovative organizations. It represents a state of positive, fulfilling, and enthusiastic involvement in one's work and the organization. Startups, with their unique characteristics, can benefit greatly from fostering work engagement among their employees.

REFERENCES

- Alikhani, Z., Shahriari, M. (2022), "The effect of servant leadership on competitiveness of startups: The mediating role of entrepreneurial orientation and self-efficacy", *The International Journal of Entrepreneurship and Innovation*, 14657503221134511.
- Azevedo, M. C. D., Schlosser, F., McPhee, D. (2021), "Building organizational innovation through HRM, employee voice and engagement", *Personnel Review*, 50(2), 751-769.
- Kulkarni, P., Mutkekar, R., Ingalagi, S. (2020), "Role of strategic management for employee engagement and skill development for startups", *Vilakshan-XIMB Journal of Management*, 17(1/2), 79-95.

Gulyani, G., Sharma, T. (2018), “Total rewards components and work happiness in new ventures: The mediating role of work engagement”, In Evidence-based HRM: A global forum for empirical scholarship, 6(3), 255-271).

Kristiana, Y., Panjaitan, A., Goeltom, V. A., & Prasetya, A. B. (2021), “Managing employee retention in mergers and acquisitions: A systematic review”, International Journal of Social, Policy and Law, 2(4), 44-54.

Men, L. R., Qin, Y. S., Mitson, R. (2021), “Engaging startup employees via charismatic leadership communication: The importance of communicating vision, passion, and care”, International Journal of Business Communication, 23294884211020488.

Mer, A., & Srivastava, A. (2023), “Employee Engagement in the New Normal: Artificial Intelligence as a Buzzword or a Game Changer?..”, In The Adoption and Effect of Artificial Intelligence on Human Resources Management, Part A (pp. 15-46). Emerald Publishing Limited.

Mer, A., Vijay, P. (2021), Towards enhancing work engagement in the service sector in India: A conceptual model, In Doing Business in Emerging Markets (pp. 118-135). Routledge, India.

Mer, A., Viridi, A. S. (2022), Artificial Intelligence Disruption on the Brink of Revolutionising HR and Marketing Functions, Impact of Artificial Intelligence on Organizational Transformation (pp. 1-19). Wiley, US.

Mer, A., Viridi, A. S., Sengupta, S. (2022), “Unleashing the Antecedents and Consequences of Work Engagement in NGOs through the Lens of JD-R Model: Empirical Evidence from India”, VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations, 1-13.

Mer, A. (2023), Artificial Intelligence in Human Resource Management: Recent Trends and Research Agenda, Digital Transformation, Strategic Resilience, Cyber Security and Risk Management, 111, 31-56.

Mer, A. (2022), A study on antecedents and consequences of work engagement with special reference to NGOs in Uttarakhand, Thesis, Shodhganga.

Pollack, J. M., Carr, J. C., Michaelis, T. L., Marshall, D. R. (2019), “Hybrid entrepreneurs’ self-efficacy and persistence change: A longitudinal exploration”, Journal of Business Venturing Insights, 12, e00143

Pukkeeree, P., Na-Nan, K., Wongsuwan, N. (2020), “Effect of attainment value and positive thinking as moderators of employee engagement and innovative work behaviour”, Journal of Open Innovation: Technology, Market, and Complexity, 6(3), 69.

Rajagopal, A., & Rajagopal, A. (2020), “Entrepreneurial Evolution at the Bottom of the Pyramid”, Managing Startup Enterprises in Emerging Markets: Leadership Dynamics and Marketing Strategies, 21-43.

Kwon, K., & Kim, T. (2020), “An integrative literature review of employee engagement and innovative behavior: Revisiting the JD-R”, *Human Resource Management Review*, 30(2), 100704.

Van Gelderen, M., & Jansen, P. (2006), “Autonomy as a start-up motive. *Journal of small business and enterprise development*”, *Journal of small business and enterprise development*, 13(1), 23-32.

Examination of the Companies in the BIST 30 Index within the Framework of the UN Sustainable Development Goals

Sinan Saraçlı¹, Bilge Villi², Berkalp Tunca³

Abstract

Introduction: Sustainability; In recent years, has become one of the issues that has been frequently emphasized, the subject of many researches, and given more importance to businesses. Through sustainability reports, which can be considered as an indicator of the importance businesses attach to sustainability and a reflection of their understanding of transparency and accountability; to share their statements regarding the economic, environmental and social dimensions of their activities with their stakeholders. Sustainability reporting can be defined as the practice of being accountable, disclosing and measuring corporate performance to internal and external stakeholders for the purpose of sustainable development.

Aim: The purpose of this study is to statistically examine the companies in the BIST 30 Index in terms of their attitudes towards 17 goals within the sustainable development goals determined by the United Nations.

Method: In the study, the sustainability and integrated activity reports compiled from the Borsa Istanbul and Public Disclosure Platform websites published by the companies in the BIST 30 Index were examined. The data compiled from these reports were examined with Multiple Correspondence Analysis (MCA) and the relationships between categorical variable levels were presented in a two-dimensional Euclidean space.

Findings: When the data compiled within the scope of the study is examined, it is seen that 6 out of 30 companies do not have a sustainability report, and among those that do exist, very few give very high priority to the sustainable development goals determined by the UN. Detailed findings of the analysis are given in the relevant figures and tables.

Originality and value: When the national literature was examined, no study was found examining the companies in the BIST Index in terms of sustainable development goals. For this reason, it is thought that this study will be a pioneering study and will contribute to the literature.

Key Words: Sustainability, Sustainability Reports, BIST, Global Development Goals, Multiple Compliance Analysis.

Jel Codes: C10, M10, M20

¹ Ph.D. Balıkesir University, Faculty of Medicine, Department of Biostatistics, Turkey.

² Ph.D. Balıkesir University, Sındırgı Vocational School, Department of Business Management, Turkey.

³ Ph.D. Candidate, Eskişehir Osmangazi University, Department of Statistics, Turkey.

1. INTRODUCTION

Sustainability has been the subject of study for many different disciplines to date. Its first emergence was realized with business activities. By focusing on the economic, environmental and social dimensions of business activities, sustainability offers important strategic advantages for businesses to survive and guides the vision of businesses. While the economic dimension of sustainability is concerned with profit and continuity, which are the main objectives of businesses, the social dimension focuses on the fact that the business is a social entity and should not be indifferent to social issues. The environmental dimension of sustainability, on the other hand, offers recommendations to businesses on important issues such as preventing waste of resources and not jeopardizing the living standards of future generations. In fact, when modern management theory is examined, it is seen that the main goal of businesses is to ensure sustainability. While realizing this goal, it is not enough for businesses to focus only on financial resources and financial results, it is also important how effectively businesses manage all their resources with a focus on corporate responsibility. Ensuring corporate sustainability provides very important advantages to businesses. For example, gaining public trust, increasing trust in the business, increasing brand image and high competitiveness are the most important of these advantages.

The purpose of this study is to statistically examine the companies in the BIST 30 Index in terms of their attitudes towards 17 goals within the sustainable development goals determined by the United Nations. For this purpose, Sustainability and Integrated Annual Reports published by 30 companies in the BIST 30 Index in 2023 were analyzed. It is seen that 6 companies did not publish any of these reports. In the following sections, first the literature review and then the methodology and results are presented.

2. LITERATURE REVIEW

From the perspective of businesses, sustainability is defined as the conduct of economic activities in proportion to social and environmental conditions. Businesses that contribute to the national or global economy have environmental and social responsibilities in addition to their economic responsibilities (Clarke & Clegg, 2003). For this reason, businesses should act with a sense of responsibility towards all stakeholders as well as investors and shareholders. In the BIST Sustainability Index Research Methodology (2015:2), it is stated that the concept of sustainability includes environmental factors such as climate change, use of natural resources, energy use, biodiversity, giving more importance to renewable energy sources and recycling, as well as social and corporate governance factors such as board structure, anti-bribery, human rights, supply chain of goods in the production process, ensuring the health and safety of employees.

The Brundtland Report, also known as "Our Common Future", is one of the most important publications of the 20th century, containing principles and guidelines on

sustainability published by the United Nations in 1987. The report is named after Gro Harlem Brundtland, former Prime Minister of Norway at the time and President of the World Commission on Environment and Development (WCED). The report defines sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Schaefer & Crane, 2005). The report also recognizes that it is in the common interest of all countries to adopt the goal of sustainability. The concept of sustainable consumption was first discussed in Agenda 21, which was part of the United Nations World Summit Action Plan for Sustainable Development held in Rio in 1992. Subsequently, the sustainable production and consumption approach was reiterated at a conference organized by the Norwegian Ministry of Environment in Oslo in 1994, and sustainable consumption was defined by the United Nations Environment Program (UNEP, 2012) as a fundamental element of national and global sustainability policies. Twenty years after the 1992 Rio conference, the United Nations Conference on Sustainable Development, also known as Rio+20, was held in Rio de Janeiro in 2012. As a result of the Rio+20 Summit, a road map emerged, and a report entitled "The Future We Want" was adopted. The United Nations Sustainable Development Goals (SDGs), consisting of 17 goals and 169 targets based on the Millennium Development Goals, were adopted in New York on September 27, 2015. The 17 goals adopted by 193 UN member states, including Türkiye, which will be in effect until 2030, are shown in Figure 1 below (UN, 2023).



Figure 1: Global Goals for Sustainable Development
Source: United Nations, (2023).

3. RESEARCH METHODOLOGY

3.1.Statistical Analysis

Correspondence analysis is a multivariate analysis method applied to reveal the compatibility between variables that have been obtained categorically or have been categorized. It aims to display the correspondence among the levels of categorical variables in a less dimensional space (Özdamar, 2013, Gül et all, 2022). With correspondence analysis, the relationships between categorical variables that may be difficult and complex to interpret via chi-square independence test and contingency tables, are easily interpreted through a graphical presentation of the cross-tables, and significant relationships emerge between categories (Tüzüntürk, 2017). In addition, the results of the correspondence analysis presented in Euclidean space are explained using a distance function known as the Chi-Square distance between the variable levels (Yılmaz and Saraçlı, 2007).

3.2. Findings

Even there are 30 companies in BIST 30, in Table 1, 24 of them are examined related with having their Sustainability Reports.

Table1. Descriptive statistics of the Companies

Variable	Label	Frequency	%
Sector	Banks	4	16,7
	Holdings and Inv.Comp.	5	20,8
	Manufacturing	9	37,5
	Others	6	25,0
Age	0-40 Year	4	16,7
	41-80 Year	15	62,5
	81+ Year	5	20,8
BIST SDI	Not Exist	5	20,8
	Exist	19	79,2
SDG1 (No Poverty)	Not Included	19	79,2
	Included	5	20,8
SDG2 (Zero Hunger)	Not Included	20	83,3
	Included	4	16,7
SDG3 (Good Health and Well-Being)	Not Included	12	50,0
	Included	12	50,0

SDG4 (Quality Education)	Not Included	7	29,2
	Included	17	70,8
SDG5 (Gender Equality)	Not Included	5	20,8
	Included	19	79,2
SDG6 (Clean Water and Sanitation)	Not Included	11	45,8
	Included	13	54,2
SDG7 (Affordable and Clean Energy)	Not Included	1	4,2
	Included	23	95,8
SDG8 (Decent Work and Economic Growth)	Not Included	1	4,2
	Included	23	95,8
SDG9 (Industry, Innovation and Infrastructure)	Not Included	2	8,3
	Included	22	91,7
SDG10 (Reduced Inequalities)	Not Included	9	37,5
	Included	15	62,5
SDG11 (Sustainable Cities and Communities)	Not Included	13	54,2
	Included	11	45,8
SDG12 (Responsible Consumption and Production)	Not Included	4	16,7
	Included	20	83,3
SDG13 (Climate Action)	Not Included	0	0
	Included	24	100
SDG14 (Life Below Water)	Not Included	14	58,3
	Included	10	41,7
SDG15 (Life on Land)	Not Included	16	66,7
	Included	8	33,3
SDG16 (Peace, Justice and Strong Institutions)	Not Included	14	58,3
	Included	10	41,7
SDG17 (Partnerships for the Goals)	Not Included	5	20,8
	Included	19	79,2

Even there are 30 companies in BIST 30, in Table 1, 24 of them are examined related with having their Sustainability Reports.

It can be seen from Table 1 that there are 4 Banks, 5 Holdings and Investment Companies, 9 Manufacturing and 6 other kinds of companies as the sector in BIST 30. Within these companies as an age, 4 of them are between 0-40 years old, 15 of them 41-80 years old and 5 of them are 81+ years old. While 19 of the exists in the SDI of BIST 30 5 of them do not.

Before applying the multiple correspondence analysis, CHAID analysis is applied as considering each SDG as dependent and the other demographics as independent variable.

By CHAID analysis, as some of the demographic variables were found statistically significant on SDG1, SDG5, SDG6, SDG8, SDG10, SDG12 and SDG14, correspondence analysis is applied among the demographics and these SDGs separately. Results of the MCA are given in Figure 1 - 7 respectively.

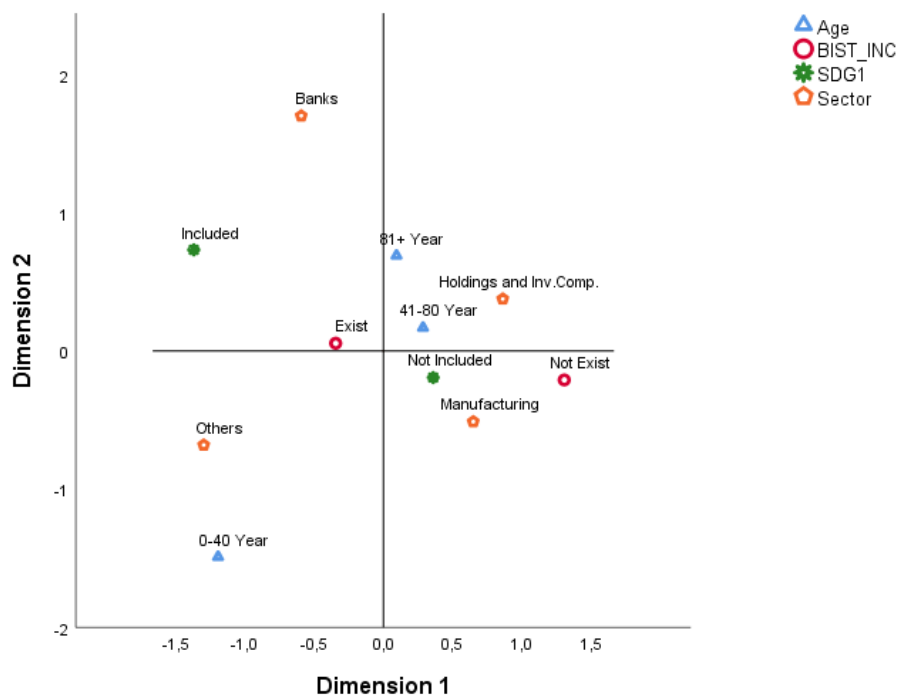


Figure 2. Results of MCA among the levels of SDG1, Age, BIST Inc and Sector

Figure 2 indicates that within the companies having the highest market values in BIST 30 index, while the companies who consider the Sustainable Development Goal (SDG1) of “No Poverty” are generally the companies who are included in the sustainability index of BIST, existing 81 years and more, and in Banking sector, the companies who do not consider SDG1 “No Poverty” in their Sustainable Development Goals are generally the companies in Manufacturing sector, existing between 41-80 years and who are not included in the sustainability index of BIST.

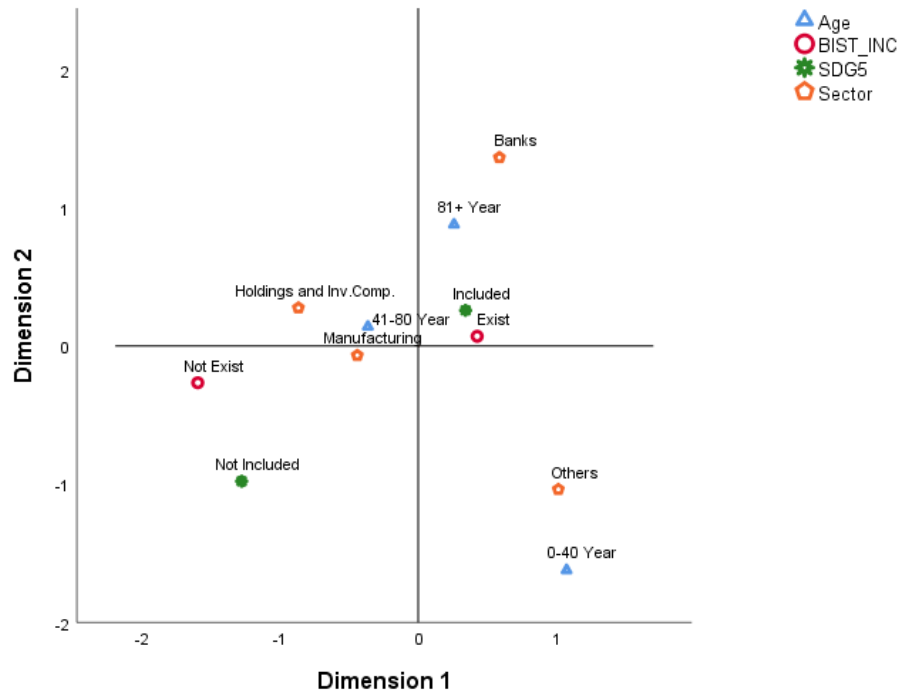


Figure 3. Results of MCA among the levels of SDG5, Age, BIST Inc and Sector

Figure 3 indicates that within these companies who consider the Sustainable Development Goal (SDG5) of “Gender Equality” are generally the companies who exist in the sustainability index of BIST, as an age 81 years and more, and Banks as the sector. On the other hand, the companies who do not consider SDG5 are especially the Manufacturing companies that are between 41-80 years old as an age, not existing in the sustainability index of BIST. Even these results are very similar but not same as the results given in Figure 1, as SDG5, holdings and investment Companies are little far away from the level not included.

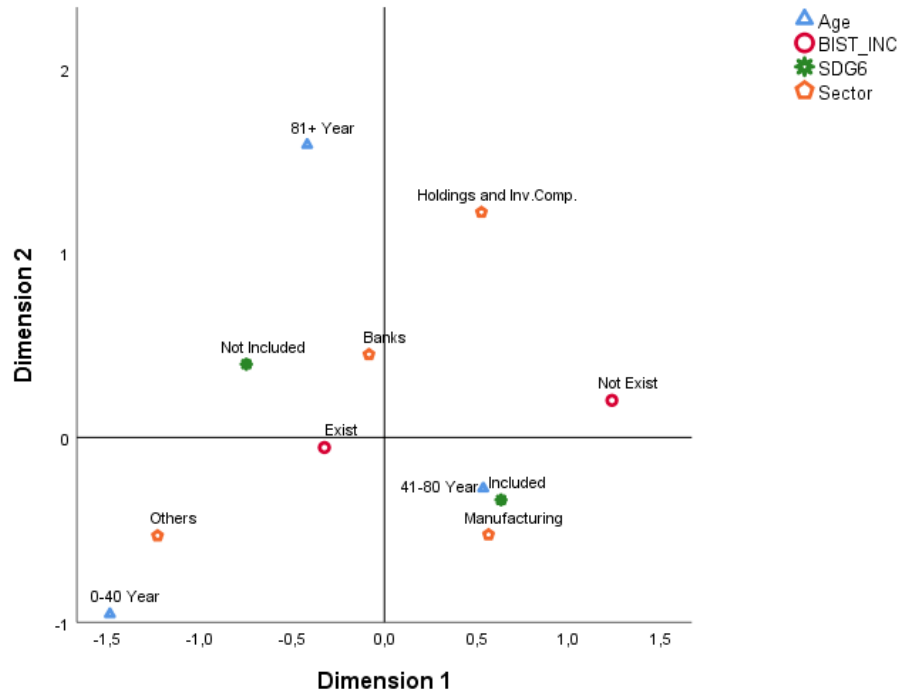


Figure 4. Results of MCA among the levels of SDG6, Age, BIST Inc and Sector

Figure 4 indicates that within these companies who consider the Sustainable Development Goal (SDG6) of “Clean Water and Sanitation” are generally the Manufacturing companies between 41 and 80 years old and who do not exist in the sustainability index of BIST30. The companies that do not consider SDG6 are generally exist in the sustainability index of BIST30, Banks as sector and 81+ years old as their age.

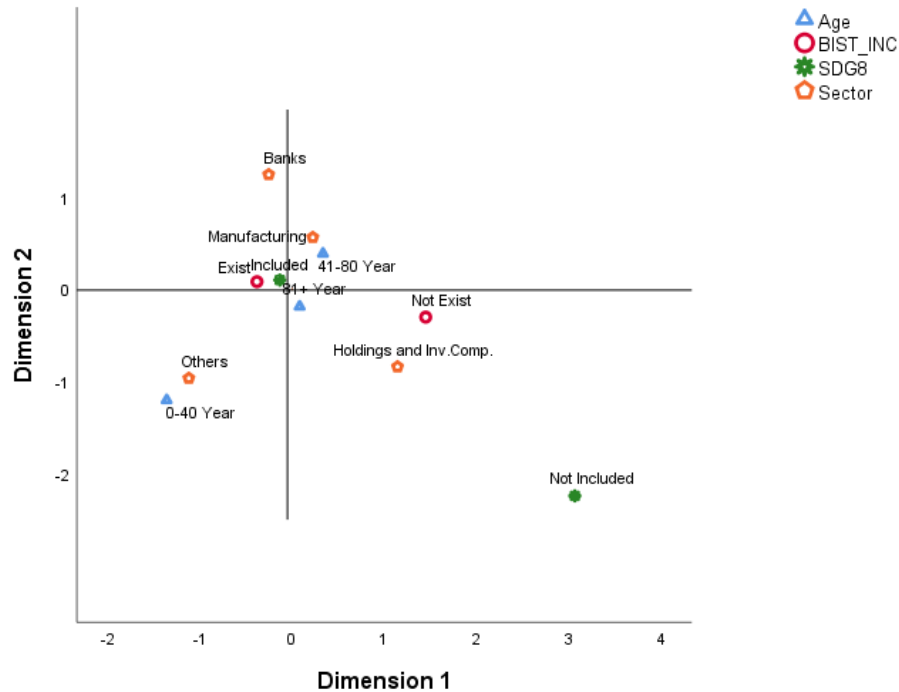


Figure 5. Results of MCA among the levels of SDG8, Age, BIST Inc and Sector

Figure 5 indicates that while the companies who consider the Sustainable Development Goal (SDG8) of “Decent Work and Economic Growth” are generally the Banks and manufacturing companies who exist in the sustainability index of BIST30 and between 41-80 years old, the companies who do not consider SDG8 are especially in the sector of Holdings and investment, not existing in the sustainability index of BIST30 and between 81+ years old as their age.

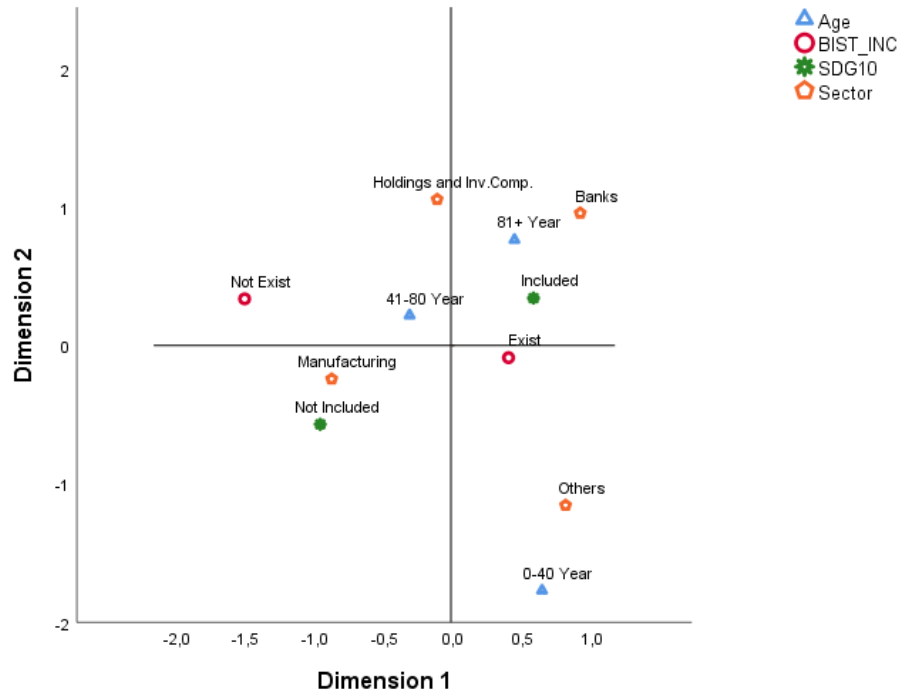


Figure 6. Results of MCA among the levels of SDG10, Age, BIST Inc and Sector

Figure 6 indicates that while the companies especially in Banking sector, 81 + years old and included in the sustainability index of BIST consider the Sustainable Development Goal (SDG10) of “Reduced Inequalities” then the others, the companies in Manufacturing sector, between 41-80 years old and not included in the sustainability index of BIST do not consider SDG10 as the others.

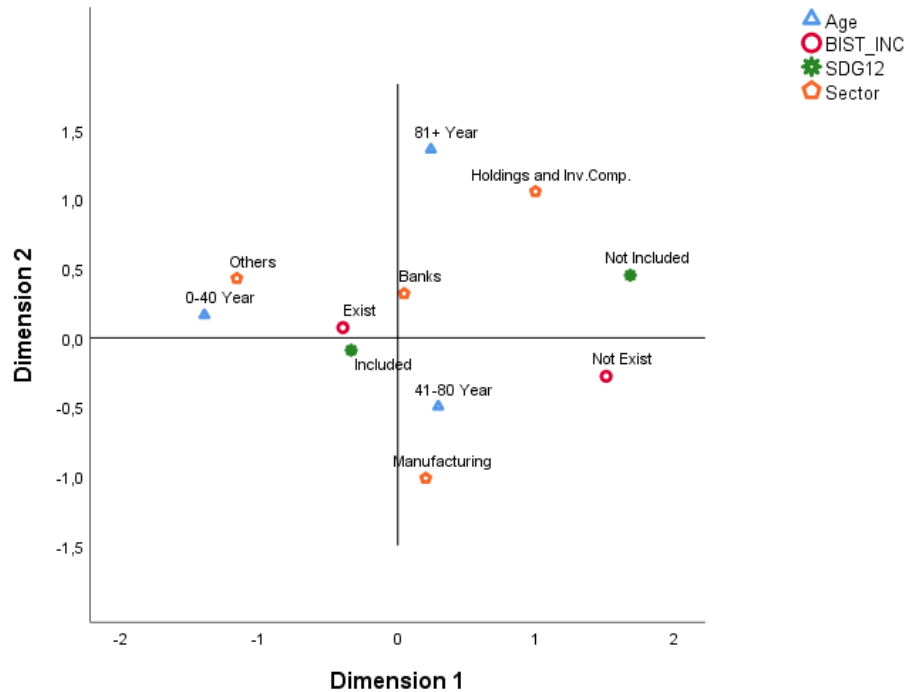


Figure 7. Results of MCA among the levels of SDG12, Age BIST Inc and Sector

Figure 7 indicates that generally Banks and Manufacturing companies who do not exist in the sustainability index of BIST 30 and 81+ years old as their age do not pay attention to the Sustainable Development Goal (SDG12) of “Responsible Consumption and Production”. On the other hand, the companies who pay attention to SDG12 are generally less than 41 years old, existing in the sustainability index of BIST 30 and other companies as their sector.

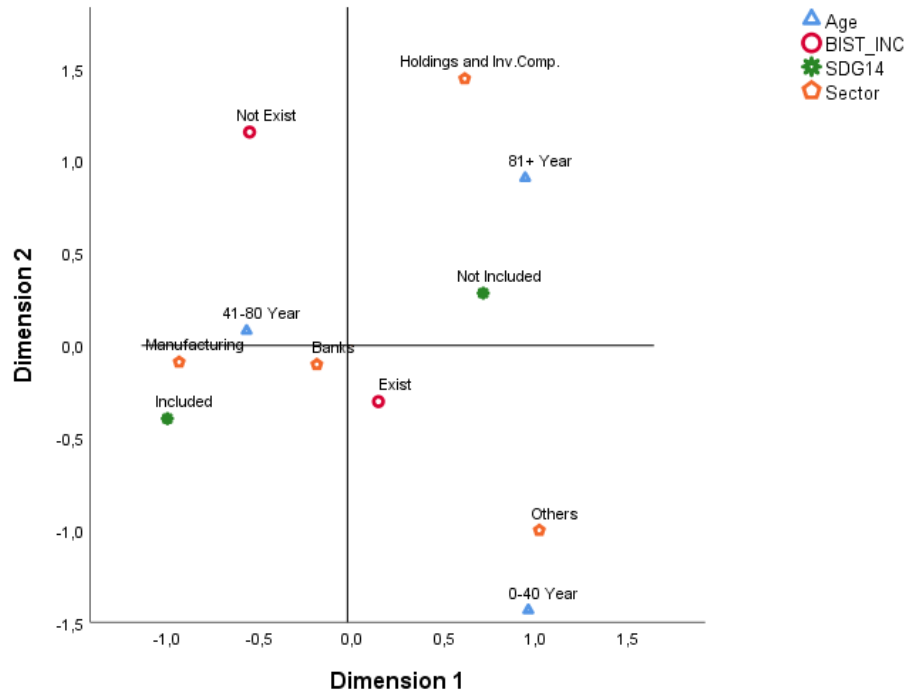


Figure 8. Results of MCA among the levels of SDG14, Age, BIST Inc and Sector

Figure 8 indicates that while the companies especially between 41-80 years old in Banking and Manufacturing sector and included in the sustainability index of BIST 30 consider the Sustainable Development Goal (SDG14) of “Life Below Water” then the others. Figure 7 also indicates that holdings and investment companies in 81+ years old and again included in the sustainability index of BIST 30 do not consider SDG14 as the others.

4. CONCLUSION

Today, most companies prepare sustainability reports and share these reports with the public. Companies prepare sustainability reports to enhance their reputation and brand value, to make predictions about future risks and opportunities, to convey the company's performance to stakeholders and individuals or institutions that will invest in the company in a good way, and to explain the relationship between financial and non-financial success to all interested parties. Sustainability reporting is the sharing of a company's economic, social and environmental performance with all information users with its negative and positive aspects in order to plan harmoniously for the future today by balancing the basic life needs of a company with the sustainability of natural resources in terms of environmental, social and economic aspects.

When the findings of the study are analyzed in terms of the UN Sustainable Development Goals, it is seen that most of these companies contribute to the UN goals. (The contributions are presented in Table 1 in the findings section). For example, while banks in the BIST Sustainability index contribute the most to “No Poverty”, “Gender Equality” and “Reducing Inequalities” among the UN Sustainable Development Goals, companies in the manufacturing sector and not included in the BIST Sustainability index do not contribute to these goals. It can be said that banks reduce the number of individuals living in poverty by contributing to the “No Poverty” goal, and that they give importance to equality by not discriminating on the basis of gender by contributing to the “Gender Equality” goal. In addition, banks contribute to the “Reducing Inequalities” objective by giving importance to issues such as reducing income inequalities, ensuring equal opportunities and ending discrimination.

Companies operating in the manufacturing sector and not included in the BIST Sustainability Index contribute the most to the Sustainable Development Goals “Clean Water and Sanitation”. Because it is known that the manufacturing sector is one of the sectors that consume the most water. Türkiye's 2023 targets include utilizing its entire water potential of 112 billion m³. In addition, the shares of total water use are targeted as 64% in agriculture, 20% in manufacturing sectors and 16% in households (Hakyemez, 2019). In terms of sectors, 40.8% of the water withdrawn from water resources is used in municipalities, 36.4% in thermal power plants, 12.8% in manufacturing enterprises, 8.6% in villages, 1% in organized industrial zones (OIZ) and 0.5% in industrial areas such as mining enterprises (Ministry of Development, 2018).

The companies that contribute to the Sustainable Development Goals “Decent Work and Economic Growth” and “Life Below Water” are banks and manufacturing companies included in the BIST Sustainability Index. Because these sectors are labor-intensive and the resource that creates added value in these sectors is human resources. For a sustainable economic growth, the necessary investment in human resources should be made. In addition, these sectors contribute to the “Life Below Water” cause and strive to reduce marine pollution and protect and restore the ecosystem.

When the companies that contribute to the “Responsible Consumption and Production” development goal are analyzed, it is seen that there are companies included

in the BIST Sustainability Index and companies in other sectors (Technology, Electricity, Gas and Water, Wholesale, Transportation and Warehousing, Information and Communication). It can be said that companies in these sectors attach importance to sustainable management and utilization of natural resources, responsible chemical and waste management, and significant reduction in waste generation. In general, it is seen that holding and investment companies are insufficient in realizing the UN Sustainable Development Goals.

REFERENCES

- Clarke, T., & Clegg, S. (2003). Management Paradigms for the New Millennium. *International Journal of Management Reviews*, 2(1), 60-61.
- Gül, İ., Kundakcı, Y. E., Babacan, Ş., & Saraçlı, S. (2022). İletişim Becerilerinin Uyum Analizi ile İncelenmesi: Sağlık Bilimleri Fakültesi Örneği. *Sağlık Bilimlerinde Değer*, 12(2), 230-238.
- Hakyemez, C. 2019. SU: Yeni Elmas. Ekonomik Araştırmalar. Türkiye Sınai Kalkınma Bankası A.Ş. Şubat 2019.
- Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009). Why Sustainability is Now the Key Driver of Innovation. *Harvard Business Review*, 87(9), 56-64.
- Özdamar, K. (2013). Paket Programlar ile İstatiksel Veri Analizi: MINITAB 16-IBM SPSS 21. Nisan Kitabevi.
- Schaefer, A., & Crane, A. (2005), Addressing Sustainability and Consumption, *Journal of Macromarketing*, Vol.25, No.1;76-92.
- Tüzüntürk, S. (2017). Uyum Analizi Kullanarak Y Kuşağı Akıllı Telefon Kullanıcılarının Tüketici Davranışlarının Anlaşılması: Bursa Örneği. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 39(1), 257-280.
- Yılmaz, V., & Saraçlı, S. (2007). Çocuklarda Suç Türü ve Nedenlerinin Uyum Analiziyle İncelenmesi. *Afyon Kocatepe University Journal of Science*, 7(1).
- <https://sdgs.un.org/goals>, (Accessed: 20.09.2023).
- https://wedocs.unep.org/bitstream/handle/20.500.11822/10580/RRMSW_Report_EN.pdf?sequence=1&isAllowed=y, (Accessed: 02.10.2023).
- <https://www.borsaistanbul.com/endeksler/bist-pay-endeksleri/surdurulebilirlikendeksi>, (Accessed: 05.10.2023).
- <https://www.sbb.gov.tr/ozel-ih-tisas-komisyonu-raporlari/#1540024439304-a116e9a-4191>, (Accessed: 06.10.2023).

Modelling Malta and Turkiye stock exchange returns with Markov-Switching Dynamic Regression analysis

Kenan İlarslan¹

Abstract

Introduction: Economic and financial crises, political uncertainty and tensions can cause significant fluctuations in stock markets. These resulting uncertainties can harm the functioning of the stock market. It is worth examining how price movements in stock markets, which are seen as the barometer of economies, react in different regimes. The Markov-Switching dynamic regression model (MSDR) is considered a powerful technique to analyze the dynamic behavior of stock market indices under various regimes and to predict the transition probabilities among regimes.

Aim: The aim of this study is to reveal whether there is a structural break in the returns of the Malta and Turkish stock markets and to the behavior in different regimes in the period between January 3, 1996 and August 31, 2023.

Method: In the study, analyzes were made within the framework of basic statistical tests, unit root tests, BDS test, Supremum Wald test, MSDR analysis.

Findings: It has been determined that the series does not show a normal distribution, has a non-linear structure, experienced structural breaks at different dates and has two different regimes. It was concluded that the persistence in Regime 1 was higher in the Malta stock exchange, while the persistence in Regime 2 was higher in the Turkish stock exchange.

Originality and value: No comparative analysis of the dynamic structure of the Maltese and Turkish stock markets using the MSDR method has been found in the literature.

Key Words: Markov-Switching Dynamic Regression, Stock Exchange, Investment Decisions

Jel Codes: G 24, G 10, G 11

1. INTRODUCTION

One of the features of economic and financial time series is cyclical asymmetry, where economies behave differently during expansions and declines. Although different linear and non-linear time series methods have been used to model different features of time series, linear models are inadequate to capture this change. Recently, there has been great relevance in nonlinear features of the type that can separate between fall and enlargement stages seen in time series and are elastic enough to allow different connections to be applied on these stages. Nonlinear methods used to capture these observed asymmetries include Threshold models, Smooth-transition autoregressive

¹ Assoc. Prof. Dr., University of Afyon Kocatepe, Bolvadin Applied Sciences Faculty, Accounting and Finance Management, Turkiye

models, and Markov switching regime models (Moolman, 2004). The Markov Switching method allows for time-varying causality between regimes, rather than linear models with fixed parameters and no regime (structural) changes. The advantage of the Markov-switching model is that it uses predictive data regarding the varying regime switching probabilities of being in a specific regime, rather than a linear model that must be estimated completely separately for each regime (Just and Echaust, 2020; Basher et al., 2016). The Markov switching method is a combination time series method of both the Markov chain and the regime switching method, which reveals the time change in the state-specific value factor. All factors allow the model to switch among high volatility and low volatility regimes simultaneously. For this reason, the Markov switching method has the benefits of allowing one state to represent expansion and the other to represent stagnation, thus capturing complex dynamic templates of time series data (Phoong et al., 2022).

2. LITERATURE REVIEW

Markov Switching regression model, which has found application in different fields, has found application in recent years, especially in the fields of economy and finance. For example, studies examining the change in commodity prices (Moutinho et al., 2022; Alola 2022; Adekoya et al., 2021; Torre-Torres et al., 2020; Chen et al., 2019); studies modeling inflation dynamics (Airaud and Hajdini 2021; Bojanic 2021; Zivkov et al., 2019; Dai and Serletis 2019) and studies examining exchange rate changes (He et al. 2023; Cheikh and Zaied 2020; Churchill et al. 2019) can be given as examples. In this study, some of the studies examining stock market returns using the Markov Switching regression method are briefly summarized below.

Bouteska et al. (2023) aims to examine regime switching and time-varying dependence among the COVID-19 pandemic and US financial markets using the Markov-switching method. According to the results of the study, COVID-19 deaths caused by asymmetric dependence on financial markets exhibited considerable regime switching behavior.

Athari et al. (2023) aims to investigate the impact of the global pandemic uncertainty index on the DAX index for the period 1996Q1-2020Q3 by controlling the exchange rate, industrial production index and inflation. According to the empirical results obtained from the study, in both high and low volatility regimes, the global pandemic uncertainty index and real exchange rate negatively affect the DAX index, while industrial production and inflation have a positive effect.

The study by Mahmoudi and Ghaneei (2022) aims to analyze the impact of the crude oil market on the TSX. The results obtained from the Markov Switching regression analysis in the study based on monthly data from 1970 to 2021 show that the TSX return has two regimes, positive (regime 1) and negative (regime 2), and the crude oil market negatively affects the financial market in Regime 1, Regime 2. It shows that it has a positive effect on the financial market.

In the study conducted by Çipe and Aslan (2022), the Markov Regime Change Model was used to examine this relationship between the Housing Price Index in Türkiye and the BIST100 price index. According to the results of the Markov Regime Change Model, the probability of transition between regimes in the series is low, while the probability of remaining in the same regime is quite high.

The study by Hoque and Zaidi (2019) reveals that economic global policy uncertainty has considerable effects on Malaysian financial market returns. It reveals that these effects vary according to regime states, sectors and the nature of the impacts, and that the negative impacts of global economic policy uncertainty outweigh the positive impacts. Therefore, the findings confirm the existence of an asymmetric, non-linear, non-monotonic and state-dependent relationship among global economic policy uncertainty and stock returns in Malaysia.

Xaba et al. (2019) uses data from 1/1997 to 01/2017 in BRICS countries and examines the movement of 5 stock market return series with the Markov Switch dynamic regression model. The aim of the study is to measure the return change between two regimes for five stock market returns and to measure the duration of each regime for all financial market returns examined. According to the results obtained from the study, it was determined that the five return series showed a two-regime behavior, namely recession and crisis periods, and also, according to the MS-DR model, the timing of two crisis periods affecting five stock markets was determined.

Chkili and Nguyen (2014) used the Markov regime switching model in their study to examine the dynamic links among exchange rates and financial market returns in BRICS countries. The results show that the stock returns of BRICS countries develop according to two various regimes, namely the low volatility regime and the high volatility regime, and that stock markets have a greater effect on exchange rates in both static and chaotic periods.

In their study, Moore and Wang (2007) examined the volatility in the financial markets of the countries that newly joined the EU by using MS regression method. According to the findings obtained from the analysis, it appears that there are two or three volatility situations for the relevant financial markets. It has been stated that this situation is related to the EU entry and the decrease in volatility in unstable emerging markets.

3. RESEARCH METHODOLOGY

Financial markets are characterized by periods of high and low volatility. These regimes can be distinguished by considerable changes in asset returns, variances, and correlations and can provide the basis for correct detection methods to be used by finance managers. One such detection technique is the Markov switching regression method (MSR), introduced by Goldfeld and Quandt in 1973 and later extended by Hamilton in 1989 and Krolzig in 1997. It is one of the most well known statistical methods for distinguishing regime changes in economics and finance (Pomorski and Gorse, 2023).

Markov-Switching dynamic regression model was used in the application phase of the study. This method exhibits various dynamics between unobserved states by using state-dependent parameters to accommodate structural breaks or other multi-state events. Transitions among unobserved states follow the Markov chain. The mathematical representation of the model is introduced below.

3.1. Research Model and Hypothesis

The MSDR model, which allows us to capture the dynamics of MSE and BIST stock market returns in different regimes (fall and rise), can be shown mathematically as follows (Pomorski and Gorse, 2023).

$$return_t = \mu_{S_t} + return_{t-1}\beta_{S_t} + \sigma_{S_t}\varepsilon_t$$

Where; μ_{S_t} is a state-dependent intercept, β_{S_t} is a state-dependent coefficient of lagged returns and σ_{S_t} is a state-dependent volatility. It is also accepted that S_t regime dynamics have transition possibilities and follow a Markov Chain process. $p, q \in [1, 2]$,

$$\begin{pmatrix} p & 1-p \\ 1-q & q \end{pmatrix}$$

3.2. Data Analysis

3.2.1. Descriptive Statistics

Descriptive statistical information for both countries' stock markets is shown in Table 1 below.

Table 1. Descriptive Statistics

	MSE	BIST
Mean	0.0002	0.0004
Median	0.0000	0.0005
Max.	0.0870	0.0771
Min.	-0.0563	-0.0867
Std.Dev.	0.0079	0.0097
Skewness	1.1499	-0.1150
Kurtosis	17.7891	9.9287
JB	59604.71 [0.0000]	13751.10 [0.0000]
ADF Test	-67.1321*** [0.0001]	-81.1660*** [0.0000]

Note: Significance, ***1%

Accordingly, the exchange with the highest standard deviation is BIST. Therefore, the Turkish stock exchange is more risky than the Malta stock exchange. However, the returns of the two stock markets do not show normal distribution. In addition, the return series are stationary at the 1% significance level according to the ADF test.

3.2.2. Nonlinearity Test Results

One of the most important questions we need to answer before estimating a regime switching model is whether the additional regime contributes significantly to explaining the dynamic behavior of the time series.

Table 2. ARCH-LM Test Results

Lags	MSE		BIST	
	Test statistics	p-value	Test statistics	p-value
1	639.567***	0.000	555.386***	0.000
2	645.594***	0.000	813.793***	0.000
3	703.857***	0.000	839.492***	0.000
4	704.953***	0.000	847.572 ***	0.000

Note: Significance, ***1%

According to the results, the null hypothesis is rejected for both stock market index returns (there is no ARCH effect). Therefore, it is concluded that stock market returns are non-linear and dependent.

One of the popular tests to determine the nonlinearity of variables is the BDS test. BDS test results for the variables used in the study are given below.

Table 3. BDS test results

	Dimension	BDS statistic	Std.Error	p-value
MSE	2	0.036***	0.001	0.000
	3	0.064***	0.002	0.000
	4	0.083***	0.002	0.000
	5	0.091***	0.002	0.000
	6	0.092***	0.002	0.000
BIST	2	0.023***	0.001	0.000
	3	0.050***	0.001	0.000
	4	0.071***	0.002	0.000
	5	0.083***	0.002	0.000
	6	0.088***	0.002	0.000

Note: Significance, ***1%

According to BDS test results, the null hypothesis was rejected for both stock market returns and it was determined that the series were non-linear.

3.2.3. Detection of Structural Breaks

Time series may be subject to some changes over time for some reasons. Economic and financial crises, wars, natural disasters, etc. can be considered as the reasons for this change. If these changes cause a permanent change in the variable, estimating the entire series with the same model may give misleading results. Whether there is a structural break on both stock market returns in the study is shown in Table 4 below.

Table 4. Supremum Wald test results

	MSE		BIST	
Estimated break date	29 March 2006		5 December 2000	
	Test statistic	p-value	Test statistic	p-value
	25.797***	0.000	12.006**	0.0103

Note: Significance, ***1%, **5%

The structural break date seen in the Malta Stock Exchange is 29 March 2006. Before this date, in the first months of 2006, MSE reached its historical peaks in 6,600 and entered a downward trend since the break date. We can see this event as the spillover effect of the major declines experienced in the Middle Eastern stock markets. In Türkiye, the structural break date of BIST was found to be 5 December 2000. Money and capital markets were shaken due to the arrest of some bankers and businessmen in November 2000 and the fear and anxiety in the markets. As a result, with the announcement of a 10.4 billion dollar agreement with the IMF on December 5-6, the markets were relieved, and there was an increase of up to 20% in the stock market and a decrease in interest rates from 1,500 points to 180 points.

3.2.4. Regression Analysis Results

The MSDR analysis results for the series of non-linear stock market returns with structural breaks are presented in Table 5 below.

Table 5. Markov-Switching Dynamic Regression Results

MSE		
	<i>Regime 1</i>	<i>Regime 2</i>
L.return	-0.093*** [0.000]	1.006*** [0.000]
constant	-0.000 [0.958]	0.0005* [0.086]
σ (Sigma)	0.006	
Transition probabilities	P(1 1)= 0.898 P(2 1)= 0.526	P(1 2)= 0.101 P(2 2)= 0.473
Duration	9.849	1.900

BIST		
	<i>Regime 1</i>	<i>Regime 2</i>
L.return	0.978*** [0.000]	-0.173*** [0.000]
constant	-0.001*** [0.000]	0.0008*** [0.000]
σ (Sigma)	0.008	
Transition probabilities	P(1 1)= 0.195 P(2 1)= 0.162	P(1 2)= 0.804 P(2 2)= 0.837
Duration	1.242	6.141

Note: Significance, ***1%, ** 5%, *10%

According to the MSDR results, there are 2 regimes from both stock exchanges. Regime 1 indicates the period in which the decline is dominant in the stock market index, that is, the bear market, and Regime 2 indicates the period in which the increase in the stock market index is dominant, that is, the bull market. BIST offers more loss/gain opportunities than MSE during both bear market and bull market periods. However, MSE's persistence in the bear market is greater than BIST. On the other hand, BIST's persistence in the bull market is greater than MSE. Thus, the probability of MSE switching from a bear market to a bear market outlook again one day later is approximately 90%, and the probability of BIST changing from a bull market to a bull market outlook again one day later is approximately 84%.

CONCLUSION

The main motivation of the study is to measure the returns in different regime periods in the Malta and Turkish stock markets, to determine the transition probabilities and to determine the persistence periods in the regime periods. An attempt was made to give the study a unique quality by approaching the subject from the perspective of these two countries.

In the study covering the period between January 3, 1996 and August 31, 2023, it was determined that stock market returns were not normally distributed and were not linear. In addition, among these two stock exchange returns, BIST is the exchange with the highest standard deviation, in other words, the risk. Therefore, BIST offers investors more gain/loss opportunities. The structural break date was determined as 29 March 2006 for MSE and 5 December 2000 for BIST. According to the MSDR regression analysis results, two regimes were determined for both stock market returns: regime 1 (bear market) and regime 2 (bull market). The persistence of MSE in the bear market is greater than that of BIST in the bull market.

The study contributes to individual and especially institutional investors and portfolio managers to understand the behavior of these two stock exchanges in different regime periods and to model risk and return.

REFERENCES

- Adekoya, O. B., Oliyide, J. A., Oduyemi, G. O. (2021). “How COVID-19 Upturns the Hedging Potentials of Gold Against Oil and Stock Markets Risks: Nonlinear Evidences Through Threshold Regression and Markov-Regime Switching Models”, *Resources Policy*, 70, 101926.
- Airaud, M., Hajdini, I. (2021). “Consistent Expectations Equilibria in Markov Regime Switching Models and Inflation Dynamics”, *International Economic Review*, 62 (4), 1401-1430.
- Alola, A. A. (2022). “The Nexus of Renewable Energy Equity and Agricultural Commodities in the United States: Evidence of Regime-Switching and Price Bubbles”, *Energy*, 239, 122377.
- Athari, S. A., Kirikkaleli, D., Adebayo, T. S. (2023). “World Pandemic Uncertainty and German Stock Market: Evidence From Markov Regime-Switching and Fourier Based Approaches”, *Quality & Quantity*, 57, 1923-1936.
- Basher, S.A., Haug, A.A., Sadorsky, P. (2016). “The Impact of Oil Shocks on Exchange Rates: A Markov-Switching Approach”, *Energy Economics*, 54, 11-23.
- Bojanic, Antonio N. (2021). “A Markov-Switching Model of Inflation in Bolivia”, *Economics*, 9, 37.
- Bouteska, A., Sharif, T., Abedin, M. Z. (2023). “COVID-19 and Stock Returns: Evidence From the Markov Switching Dependence Approach”, *Research in International Business and Finance*, 64, 101882.
- Cheikh, N. B., Zaied, Y. B. (2020). “Revisiting the Pass-Through of Exchange Rate in the Transition Economies: New Evidence From New EU Member States”, *Journal of International Money and Finance*, 100, 102093.
- Chen, J., Zhu, X., Zhong, M. (2019). “Nonlinear Effects of Financial Factors on Fluctuations in Nonferrous Metals Prices: A Markov-Switching VAR Analysis”, *Resources Policy*, 61, 489-500.
- Chkili, W., Nguyen, D. K. (2014). “Exchange Rate Movements and Stock Market Returns in A Regime-Switching Environment: Evidence for BRICS Countries”, *Research in International Business and Finance*, 31, 46-56.
- Churchill, S. A., Inekwe, J., Ivanovski, K., Smyth, R. (2019). “Dynamics of Oil Price, Precious Metal Prices and the Exchange Rate in the Long-Run”, *Energy Economics*, 84, 104508.

- Çipe, B., Aslan, A. (2022). “Investigation of Housing Price Index and BIST 100 Stock Market Index in Turkiye with Markov Switching Model”, *Trends in Business and Economics*, 36 (1), 109-114.
- Dai, W., Serletis, A. (2019). “On the Markov Switching Welfare Cost of Inflation”, *Journal of Economic Dynamics & Control*, 108, 103748.
- De la Torre-Torres, O.V., Aguila-socho-Montoya, D., Alvarez-Garcia, J., Simonetti, B. (2020). “Using Markov-Switching Models with Markov Chain Monte Carlo Inference Methods in Agricultural Commodities Trading”, *Soft Computing*, 24, 13823-13836.
- He, X., Gokmenoglu, K.K., Kirikkaleli, D., Rizvi, S. K. A. (2023). “Co-movement of Foreign Exchange Rate Returns and Stock Market Returns in an Emerging Market: Evidence From the Wavelet Coherence Approach”, *International Journal of Finance and Economics*, 8, 1994-2005.
- Hoque, M.E., Zaidi, M. A. S. (2019). “The Impacts of Global Economic Policy Uncertainty on Stock Market Returns in Regime Switching Environment: Evidence From Sectoral Perspectives”, *International Journal of Finance and Economics*, 24, 991-1016.
- Just, M., Echaust, K. (2020). “Stock Market Returns, Volatility, Correlation And Liquidity During The COVID-19 Crisis: Evidence From The Markov Switching Approach”, *Finance Research Letters*, 37, 101775.
- Mahmoudi, M., Ghaneei, H. (2022). Detection of Structural Regimes and Analyzing the Impact of Crude Oil Market On Canadian Stock Market: Markov Regime-Switching Approach”, *Studies in Economics and Finance*, 39 (4), 722-734.
- Moolman, E. (2004). “A Markov Switching Regime Model Of The South African Business Cycle”, *Economic Modelling*, 21, 631–646.
- Moore, T., Wang, P. (2007). “Volatility in Stock Returns for New EU Member States: Markov Regime Switching Model”, *International Review of Financial Analysis*, 16, 282-292.
- Moutinho, V., Oliveria, H., Mota, J. (2022). “Examining the Long Term Relationships Between Energy Commodities Prices and Carbon Prices on Electricity Prices Using Markov Switching Regression”, *Energy Reports*, 8, 589-594.
- Phoong, S.W., Phoong, S. Y., Khok, S. L. (2022). “Systematic Literature Review With Bibliometric Analysis on Markov Switching Model: Methods and Applications”, *SAGE Open*, 1-16.
- Pomorski, P., Gorse, D. (2023). “Improving on the Markov-Switching Regression Model by the Use of an Adaptive Moving Average”, *New Perspectives and Paradigms in Applied Economics and Business*, (Ed. W.C. Gartner), Springer Press, USA, 17-30.

Xaba,D., Moroke, N. D., Rapoo, I. (2019). “Modeling Stock Market Returns of BRICS with a Markov-Switching Dynamic Regression Model”, *Journal of Economics and Behavioral Studies* , 11 (3), 10-22.

Zivkov, D., Duraskovic, J., Manic, S. (2019). “How Do Oil Price Changes Affect Inflation in Central and Eastern European Countries? A Waveletbased Markov Switching Approach”, *Baltic Journal of Economics*, 19 (1), 84-104.

Elements of Gastronomy in Ottoman Miniatures

Betül Arslan ¹, Hülya Yaman ²

Abstract

Introduction: The Ottoman Empire has produced numerous works of art throughout its history. Among these works of art, miniatures hold significant importance in depicting important events of the era.

Aim: The aim is to reveal the elements that can be subject to Ottoman-style gastronomy, to see the reflections of known culinary characteristics in miniatures, and to provide a new perspective.

Method: This paper, prepared through a compilation study, includes a literature review and examines various miniatures.

Findings: It has been observed that Ottoman miniatures, with their feature of faithfully representing reality, contain many details related to gastronomy, such as various kitchen utensils, plates, and food diversity used in the Ottoman Empire.

Originality and value: As a result of the literature review, it was observed that no study within this scope exists, and there is a need to conduct such a study in order to present the values related to gastronomy.

Key Words: Miniature, Gastronomy, Ottoman Miniature

Jel Codes: Z32, L66, L83

1. INTRODUCTION

When we look at Ottoman miniatures, we often encounter elements related to food, although it may not be the central focus in many works. In depictions of events such as weddings, ceremonies, gatherings, and hunting, scenes involving the preparation, presentation, and sale of food are commonly seen. However, due to the lack of examination from a culinary perspective, this study aims to evaluate the gastronomic elements found in Ottoman miniatures. While miniatures initially began as a means to adorn written texts, they expanded their scope by providing detailed depictions of various aspects of events, even though their primary subject matter may not be within the realm of gastronomy.

Gastronomy is considered the art of food, emphasizing taste and visual aspects from food preparation to consumption. It is recognized that cuisine also possesses artistic qualities, and it encompasses the various factors such as religion, culture, and geography that shape how people obtain, present, and consume food.

This research area is intriguing as Ottoman miniatures provide a unique window into the historical and cultural fabric of the Ottoman Empire. Despite their original decorative purpose, they evolved to vividly portray events and lifestyles, making them a valuable source for understanding the gastronomic aspects of the time. Scenes related to food preparation, presentation, and consumption in Ottoman miniatures hold

¹ Master's Student, Abant İzzet Baysal University, Tourism Faculty, Department of Gastronomy and Culinary Arts, Turkey

² Assist.Prof.Dr. , Abant İzzet Baysal University, Bolu School of Tourism Management and Hospitality, Turkey

significance in the realm of gastronomy. These details can shed light on the eating habits, rituals, and cultural values of the Ottoman Empire.

Additionally, gastronomy encompasses not only the consumption of food but also the entire process, from food production to storage and presentation. These processes are influenced by various factors such as geography, climate, religion, culture, and history. Analyzing how these processes are depicted in Ottoman miniatures can provide insights into the food production and consumption practices of the Ottoman Empire.

In conclusion, the examination of gastronomic elements in Ottoman miniatures can provide valuable insights into the food culture and historical development of the Ottoman Empire, benefiting both historians and gastronomy experts. This study can help us better understand the culinary habits and cultural interactions of the past. (Özdemir, 2019: 3).

2. LITERATURE REVIEW

According to Larousse, miniature is defined as "the art of painting on paper, parchment, and ivory with paint and gilding without giving light and shadow dimensions." (s.8207). When the origin of the word is examined, it is derived from the Italian language. In medieval Europe, the first letters of handwritten books were painted and embellished with a red mineral called "minium" (vermilion). Subsequently, this term was also used for the paintings made to decorate books. The word "miniature" was not originally found in the Turkish language but later began to be used through borrowings from European languages. In Turkish, when we look at the expressions, we can see that the term "*miniature*" has been replaced by "*nakış*" (embroidery), and those who practice this art are referred to as "*nakkaş*" (Binark, 1978:271).

In the early examples of miniatures, we can observe images that, while generally small in size, varied in dimensions depending on the subject to elaborate on the author's intended details and enhance clarity. Over time, miniatures evolved from serving the sole purpose of complementing or completing handwritten works to establishing a separate field of study in their own right (Kahraman & Önal, 2021). The art of miniatures distinguishes itself from other forms of visual arts by adhering to the principles of avoiding any elements that provide depth and dimension, careful execution of coloration while ensuring there are no features imparting depth, intricate detailing of the specifics of events to be portrayed, determination of the positioning and size of individuals on the page based on their roles and status, and the rendering of an element in the depicted scene in a way that does not overshadow the others. This allows it to establish its uniqueness and character (Kahraman & Önal, 2022).

One of the significant features that sets miniature art apart from other visual arts is the use of distinctive blends for brushes, paint, and paper. In the early periods, earth-derived pigments were used to prevent colors from mixing with each other. To ensure the stability of pigments, they were mixed with egg yolks but couldn't be reused due to the drying of this mixture. Over time, glue started to replace eggs, and the mixture was rendered into a liquid form by adding molasses or grape juice, eliminating the need to prepare a new mixture each time. The key element in achieving the delicate craftsmanship in miniatures is the quality of the brushes used. To achieve this, "*very fine brushes made from the underfur of a three-month-old white kitten*" are used. In terms of paper usage, special mixtures were employed to

prepare illuminated miniatures sealed with chalk or egg to create bright visuals (Mahir, 2004: 15).

Detail-oriented work is known to be one of the essential characteristics that have allowed miniature art to persist from its early examples to the present day. Additionally, the period, circumstances, and the thoughts of the individuals involved in the creation of the artwork, harmonized with the *nakkaş*'s own ideas, contribute to the creation of works with documentary value. Observation is one of the fundamental techniques, and the absence of depth and shading brings out the abstraction while the prepared details, along with abstraction, help soften the abstractness, bringing a realistic approach (Kahraman & Önal, 20201).

2.1. The Emergence and Development of Miniature Art

The first geography where the existence of miniatures is acknowledged is considered to be the Eastern civilizations, and it has been found and developed in various other regions, primarily Western civilizations. The oldest known examples of miniatures discovered so far are seen in Ancient Egypt, while miniature examples created to enhance the depictions in manuscripts from various different nations, including Romans, Japanese, and Indians, can be found (Sağlam, 2017: 4).

Throughout history, individuals practicing art within the framework of different beliefs and religious rules have had a significant influence on the development and shaping of artistic styles. While it is generally considered to be an Eastern art form, it is known that important examples have also emerged in the West. Miniature art has expanded its geographical influence while maintaining its significance, following a concrete path without losing its value as it has evolved over time.

When looking at the earliest examples of miniatures in different civilizations, it can be expressed as follows: the oldest known example of miniatures in history dates back to the 2nd century BC in Egypt, created on a papyrus. The first miniature examples observed among the Turks date to the 9th century, while miniatures dating back to the 8th century can be found in Europe." (Aytar, Bayrak, Bilgiç, 2017: 138).

When we examine Byzantine miniatures, they were primarily used for embellishing manuscripts or included as portrait-like depictions within these works. They predominantly adopted religious themes, appearing as decorations in the margins of pages, manuscripts, and alongside various shapes. The development of Byzantine miniatures occurred during the Macedonian period, and over time, many works in this style integrated features borrowed from the East to establish a classical style. Many of these works are now exhibited in Paris.

Islamic miniatures had their early examples in the 11th century, with their development and dissemination occurring in the 12th century. Numerous works emerged from the region ruled by the Mesopotamia and Anatolian Seljuks, and some of these have survived to the present day. The development of miniature art in the Islamic world and the presence of specialized artists were facilitated by the existence of schools in regions such as Baghdad, Shiraz, and Tabriz. These schools were dedicated to the training of *nakkaş* artists and operated workshops in palaces, allowing for the creation of rare miniature pieces. Islamic civilizations like the Seljuks, Mongols, and Iran maintained the fundamental principles of miniature art while developing their distinctive styles. Turkish empires such as the Uzbeks and Mughals, through their expansion of territories and interactions with other civilizations, gave rise to unique styles while continuing the tradition of portraiture that is also found in Ottoman miniatures.

While the origins of Anatolian miniatures can be traced back to the Seljuks, the conservative tendencies of the Ottoman rulers hindered its progression, and it remained confined primarily to illuminated manuscripts. Over time, this attitude changed, and Anatolian miniatures developed by distancing themselves from the characteristics of miniatures from different nations while still conforming to religious sensibilities and focusing on a realistic style that did not contradict the prevalent beliefs.

This progress was made in connection with the palace, and the first examples began to emerge during the reign of Sultan Mehmed the Conqueror (Fatih). The subjects typically embraced in Anatolian miniatures include scenes of warfare, significant political events, the lifestyles of the sultans, and the depiction of important architectural structures, shedding light on historical events. Generally, the development of miniatures was centered around the palace, as the palaces established *nakkaş* workshops and supported *nakkaş* artists, enabling the creation of various works and styles. However, over time, the value of miniature art waned, and by the 19th century, it had been largely supplanted by other forms of visual arts (Larousse, *Milliyet bas.*, s.8208-8210).

2.2. The Acceptance of Miniature Art in Islamic Religion

Individuals who have embraced Islam adhere to the rules of the religion in their lives, and this principle also applies to art. However, this stance does not hinder the presence of art in Islam; on the contrary, it ensures that art is practiced with caution and sensitivity, within the boundaries and limits set by Islamic guidelines, leading to the development of painting (Sarac, 2011).

While Islam does not explicitly forbid the creation and possession of images in the Quran, the issue of the prohibition of depictions has been associated with the 93rd verse of Surah Al-Ma'idah. According to this verse: *"Wine, gambling, [sacrificing on] stone altars [to other than Allah], and divining arrows are but defilement from the work of Satan, so avoid it that you may be successful."* The term *"divining arrows"* in this verse has been translated by some scholars as referring to images and depictions, leading to the argument that Islam prohibits representations. However, in the interpretation of most scholars, the term *"divining arrows"* is described as *"idols set up for worship."* Therefore, it can be said that this verse advises Muslims to avoid paths that may lead to idolatry rather than specifically prohibiting depictions in Islam (Konak, 2013 s.969). While it is not definitively considered a sin, Islam, being a religion of the Prophet, has been subject to various hadiths where the creation of images is discouraged, leading to differing opinions. As a result, for a long time, it was not well-received and was associated with idolatry (Özşahin, 2017: 17).

The idols and images found in the Kaaba were destroyed under the leadership of Prophet Muhammad, and the worshipped visual representations were eradicated. However, it is known that he did not allow the destruction of the figures of Jesus and Mary and did not have the area where the footprint of Prophet Abraham is located demolished (İlden, 2012: 61). Attitudes towards images have varied at different times, and when we look beyond the time of Prophet Muhammad, there is no strict prohibition that was universally enforced. During the Seljuk period, elements of representation were frequently present, and it is known that the Ottomans produced superficial and monumental works outside of mosques (Özşahin, 2017: 17; Konak, 2013).

The material prosperity of Muslim communities over time has facilitated the construction of richly decorated mosques and artworks in terms of architecture. Through contact with other communities, artistic advancements led to the easy transition of visual arts into the Muslim society. Influenced by the depiction of historical events in art, a positive approach was taken, and it was decided that they could also practice this art, leading to the development of the art of miniature (Kahraman ve Önal, 2020: 21).

When we compare European painting to Muslim miniatures, it is evident that, within certain boundaries and without shadows or dimensions, visual representations were used to depict situations, ensuring that it did not approach idolatry, as prohibited by Islam. In contrast, European style often captured events in a one-to-one scale, freezing them in their original form. By making this distinction clear, Muslim artists have steered clear of features in painting that could be at odds with Islam and have developed miniature art. (Sarac, 2011).

2.3. The Beginning and Development of Ottoman Miniatures

In the Ottoman Empire, the visual arts commenced and developed within the framework of the rules adopted by the Islamic world. When establishing their own style in Ottoman miniatures, factors such as the expansion of their geographical territories, interaction with other civilizations, and the strengthening of the reign, all contributed to an increase in the value of art. The initial examples of miniatures in the Ottoman Empire were primarily created within illuminated manuscripts with the aim of visualizing the text's narration (Bağcı, Çağman, Renda, Tanındı, 2006).

When we look at the characteristics of miniatures, they are considered works that shed light on history, depicting various subjects such as social life, prominent events of the era, religion, and architecture (Aytar, Bayrak, Bilgiç, 2017). Although the first examples and beginnings of miniatures are proven with examples from the first half of the 15th century in Bursa in illuminated manuscripts, no works have survived to the present day. For this reason, the miniatures depicting a medical procedure during the early reign of Sultan Murad II and a miniature from the reign of Mehmed the Conqueror are considered to be among the earliest surviving Ottoman miniatures. These examples are recognized as the inception of miniature art (Sağlam, 2017).

During the reign of Sultan Mehmed the Conqueror (Fatih), the formation of miniature art is widely accepted. Art was highly valued during this period, and to develop it in the Ottoman Empire, many foreign and local artists were brought together to create portraits, thus marking the beginning of imperial portraiture. The influence was not only from the practice of European rulers having their portraits on coins and symbolizing political events but also due to the Eastern campaigns, which resulted in the incorporation of various cities into the Ottoman territories. Artists and artworks from these regions were brought to Istanbul, making Ottoman miniatures a synthesis of both Western and Eastern influences (Aladağ, 2011).

With the conquest of Istanbul, a workshop for manuscript illumination was established within the palace. The presence of a valuable library containing rare manuscripts, which were adorned with miniatures and presented to the sultan, led to the creation of exquisite artworks. The atmosphere of art within the palace was remarkably strong, and no other extensive art school of this kind has been observed (Binark, 1978). The era of Fatih (Mehmed the Conqueror) saw the establishment of

palace workshops that played a crucial role in training artists and producing works of art, particularly in the field of miniature art. This period is significant in the history of Ottoman miniatures. The collection of miniatures from this era, which includes both color and black ink works, is known as the "Fatih Album." It is a compilation of important works from that time and is housed in the Topkapi Palace Treasury (Aslanapa, 1986).

With the expansion of the Ottoman Empire's territories and treasury, the state's power increased in many aspects. As a result of the acquired resources, the value placed on art, artists, and artworks also grew. In the administration of the palace, miniaturists in the workshop became salaried state employees, and they were encouraged with various rewards and gifts in proportion to their productions. Moreover, many forms of support, such as covering expenses by the palace, ensured that the best artists and artworks would emerge.

Following the period during which Ottoman miniatures produced some of their finest examples, a decline began as the power of the rulers waned, economic resources were limited, and stagnation set in within the art organization. This period of stagnation coincided with diplomatic relations with Europe, leading to interactions that brought about changes and differentiation in art. The style of representation that imparted dimensions, in contrast to the perspective that miniatures traditionally adopted, gained prominence as a result of these interactions. Within the Ottoman miniature style, the technique of imparting dimensions made itself known primarily in depictions of natural and architectural elements, enhancing landscape compositions that were well-received by the palace residents.

While Ottoman miniatures were preserved by the palace in the later periods, their production diminished as the activities of the miniaturist workshops dwindled, and Western-style painting gained popularity and began to be practiced in the 19th century and beyond (Tanındı, 1996).

2.4. Subjects Depicted in Ottoman Miniatures

The subjects that nakkaş artists worked on typically included scenes from the palace life, daily life, ceremonial events such as coronations, as well as portraits, landscapes, animals, human figures, architecture, and religious themes, among various other depictions (Özaltın & Ölmez, 2011).

In his book from Metin And (2008), categorized miniatures into seven types, which include portraits, depicting historical events, illustrating literary works, religious subjects, architecture and landscapes, everyday life scenes, and the depiction of subjects with an encyclopedic nature.

When we look at the subject characteristics, portraits began with the practice of Fatih Sultan Mehmed having his own portraits created, similar to European rulers, which in turn led to the development of royal portraiture. With the involvement of many foreign and local artists, various works were produced, and in the subsequent periods of the reign, portrait creation continued. These works enabled the depiction of various details regarding the physical characteristics, clothing, environment, and more about the sultans of that era (Kılıç, 2020). There are two distinct examples that stand out in Ottoman miniature style. The first is the fusion of the miniature style with the Western painting approach, and the second is the style found in the works of Nakkaş Nigari. While Nakkaş Nigari's examples are important for portraiture and have contributed to the Ottoman style, they have also been influential in shaping the tradition that would follow (Konak, 2013).

Depicting historical events in miniatures, such as battles, weddings, receiving envoys, and subjects like sultans showcasing their skills in archery and hunting, not only helps in grasping the essence of the event when initially viewed but also provides more information when examined in detail. In these works where historical scenes come to life, the sense of power and dominance granted by the empire is palpable (Tanındı, 1996: 32). Miniatures depicting literary works have emerged through the representation of both oral and written works and have always been well-received, often exploring themes of love, sorrow, and separation. In particular, the rulers of the time encouraged the portrayal of literature, which was popular in every segment of society, thus enriching and enhancing its content. (Koç. 2021: 168).

Another significant factor that miniatures depict is the portrayal of religious events and figures. Various aspects, such as the miracles of the prophets, signs of the Day of Judgment, subjects mentioned in sacred scriptures, and depictions of heaven and hell, have been visualized. Guiding sources for the portrayal of these works have often been the sacred texts, hadiths, and narrations (Kaplan, 2011: 178-179).

Architectural and landscape depictions vary according to the subject matter, often featuring scenes from palace life and daily activities. Palaces, gardens, mosques, and numerous other structures are meticulously rendered in miniatures, while landscape elements such as trees, flowers, and fountains provide direction and color to the scenes. When examining these depictions, it's evident that they frequently include scenes of sultans showcasing their skills, scenes of entertainment, festive gatherings, and diwan meetings. (Çavdar, 2020: 226-231). Among the subjects depicting various aspects of life, science is also prominently featured in numerous miniatures. Especially in the book "Kitabu'l-Cerrahiyetu'l-Haniyye," where surgical experiences and methods are documented in writing, medical practices are visualized through miniatures. Apart from this book, it is known that many scientific depictions, particularly those related to medicine, have been visualized through miniatures (Görsoy, 2013:118).

When the main topics are examined, it is evident that they provide us with information about the clothing, jewelry, material wealth, musical instruments, everyday objects, food and beverage diversity, and culture of the period. These details are crucial for understanding the characteristics of the era.

3. THE ROLE OF GASTRONOMY ELEMENTS IN OTTOMAN MINIATURES

The entire process from the preparation of foods that reflect the traditions and habits shaping a society's culture to their consumption falls within the scope of gastronomy. It is closely connected to various fields such as history, geography, culture, and art, while encompassing the culinary arts within itself (Gülen, 2017: 32-33). When examining its relationship with art, it is evident that miniatures have a significant influence and depict various elements in subjects such as hunting, feasts, weddings, daily life, entertainment, and gatherings. The works in which gastronomy is most featured are typically found in the Surnames, which describe ceremonies. In general, the flow of a ceremony starts with determining the date and time of the event, announcing it to the invitees, making preparations, setting up tents, ensuring the kitchen equipment for the feast is ready. The feast itself, the exchange of gifts, the procession of tradesmen, and the entertainments are part of the ceremony (Kaytaz, 2015: 287).

The preparation of the kitchen holds great importance, and a person is appointed to manage kitchen affairs. The budget for the feast is allocated, and someone is tasked with managing the expenses and keeping accounts. It is known that a kitchen is set up at the venue of the ceremony, various cauldrons and trays are prepared, and various dishes and utensils, including Chinese and Iznik porcelain, are acquired (Atasoy, 1997: 21).

Miniature painting 1 depicts the sultan III. Ahmed's four princes drinking the soup served at the circumcision ceremony. Upon examining the miniature, it is observed that two successive scenes are illustrated, and the blue and white dishes depicted may be Chinese porcelain or Iznik ceramics. The spoons are among the other dining utensils used in closed metal containers and incense burners. In addition to these features conveyed by the miniature, it is also evident that a simple table setting predominates.

	
<p>Picture 1: Those Drinking Soup at the Prince's Circumcision</p>	<p>"Picture 2: Kebab Vendors in the 16th Century"</p>

"Picture 1: Levni, Surnâme-i Vehbi, Topkapi Palace Museum y50a"



"Picture 2: Nakkaş Osman, Surname-i Hûmayun, Topkapi Palace Museum y.343a."

While the Ottoman cuisine featured a wide variety of dishes, it was known for its preference for meat dishes. Looking at the period's recipes, it's evident that various types of meat, including kebabs, chicken, small livestock, and fish, were consumed in different preparations. A distinctive feature of Ottoman cuisine was its embrace of simplicity, resulting in meat dishes like köfte (meatballs), stews, and kebabs being prepared in uncomplicated ways. The focus was on bringing out the natural flavors

of the dishes. (Şavkay, 2000: 65-67). In the work executed by Nakkaş Osman depicted in Image 2, the representation of kebab vendors from the 16th century serves as clear evidence of this particular characteristic.

When examining the place of pastries and pies in Ottoman cuisine, one can observe a wide array of both sweet and savory varieties. These include börek (savory pastries), akıtma (fried dough), lokma (sweet fried dough), mantı (dumplings), baklava, among others. The list can be extended with additional types. Looking back at the culinary history, it's known that vegetable dishes began to appear in Turkish kitchens with the transition to a more settled way of life. The introduction of various vegetables from different cultures kickstarted vegetable cultivation in Anatolia, thus enhancing the culinary diversity. Apart from the mentioned food and beverages like pilafs, stuffed dishes, salads, appetizers, and sherbets, it's important to note that Ottoman cuisine featured a wide variety of desserts. Pastries, dairy-based sweets, fruit-based sweets are among the categories. Baklava and halva hold a particular significance in Ottoman cuisine (Şavkay, 2000).

It is well-known that at gatherings and feasts, trays of baklava are prepared, and large pots are used for roasting helva. When examining the elements in miniatures, one can easily see the diversity of dishes, the process of food preparation, the serving of meals, and depictions of vendors selling food.

	
<p>Picture 3: XVI. halva makers in the century</p>	<p>Picture 4: Festivities in Atmeydanı</p>

Picture 3: Nakkaş Osman, Surnâme-i Hümayun, Topkapi Palace Museum

Picture 4: Nakkaş Osman, Surnâme-i Hümayun, Topkapi Palace Museum

When examining the works related to meals in Ottoman miniatures, it can be observed that the dining tables are prepared on large round platters placed on wooden or metal pedestals. Beneath the platters, there are spread cloths, and the individuals at the table often place an additional cloth on their knees during the meal. Despite the variety in dining tables and meals, simplicity is maintained. In general, except for the sultan, the serving of dishes is designed for communal dining. The choice of dishes for serving predominantly includes ceramics or porcelain, and copper vessels with or without lids, depending on the nature of the meal. Those who sit at the table

are dressed neatly and carefully, and depending on the occasion, tables are typically set for large gatherings. The depiction of these details aligns with literary and historical texts, facilitating the visualization of events. Considering the style adopted by Ottoman miniatures, it can be acknowledged that these works shed light on history.

4. CONCLUSION

The miniature art distinguishes itself from other visual arts by visualizing events and situations without providing depth and dimension. With this style, it has developed in accordance with Islamic attitudes toward the art of painting. Although it took some time for miniature art to develop in the Ottoman Empire so as not to contradict with religion, it eventually formed its own style and produced significant works within the palace.

Various events have been depicted with intricate details in miniatures, leaving behind evidence that allows contemporary researchers to draw conclusions. In the course of this study, it is observed that miniatures contain elements related to past kitchen equipment, dishes, and food diversity. The details in miniatures support information on various aspects such as types of food and cultures found in other existing sources. The depiction of large and crowded tables, the ritual characteristics of ceremonies, and the strong sense of unity and togetherness stand out.

After general interpretations are made in this study, it becomes evident that miniatures can be further examined in greater detail, as gastronomy is closely related to various fields. This leaves room for different interpretations within the realm of art.

REFERENCES

- Aladağ, E. (2011). *Minyatürde Mekan Algısı V Erol Akyavaş* (Yayımlanmamış Yüksek Lisans Tezi). Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü, İzmir
- And, M. (2008). *Minyatürlerle Osmanlı-İslam Mitologyası*lanapa, O. (1986). *Türk Minyatür Sanatının Gelişmesi* .
- Atasoy, N. (1997). *Surname-I Hümayun: Dügün Kitabı*
- Aytar, O., Bayrak, T., & Bilgiç, A. (2017). *Osmanlı Minyatür Sanatında Yönetim İlkeleri* 1 Öz.
- Bağcı, Çağman, Renda, Tanındı, (2006). *Osmanlı Resim Sanatı*. Basıldığı Yer:İstanbul
- Binark, İ. (1978). *Türkler'de Resim Ve Minyatür Sanatı*.
- Çavdar, H. (2020). *Osmanlı Minyatürlerinde Saray Hayatı* (Yayımlanmamış Yüksek Lisans Tezi).
- Gülen, M. (2017). *Gastronomi Turizm Potansiyeli Ve Geliştirilmesi Kapsamında Afyonkarahisar* S.32-33.
- Gürsoy, F. (2013). *Minyatür Sanatında Dermatoloji* S.118
- İlden, S. (2012). *Türk Minyatür Sanatının Gelişiminde Dinin (İslamiyetin) Etkisi*. Akdeniz Sanat, 5(9).

- Kahraman, M. E., & Önal, H. (2020)1. Minyatür Sanatının Evrimi. Pearson Journal Of Social Sciences - Humanities, 9, P. 19-25.
- Kahraman, M. E., & Önal, H., (2020)2. Modern Dünyada Minyatür Sanatı. Pearson Journal Of Social Sciences - Humanities, 8, P. 240-245. Doi: 10.46872/Pj.166.
- Kaplan, N. (2011). Osmanli Resim Sanatinda Cehennem Tasvirleri. Mukaddime, 4(4), 175-195.
- Kaytaz, F. (2015). Erken Dönem Osmanlı Tarihlerinde Yıldırım Bayezid'in Düğününün Anlatımına Dair Bölümlerin Sûrnâme Bağlamında Değerlendirilmesi. Türkiyat Mecmuası, 25(2), 281-305.
- Kiliç, H. (2004). Osmanli Minyatürlerinde Padişah Portreleri. Lale, 1(1), 96-104.
- Koç, Ö. (2021).Süç Aşk Konulu Mesneviden Minyatürler Ve Feraye Türküsü Minyatürü. Güzel Sanatlar Enstitüsü Dergisi, 27(46), 168-183.
- Konak, R. (2013). Osmanli Minyatür Sanatinda Padişah Portreciliğinin İlk Örnekleri Ve Geleneğe Katkiları. Electronic Turkish Studies, 8(5).
- Konak, R. (2013). İslam'da Tasvir Yasağı Sorunu Ve Minyatür Sanatı.
- Larousse (Milliyet Bas.). Büyük Larousse Sözlük Ve Ansiklopedisi, "Minyatür" Maddesi, Milliyet Gazetecilik A.Ş., İstanbul. Cilt.16. S. 8207-8210.
- Mahir, B. (2004). Osmanlı Minyatür Sanatı Kabalcı Yayınları
- Mesara, G. (1987). Türk Tezhip Ve Minyatür Sanatı
- Özaltın, N., & Ölmez, F. (2011). Osmanlı Dönemi Minyatürlerinde El Sanatlarından İzler. Art-E Sanat Dergisi, 4(7), 1-30.
- Özdemir, G., & Altiner, D. D. (2019). Gastronomi Kavramları Ve Gastronomi Turizmi Üzerine Bir İnceleme. Erzincan Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 12(1), 1-14.
- Özşahin M.Semih. (2017). Türk Minyatür Tekniği İle Çizgi Roman Tasarımı (Yayımlanmamış Yüksek Lisans Tezi)
- Polat, E. (2018). Yüksek Lisans Tezi Osmanlı Minyatür Sanatında Resmi Tören Tasvirleri Ve Tahlilleri
- Sağlam, S. S. (2017) Yüksek Lisans Tezi Türk İllüstrasyonuna Minyatür'ün Etkisi Ve Çağdaş Bir Uygulama
- Tanıncı, Z. (1996). Türk Minyatür Sanatı S.32
- Picture 1: <https://www.tarcintadi.com/2010/08/bir-kase-scak-corba.html>
- Picture 2: <http://uluset.blogspot.com/2014/10/osmanli-minyaturlerinde-kasaplk-butchers.html>
- Picture 3: <https://yemek.com/sabuniye-helvasi-hikayesi/>
- Picture 4: <https://www.asitanerestaurant.com/English/scramble-for-the-dishes/>

Block chain based identification and authorization, hospital billing along with Insurance Claim Management

Monika Gahlyan¹, Brij Mohan², Vinit Kumar³, Larisa Mistrean⁴

Abstract

Introduction: In real-world transactional systems, block chain technology allows privacy, security, auditability, tracking, and monitoring. Block chain has been used because to its characteristics in many different sectors. SCM, or supply chain management, is one of these crucial applications. In this essay, the use of block chain technology in the healthcare sector has been examined.

Aim: The goal of using block chain technology is to identify a hospital patient specifically, automatically, securely, and effectively pay the insurance claim. In this regard, a first algorithm has been proposed that generates a unique ID using the user's smart phone and a government-issued ID.

Method: The user's smart mobile stores and makes use of the unique ID. The same ID is used to authenticate transactions after identity formation. The mobile device is used to produce a signature that is transmitted to the insurance company in order to validate the transactions.

Findings: The patient's claim for insurance was verified by the hospital using the patient's signature. The suggested block chain-based system has been simulated using the JAVA programming language. After installation, simulation tests were conducted, and performance was assessed.

Originality and value: Based on time and memory use, the effectiveness of both the certificate generation and authentication processes has been assessed. The results demonstrate the effectiveness, security, secrecy of the system's transaction management.

Key Words: Supply chain management, large-scale data handling, tagging, block chain modeling, and healthcare are some of the terms used to describe block chain technology

Jel Codes: I1, I2, Y8

1. INTRODUCTION

Block chain is a technology which is mainly used to track, monitor, and manage the real-world entities into the web-based identity. The block chain technique utilizes the mapping function which is secure and identification is easy and low cost. In this context, this technique has widely used in managing the supply chain systems.

¹ Research Scholar, BMU, CSE Department, Haryana, India

² Professor, BMU, CSE Department, Haryana, India

³ Assistant Professor, VCE, CSE Department, Haryana, India

⁴ PhD, Post-Doctoral Researcher, Academy of Economic Studies of Moldova, Behavioral Research Center, Moldova

In recent years during the COVID-19 when the entire world is suffering from broken supply chain system, the block chain-based supply chain management helped us to track and monitor the necessary supply of essential and lifesaving drugs. Therefore block chain based supply chain management plays an essential role for efficient and temper proof product and service delivery. In this paper, we utilized the block chain system for settlement (Bhatia et al., 2023, Song et al., 2019, Barak et al., 2020, Sood et al., 2022).

The aim of the proposed concept is to design a secure and efficient system for recognizing a user system wide and also utilized to authorize the financial transactions basedon hospitals. The proposed system is also promising to reduce the misuse of user identity bythe malicious users because the compromised user tries to conduct malicious transactions based on a fake user identity. Such kind of system design is need of current digital supply chain management systems due to the compromised supply chain may increase the chances of duplicate product supply, and negative affect on the reliability, maintainability, tracking, and monitoring of healthcare services (Tandon et al., 2020, Singh et al., 2023₁, Singh et al., 2023₂, Singh et al., 2023₆).

Next, the key findings of the review have been highlighted. Further based on the collected information from the different research article the problem of hospital billing and insurance claim has been rectified. In this context, two different algorithms have been contributed, first algorithm is used for developing the unique user identity and second algorithm has used to verify the digital transactions made. Implementing these block chain-based solutions requires collaboration between healthcare institutions, insurance providers, and regulatory bodies to establish standardized protocols, data formats, and security measures (Kumar et al., 2018, Aich et al., 2019, Batwa et al., 2020, Madhwal et al., 2017, Blossey et al., 2019).

Moreover, compliance with data privacy regulations such as HIPAA (in the United States) is crucial to ensure patient privacy and security (Singh et al., 2023₃, Singh et al., 2023₄, Singh et al., 2023₅). While block chain holds great promise for healthcare, it's essential to address scalability, interoperability, and regulatory challenges for its widespread adoption (Singh et al., 2021, Aslam et al., 2021, Dietrich et al., 2021, Hasselgren et al., 2020).

Additionally, the technology must evolve to meet the unique needs and requirements of the healthcare industry. Further, a complete flow of the process has been discussed for implementation point of view. Finally, the implementation details have been provided and the performance analysis has been discussed based on the different performance parameters. Finally, the conclusion of the work has been presented and future research plan have been discussed.

2. LITERATURE REVIEW

Block chain identification and authorization, hospital billing, and insurance claim management in the healthcare sector. Here's a selection of papers that have contributed to this area: "Blockchain for healthcare data management: opportunities, challenges, and

future recommendations” (Yaqoob et al., 2021) emphasizes the importance of patient identification in healthcare. It discusses how block chain technology can provide a secure and immutable patient identity.

The authors highlight the potential for reducing medical errors and improving patient safety). This research paper explores the application of block chain for access control in electronic health records (EHRs). It introduces a novel consensus algorithm for managing EHR access, enhancing security and privacy.

“Access control for electronic health records with hybrid blockchain-edge architecture” (Guo et al., 2019) presents a prototype system and discusses its benefits in terms of data security and patient privacy.

This paper delves into the challenges of traditional hospital billing systems, including errors and delays. It presents a block chain-based billing system that streamlines billing processes, reducing administrative overhead and errors. The research discusses the implementation of smart contracts to automate billing and improve accuracy. Focusing on the insurance sector, this paper explores how block chain can improve claim management. It discusses the transparency and trust-building aspects of block chain, reducing fraudulent claims.

The authors provide a case study of an insurance company that successfully implemented block chain to enhance claim processing. “Review on “Blockchain technology based medical healthcare system with privacy issues” (Saha et al., 2019) examines the privacy and security challenges in block chain-based healthcare systems. It discusses techniques for preserving patient data privacy while allowing authorized access. The paper emphasizes the need for compliance with healthcare regulations and standards.

“Applications of blockchain in healthcare: current landscape & challenges” (Katuwal et al., 2018) takes a closer look at the legal and regulatory aspects of using block chain in healthcare. It discusses compliance with laws like HIPAA and GDPR, and how block chain can assist in meeting these requirements. The authors highlight the need for collaboration between the healthcare industry and regulatory bodies.

“Scalability challenges in healthcare block chain system a systematic review” (Mazlan et al., 2020) focuses on the scalability issues that may arise in large-scale healthcare block chain implementations.

It examines various consensus mechanisms and their impact on system performance. The research proposes potential solutions to enhance the scalability of block chain-based healthcare systems.

These research papers collectively provide insights into the application of block chain technology in healthcare for identification, billing, and insurance claim management. They highlight the potential benefits, challenges, and areas for further research and development in this rapidly evolving field. Researchers, healthcare professionals, and policymakers can draw from these studies to inform their decisions and strategies for implementing block chain in the healthcare sector.

In order to understand the working and implementation of the block chain technology in healthcare industry for supply chain management a review is proposed to conduct. The presented work includes a study of 48 recently published research articles. These articles have collected from a public platform Google Scholar. Additionally, most relevant articles have been discussed for identifying gap and discussing the relevant solution. According to conducted study, Block chain is one of the most studied technologies in managing the digital supply chain. The employment of the block chain technology provides a significant number of benefits over the traditional supply chain management system, which is managed and maintained manually.

However, in recent years the Block chain technology is not only utilized in supply chain management it is being accepted in various other industries too. The summary of conducted review has been summarized in figure 1.

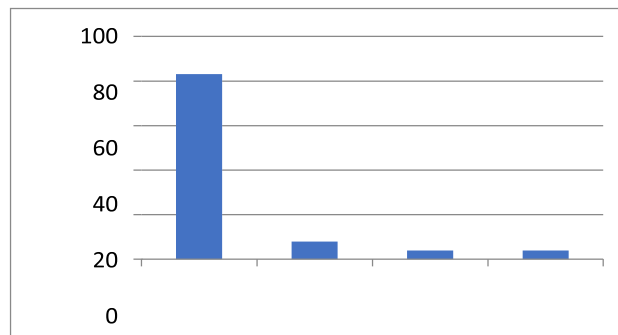


Figure 1. Work trend using the Block chain technology

According to the finding of the review, the most of the published article are limited only to the review, applications, ideas of implementation and deployment, framework design, and conceptual or theoretical overview in different industries. Additionally, when we explored the implementation of Block chain in healthcare and SCM then we found the block chain in healthcare is mostly used for data sharing, managing records, and access control. It is also found that technical details about the used Block chain are not given and do not present any implementation. Based on the conducted review, we have found that 83% of the work is dedicated to reviews of the Block chain. 8% simulate the prototype, 4% of the work was focused on designing and identifying the evaluation parameters, and the remaining 4% of techniques are utilizing this technology as the predictive model with secure data analysis. Based on the contributions figure 1 demonstrates the % of work carried out using Block chain technology in the field of supply chain management and the healthcare industry.

3. PROPOSED WORK

The healthcare industry is a large domain and involves a number of actors and activities. Among these activities the patient enrollment, billing and insurance claim is one of critical task. In this scenario it is required to identify the specific patient and process their transaction is one of the essential tasks. In addition, for billing and insurance claim it is also provide an essential assistance to the medical and insurance system. In this paper, for maintaining the transactions and records of a unique patient we need to assign a unique id. The paper include how a patient is enrolled to the medical system and insurance system using an unique block chain id and authenticated to ensure the specific patient during the transactions between hospital billing department and insurance company.

The proposed patient management system includes two key components:

- identity creation or patient enrollment;
- identity management.

Figure 2 provide an overview of the basic concept of user creation system which is utilized during the entire medical assistance.

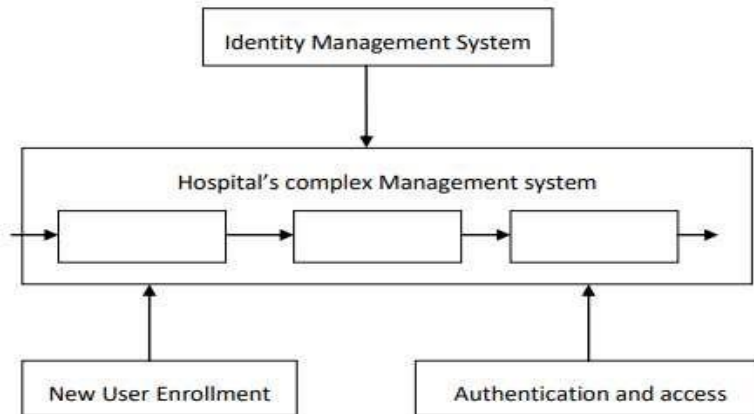


Figure 2. An overview of id creation and utilization

Objective of this research is to study the impact of social media activities of social networking sites members; more specifically Facebook members, on the brand awareness. The study mainly focuses on finding the effectiveness of social media marketing. It aims to find how successful social media marketing is for making brand awareness in potential customers.

A. System components and assumptions.

The proposed identity management system includes the following types of key components for managing the system:

A individual who is actively taking part in a transaction is referred to as a patient. In other words, the user who want to use insurance and health care services. It is necessary to receive an identity from the identity maker so that it may be used to identify him on the block chain. The individual is not trustworthy and could attempt to use the online personas of others.

Smart-phone: To communicate with the block chain-based system, the patient's smart-phone is utilized in conjunction with the identity they have generated. Here, it is assumed that a smart phone always follows a set of pre-established processes for interacting with a block chain system and any data stored on the phone.

An authority is a person who assists a patient in developing a digital identity that can be utilized with the suggested block-chain system. It is thought that the authority can be completely trusted and would never engage in unethical practices to produce false identification documents. This power may come from a government body.

Identity manager: This is a collection of identities that collaborate to submit transactions in the block chain system relating to identities.

B. Design requirements.

Block chain is a powerful information management technique. In order to effectively utilize the potential of block-chain concept, a reliable mapping between the real world and the web is essential. A cost-effective method for leveraging block chain to link a person to their online identity must also be developed. The suggested work takes into account the following model design specifications:

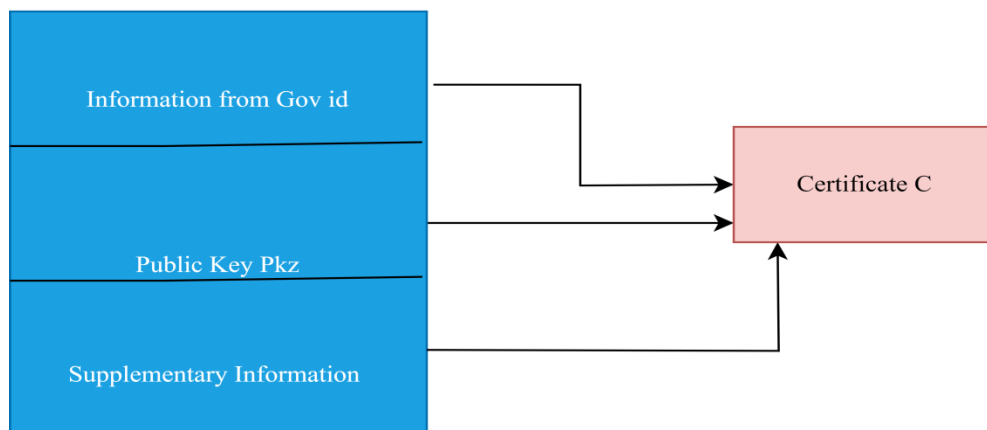


Figure 3: Model specification

Security: A user may only use his own identity with the system, and that identity contains the data from an ID that was granted by an insurance company and is now utilized in that system.

Cost: The user may communicate with the block chain system and keep their identification on their smartphone without the need for pricey hardware.

Identity Design. This section provides the method of identity creation and management. Therefore the key processes involved and functional aspects of the proposed block-chain based hospital billing and insurance management system has been discussed.

a. ID Creation.

To the patient had to utilize a government-issued ID and a smartphone to generate an ID, which was then used in the block chain-based hospital billing and insurance system.

The process given in figure 4 demonstrate a certificate C is generated to identify a patient p in the hospital billing and insurance system. The composition of certificate C is given in Figure 4.

Input: Patient p with government ID gov_{id} and smart-phone p_h , the authority A.
Process:
1.p sends gov_{id} to A 2.A checks
a. $con_1 = true$ if gov_{id} is valid; b. $con_2 = true$ if consistency of gov_{id} with p; 3.if $con_1 = con_2 = true$
a. p provide p_h to A b. if p can solve the OTP then
i. $h(p_k, s_k) = A. generateKey$
c. iv. ii. $= A. (p, gov_{id})$
4 End if End;if iii. $C = A. generate(p_k, i)$
5.Return Error Return C

Figure 4. Composition of certificate C

b. Utilizing the certificate C.

In the patient's smart phone number is used to authenticate them and to confirm their identification. To illustrate how this smartphone-based id would be used in this situation, an algorithm has been built. The procedure for using the user certificate is shown in figure 4. When it comes time for verification, end Ic who received the signature S looks

for the associated certificate C and uses the private key pk to validate the signature S . The patient p is recognized to add the tr with the signature S into the billing and insurance claim system if S and tr are consistent.

c. Confidentiality/integrity.

The algorithm is providing the way how to smart-phone stores secret information and interacts with the block-chain based hospital billing and insurance claim system.

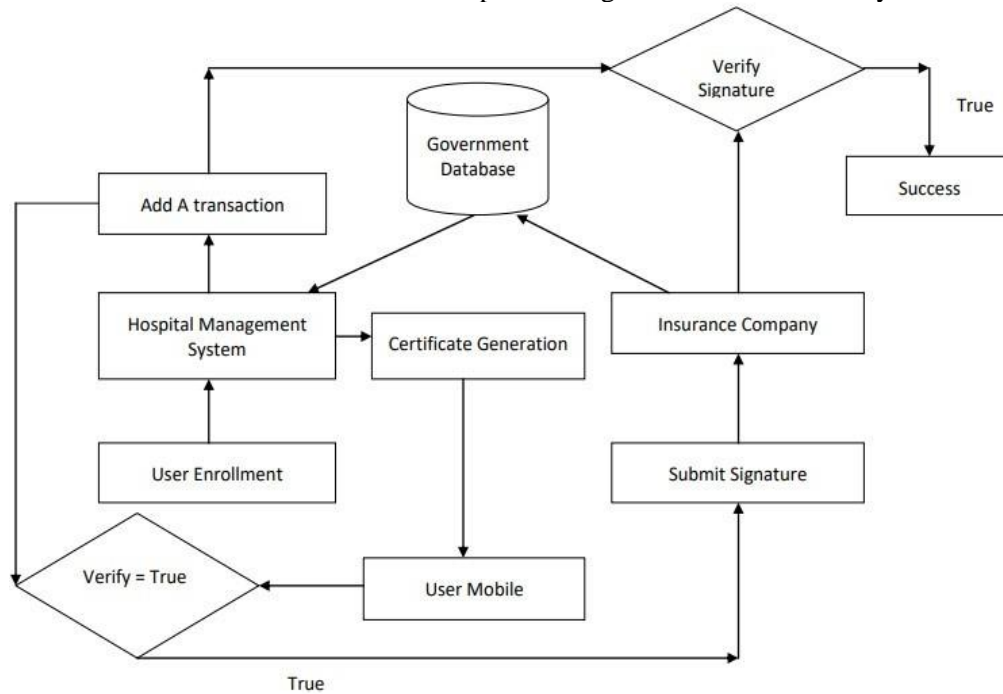


Figure 5. Working of the proposed hospital billing and insurance claim under block chain system

An attacker may directly interact with the system or attempt to change or destroy it by utilizing the secret information if they wish to compromise confidentiality and extract the private key that is kept in the PH. As a result, the attacker is unable to impersonate the user. It stops authorized users from using their identities in the system. The hardware of the smartphone protects the confidentiality and integrity of the information. Only approved software is permitted to utilize the secret signatures, thanks to the hardware.

4. IMPLEMENTATION AND RESULTS

In this section the implemented simulation system and the performance evaluation of the proposed system has been discussed.

a. Implementation.

The required process of the proposed system functioning is demonstrated in figure 5. In this system, it is assumed that the government agencies are keeping record of the

patient health insurance. Additionally it is connected with the block chain system. When a person comes to the hospital for enrollment the hospital system by using government ID generate a certificate. The certificate contains the insurance company information also as the supplementary information. This certificate is stored in device storage for future use. In near future when the hospital generate a bill for the patient then a transaction is needed to be add in insurance company. In this situation, the system asks to authorize the transaction to the user. Patient utilizes their mobile to generate a signature and generated signature is submitted to insurance company. Hospital billing system and insurance company verify the same signature for authenticating the transaction. The prototype of this system is developed using the JAVA.

Technology and their performance for certificate generation and authentication process has been evaluated. The obtained performance has been given in next section.

b. Results Analysis.

The implemented model is evaluated to measure the performance. There are two parameters are considered i.e. time and memory usage for both certificate generation and authentication. The memory usage an algorithm demonstrates the amount of main memory resource has utilized for conducting the task. That can be calculated using the following formula:

$$\text{memory Usage} = \text{total assigned} - \text{free memory}$$

Next, performance evaluation parameter is time consumption. The time consumption is measured using the following formula.

$$\text{time consumption} = \text{end time} - \text{start time}$$

Figure 6 (A) and table 6 (B) show how well the suggested model performed for both tasks. The memory use of both solutions as included in various experimental findings is shown in figure 6 (A). Additionally, the system's time consumption is shown in figure 6 (B). The algorithm's memory use has been calculated in terms of kilobytes (KB), while the system's time consumption has been calculated in milliseconds (MS). In both figures, the blue color bar shows how well the method for generating certificates performs, while the orange color bar shows how well the authentication system performs. We discovered that the time needed to issue a certificate is longer than the time needed to validate a transaction based on the time consumption figures that were collected.

Additionally, the production of certificates uses less memory than authentication does. In terms of the usage of computing resources, there are virtually little distinctions between the two processes. Therefore the proposed system is low time and memory resource consuming technique. Additionally has low cost system which does not require an expensive hardware or device to verify the transactions.

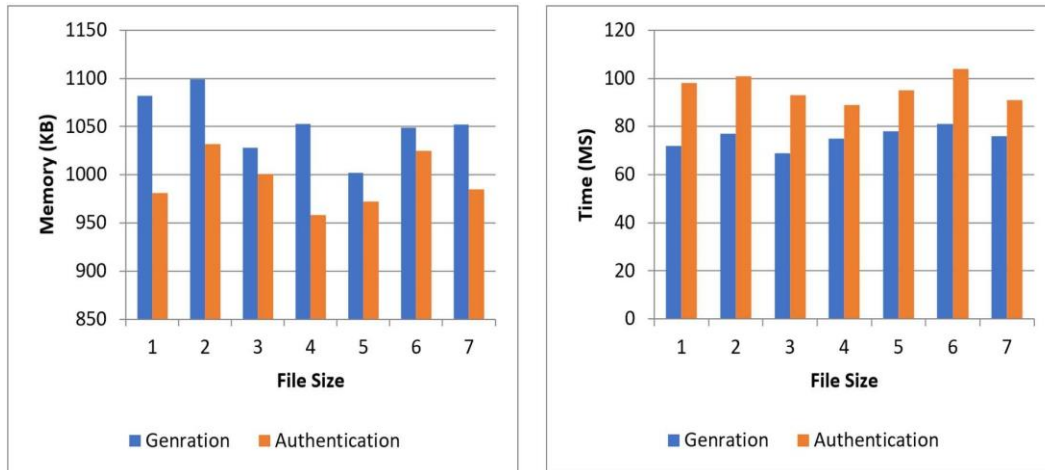


Figure 6. The memory use of both solutions as included in various experimental findings is shown in figure 6(A). Additionally, the system's time consumption is shown in figure 6(B)

5. CONCLUSION AND FUTURE WORK

One of the most effective and secure systems for tracking, observing, and validating digital transactions and activities is the block chain. As a result, block chain technology is being embraced in a variety of supply chain management system applications. A simulation of a system based on a block chain has been suggested for controlling the

System for billing and insurance claims at hospitals. In this light, an assessment of the most current supply chain management system built on a block chain has been conducted. The analysis notably took the healthcare sector into account to comprehend how it operates and the necessity for using block chain technology to effectively and affordably handle billing. The study concluded that 83% of the research performed block chain reviews, 4% provided simulations, 4% contributed to performance assessment, and the remaining 8% showed implementation-based research.

A block chain-based patient enrollment system and its application to the settlement of insurance claims have also been suggested for design and implementation. The proposed system provides the ability to create certificates that may be used to authenticate communications between an insurance claim firm and a hospital billing system. The system manages patients safely and makes use of them to authenticate transactions in a low-cost, effective, and secure manner. A simulation that evaluates the effectiveness of the established system for certificate production and authentication has also been constructed utilizing the JAVA technology. The suggested system has been determined to be effective and secure for managing the supply chain in the healthcare system based on performance assessment of the implemented model.

REFERENCES

- Aich, S., Chakraborty, S., Sain, M., Lee, H. I., Kim, H. C. (2019), “A review on benefits of IoT integrated blockchain based supply chain management implementations across different sectors with case study”, 21st international conference on advanced communication technology (ICACT), 138-141.
- Aslam, J., Saleem, A., Khan, N. T., Kim, Y. B. (2021), “Factors influencing blockchain adoption in supply chain management practices: A study based on the oil industry”, *Journal of Innovation & Knowledge*, 6(2), 124-134.
- Barak, D., Singh, K., Ahlawat, P., Sharma, H.K. (2020), “Real time tracking system: An IoT based application”, 5th International Conference on Next Generation Computing Technologies (NGCT-2019), 88-93.
- Batwa, A., Norrman, A. (2020), “A framework for exploring blockchain technology in supply chain management. Operations and Supply Chain Management”, *An International Journal*, 13(3), 294-306.
- Bhatia, S., Goel, N., Ahlawat, V., Naib, B. B., Singh, K. (2023), “A Comprehensive Review of IoT Reliability and Its Measures: Perspective Analysis”, *Handbook of Research on Machine Learning-Enabled IoT for Smart Applications Across Industries*, 365-384.
- Blossey, G., Eisenhardt, J., Hahn, G. (2019), “Blockchain technology in supply chain management: An application perspective.
- Dietrich, F., Ge, Y., Turgut, A., Louw, L., Palm, D. (2021), “Review and analysis of blockchain projects in supply chain management”, *Procedia computer science*, 180, 724-733.
- Guo, H., Li, W., Nejad, M., Shen, C. C. (2019), “Access control for electronic health records with hybrid blockchain-edge architecture”, *IEEE International Conference on Blockchain (Block chain)*, 44-51.
- Hasselgren, A., Krlevska, K., Gligoroski, D., Pedersen, S. A., Faxvaag, A. (2020), “Blockchain in healthcare and health sciences. A scoping review”, *International Journal of Medical Informatics*, 134, 104040.
- Katuwal, G. J., Pandey, S., Hennessey, M., Lamichhane, B. (2018), “Applications of blockchain in healthcare: current landscape & challenges”, *arXiv preprint arXiv:1812.02776*.
- Kumar, T., Ramani, V., Ahmad, I., Braeken, A., Harjula, E., Ylianttila, M. (2018), “Blockchain utilization in healthcare: Key requirements and challenges”, *IEEE 20th International conference on e-health networking, applications and services (Healthcom)*, 1-7.

Madhwal, Y., Panfilov, P. B. (2017), “Blockchain and supply chain management: Aircrafts’ parts’ business case”, *Annals of DAAAM & Proceedings*, 28, 1051-1056.

Mazlan, A. A., Daud, S. M., Sam, S. M., Abas, H., Rasid, S. Z. A., Yusof, M. F. (2020), “Scalability challenges in healthcare block chain system - a systematic review”, *IEEE access*, 8, 23663-23673.

Saha, A., Amin, R., Kunal, S., Vollala, S., Dwivedi, S. K. (2019), “Review on “Blockchain technology based medical healthcare system with privacy issues”, *Security and Privacy*, 2(5), e83.

Singh, K., Singh, Y., Barak, D., Yadav, M. (2023₁), “Comparative performance analysis and evaluation of novel techniques in reliability for internet of things with RSM”, *Int. J. Intell. Syst. Appl. Eng.*, 11(9s), 330-341.

Singh, K., Singh, Y., Barak, D., Yadav, M., Özen, E. (2023₂), “Parametric evaluation techniques for reliability of Internet of Things (IoT)”, *International Journal of Computational Methods and Experimental Measurements*, Vol. 11, No. 2, 123-134.

Sood, K., Dev, M., Singh, K., Singh, Y., Barak, D. (2022), “Identification of asymmetric DDoS attacks at layer 7 with idle hyperlink”, *ECS transactions*, 107(1): 217.

Singh, K., Barak, D., Singh, Y. (2021), “IoT Chatbot in insurance”, *International Journal of Engineering, Management, Humanities and Social Sciences Paradigms (IJEMHS)*, 33(1): 12-16.

Singh, K., Barak, D., Singh, Y. (2023₃), “Reviewing the IoT systems reliability and accuracy”, *The Pharma Innovation Journal*, 12(3): 2775-2780.

Singh, K., Yadav, M., Singh, Y., Barak, D. (2023₄), “Reliability Techniques in IoT Environments for the Healthcare Industry”, *AI and IoT-Based Technologies for Precision Medicine*, 394-412.

Singh, K., Singh, Y., Barak, D., Yadav, M. (2023₅), “Detection of Lung Cancers From CT Images Using a Deep CNN Architecture in Layers Through ML”, *AI and IoT-Based Technologies for Precision Medicine*, 97-107.

Singh, K., Singh, Y., Barak, D., Yadav, M. (2023₆), “Evaluation of Designing Techniques for Reliability of Internet of Things (IoT)”, *International Journal of Engineering Trends and Technology*, 71(8), 102-118.

Song, J. M., Sung, J., Park, T. (2019), “Applications of blockchain to improve supply chain traceability”, *Procedia Computer Science*, 162, 119-122.

Tandon, A., Dhir, A., Islam, A. N., Mäntymäki, M. (2020), “Blockchain in healthcare: A systematic literature review, synthesizing framework and future research agenda”, *Computers in Industry*, 122, 103290.

Yaqoob, I., Salah, K., Jayaraman, R., Al-Hammadi, Y. (2021), “Blockchain for healthcare data management: opportunities, challenges, and future recommendations”, Neural Computing and Applications, 1-16.

A patient supervising solution related to the Internet of Things with an RFID scanner

Khushwant Singh¹, Larisa Mistrean², Yudhvir Singh³, Dheerdhvaj Barak⁴

Abstract

Introduction: The system has an RFID scanner that reads RFID tags on ID cards or wristbands worn by patients to gather data, which it then sends to a web application. The online programmer analyses the data, gives medical practitioners up-to-date patient health information.

Aim: Healthcare practitioners may access patient data remotely using the web application component, which offers a safe, convenient platform. Improvements in patient outcomes, increased healthcare efficiency, and cost savings are all advantages of the system.

Method: This abstract introduces a system combining Radio-Frequency Identification (RFID) technology with a web application, creating a seamless platform for patient monitoring and data analysis. The system incorporates an RFID scanner that reads unique tags on ID cards or wristbands worn by patients. These tags facilitate the collection of patient data, which is then seamlessly transmitted to a web application.

Findings: The positive impact of cutting-edge healthcare technology is threefold. It leads to improvements in patient outcomes, as healthcare practitioners have access to up-to-date information to make informed decisions. Also, it enhances healthcare efficiency, streamlining the monitoring process, freeing up resources.

Originality and value: It brings about cost savings, making healthcare institutions more effective, sustainable. The integration of RFID technology and web-based communication in patient monitoring is poised to revolutionize healthcare. By empowering healthcare institutions to improve patient care, efficiency, and financial sustainability, this system represents a significant stride toward the future of healthcare.

Key Words: Internet of Things (IoT), Radio-Frequency Identification (RFID), Patient Monitoring

Jel Codes: I12, I15, I3, O31

1. INTRODUCTION

Due to substantial advancements in healthcare and medicine, as well as greater public awareness of the need of personal and environmental cleanliness, life expectancy has been rising around the world. Family planning has become more popular in recent

¹ Research Scholar, MDU, CSE Department, Haryana, India

² PhD, Post-Doctoral Researcher, Academy of Economic Studies of Moldova, Behavioral Research Center, Moldova

³ Professor, MDU, CSE Department, Haryana, India

⁴ Assistant Professor, VCE, CSE Department, Haryana, India

decades and has helped reduce birth rates worldwide. According to the World Health Organization (WHO).

Regarding social welfare and health, requirements, this massive ageing population would have a tremendous influence on the socioeconomic structure of society. In addition, the cost of hospital treatment, prescription medications, and medical equipment is rising, which drives up the cost of health care services. It is critical to developing and put into practice to provide the aging population or those living in places with restricted access to healthcare with better healthcare services at an affordable price, new approaches, and technology are needed to ensure the population's maximum comfort, independence, and participation.

While IoT in patient monitoring offers substantial advantages, there are challenges to overcome, including standardization, interoperability, data security, and ensuring that healthcare providers can effectively manage the influx of data generated by these devices. Additionally, ensuring that patients are comfortable and capable of using these technologies is important for their success. Nonetheless, IoT in patient monitoring has the potential to revolutionize healthcare by shifting the focus from reactive care to proactive and preventative healthcare.

2. IoT (INTERNET OF THINGS)

A developing area with important economic, social, and technological consequences is the Internet of Things (IoT) (Bhatia et al., 2023, Singh et al., 2023₁). When objects are connected to the internet and have powerful data analytics capabilities, our way of working and living is going to alter. The Internet of Things does, however, also come with several significant challenges that could prevent its potential benefits from being realized (Singh et al., 2023, Singh et al., 2023₂). Because so many diverse technologies must cooperate in an IOT system, standardization is one of them. Any IOT device, regardless of manufacturer or technology, would be able to connect to any other device in a fully interoperable ecosystem.

Using the Cloud in Healthcare. Cloud computing, utilizing acronyms like IaaS, PaaS, and SaaS, allows users to access computing resources on-demand and from anywhere. The long-held dream of computers as a utility has come realized with the development of cloud computing. Similar to how electricity and gas are produced and billed, cloud services charge consumers only for the resources and services they use. Everything is included in a User's can only pay for the services they actually utilize thanks to our dependable monthly subscription plan. Regarding the m-health sector, numerous earlier researches predicted the rise of cloud computing and provided several frameworks to improve healthcare delivery.

Mobile Healthcare System with Secure Lightweight IoT Integrated RFID - safety is currently an issue for public health around the world, particularly for elderly individuals who require physiological health monitoring systems connected with technology to watch and manage medical requirements. A mobile healthcare (M-health) system

allows doctors to enter patient health information from their location and provide medical advice as needed. Its goal is to save patient health records for all time. This arrangement increases availability and efficacy because cases and doctors do not need to meet. As a result, patients can directly receive medical advice from physicians through their Hearthstone. RFID technology is essential to this process for access to medical records and identification of patient-specific information.

Implementation and Assessment of a Centralized Patient Monitoring and Tracking System Based on RFID (RPMST) - it makes sense that keeping track of all the treatments and medical information would be burdensome for a patient. The concept of a centralized information system that shares and manages patient data using RFID technology is undoubtedly beneficial (Batwa et al., 2020). Each patient is given a distinct ID number using RFID, making it simpler to locate and retrieve their records when necessary. Tracking patients is another crucial component of patient care, particularly in an emergency. The patient's vital signs, including temperature and heartbeat, are routinely checked through patient tracking. A message with the patient's location and the urgency of the issue is sent to the closest hospital and a relative if the readings are outside the usual range. This enables prompt and effective support to be provided.

Design and Evaluation of a Web and Mobile Application-Based, Low-Cost RF Patient Monitoring System - it is undoubtedly a worthy objective to use web and embedded systems to enhance healthcare in underdeveloped nations. One of the primary components of the study is the utilization of wireless sensor networks for real-time remote identification and monitoring of healthcare data. This enables medical professionals to keep an eye on their patients' health and decide on the best course of action even when they are far away. Affordability is a crucial factor in underdeveloped nations, and the suggested system is built using RF-based infrastructure to be inexpensive. This can make it available to a large population, including individuals who live in distant locations and have little access to medical services. Additionally, the system uses multi-physiological signal processing and data capture, which enables a more complete and picture of the health of the patients (Aich et al., 2019).

Development and Use of an RFID-Based COVID-19 Patient Health Monitoring System in Government Hospitals - the use of wireless communication devices has substantially increased in recent years, increasing the flexibility of digital system communications. The development of LAN, WAN, and SWAN technologies has made the entire planet into a "Global village," enabling hierarchical global internet communication. This technology has been utilized by business sectors for a variety of purposes, including human resource management. RFID tagging is frequently used to protect data processing and sharing with data privacy among hierarchical departments in sensitive areas like server farms, scientific research labs, and nuclear power plants. The RFID technology's cryptographic integration increases the security and confidentiality of patient and hospital databases (Dietrich et al., 2021, Song et al., 2019).

Internet of Things RFID Technology Development for a Health Care Monitoring System (IoT) - the healthcare industry is a leader in using information and communication technology (ICT) to improve healthcare administration and delivery. There are now more opportunities for study and discovery across all industries, including the medical and healthcare sector, thanks to recent advancements in the development of the Internet of Things in ICT (IoT). Hospitals have started using cell phones for communication, and to enable this, they have also started employing Internet of Things (IoT) devices such as RFID and NFC tags, as well as small sensor nodes. Due to its mobility, using a mobile agent in healthcare procedures in a Wi-Fi community setting allows for the exploration of better services for patients and staff members like doctors and nurses (Singh et al., 2023₃, Singh et al., 2023₅). This study presents new ways to use the Internet of Things in the realm of inventive and scientific health care. Most surveys focus on the many healthcare methods employed in the Internet of Things, including wireless health monitoring, U-healthcare, E-healthcare, and age-friendly healthcare methods. In this study, a comprehensive monitoring existence cycle and efficient healthcare monitoring system developed with the use of IoT and RFID tags are described and proposed. The experimental findings in this research demonstrate reliable performance in the face of various medical emergencies. In this system, a combination of microcontroller and sensors is offered to obtain accurate evaluation findings, monitor and weigh the patient's health status, and boost the power of IoT.

Creation of an Internet of Things-Based Smart Health Monitoring System for Assisted Living of Elderly and Physically Challenged People - currently, traditional medical examinations and other health services may move from hospitals to home settings as part of a prospective transition in healthcare (Barak et al., 2020). As a result, patients receive medical attention more rapidly, especially in cases of emergency. In addition, hospitals might lighten their workload by sending doable and simple chores home. The decrease in expenses is a huge benefit. The hospital's expenses for each visit to the doctor could be avoided by patients. As a result, it is critical that the health sector quickly implement a trending technology to increase modern medical procedures and technologies allow for easy patient monitoring from any location. In this application, the kit consists of a microcontroller node MCU, a glucose temperature sensor, and a heartbeat sensor. The sensors are responsible for detecting and transmitting data to the web application. This data is then processed and analyzed, providing users with valuable insights and alerts. With real-time monitoring of critical health parameters, the sensors enable prompt action in the event of any abnormalities. A user-friendly version of this application can be created using PHP software. The patients can use this application to get the doctor's counsel even when he is not present physically; they can use this website to communicate their problems with the doctor. The doctor reads the patient's message and then sends a prescription to the patient's cell phone through text message. To prevent the onset of the patient's critical requirements and to regularly maintain the patient's health conditions, patient monitoring comprises examining the patient's physical condition and pharmaceutical information. Mobile medical

applications and wearables that let people record their health data are a few instances of how the Internet of Things is used in healthcare.

Design and Implementation of IoT-Based Cloud-Based Patient Monitoring Systems - the study recommends developing a mobile data acquisition (DAQ) system based on Android that can collect the specific health information of the user, store it for further analysis, and display it on Smart devices that have the option of sending it to the data center for additional processing. In addition to its internal sensors, which provide additional vital status data such as user location, magnetic or noise level, acceleration, and temperature, the mobile device can collect data from several wired (USB) and wireless (Bluetooth, Wi-Fi, cloud, and GPRS) sensors. The software solution has diary capabilities to save information regarding sleep issues, food logs, or pain diaries. It also includes a user-friendly interface that is ideal for users of various skill levels and is highly adjustable. The software solution's primary functionalities, which have been successfully tested inside a Living Lab facility, are described in the article along with its internal architecture. Overall, the suggested approach has the potential to enhance healthcare outcomes through the facilitation of more individualized and efficient health monitoring, resulting in better health condition prevention and management.

System for Wireless Patient Health Monitoring - design and implementation in order to identify health issues and ensure prompt medical care, continuous monitoring of essential health metrics like heart rate and temperature can be extremely important. The system's cost- effectiveness and ease of implementation are excellent features since they may increase its applicability to a larger range of healthcare facilities and patients. Another useful feature that could enhance the effectiveness of healthcare delivery is the ability to send alert messages to the concerned clinician in the event of deviation from nominal values.

Remote Wireless Health Monitoring Systems - the microcontroller's data is analyzed at the data processing stage, and any necessary calculations and data formatting for transmission are also carried out. The data is received and put into a format that can be sent by SMS by the Visual Basic TM software. With a GSM modem, the SMS message is sent to the intended recipient during the communication stage. Healthcare delivery could be revolutionized by the prototype wireless health monitoring system, especially in rural and poor areas. The device might be used to remotely check on patients' health and send crucial health information to doctors for evaluation and treatment. The device might also be used to notify medical staff of emergencies and give them up-to-date information on the patient's condition in real-time. A notable development in the realm of medical technology is the application of SMS technology in healthcare. The system is affordable, simple to use, and adaptable to existing healthcare systems. The wireless health monitoring system has the potential to be a key component in the delivery of healthcare services globally with future development and enhancement (Singh et al., 2021, Singh et al., 2023⁴).

Real-time object monitoring is getting harder and harder to do as a result of population increase and the expansion of IT products that offer services via the Internet

to people all over the world. The Internet of Things cloud can deliver services in real time to several locations and circumstances. is a concept that combines technology connected via the Internet. The Cloud of the Internet of Things refers to an arrangement that cloud computing, real-time data networking, and industrial process data sensor technologies (Sood et al., 2022).

It offers sensor technology as a service over the Internet. It provides real-time access to data. The services offered include border and drug control, healthcare, transportation, agriculture, public spaces, and monitoring systems. The system relies on practical and affordable solutions to handle the data produced by the Internet of Things. Databases can be created using the cloud of the Internet of Things and the Smart Hospital Information System, which will use real-time sensor technologies to gather data from numerous sensor devices connected to the hospital system in various locations and business process areas via Internet services to provide a healthcare service available in real-time. Authorized people can access patient data and offer customized services thanks to the electronic storage of medical records via a cloud or Internet of Things technology.

3. RFID TECHNOLOGY INFRASTRUCTURE

A typical RFID system consists of tags containing transponders to store data and readers that retrieve the stored data from the tags. The data is written to the RFID tag, enabling the identification of objects associated with a specific application. When RFID tags are placed within the range of a magnetic attraction field and are performing a user-defined activity, an RFID reader scans and recognizes the data from the tags.

RFID tags are versatile and can be used for various purposes, such as tracking the movement of patients and medical equipment within a hospital, monitoring individuals in care facilities, and triggering automatic tollbooths for vehicles. Following each delivery of tag information, the tag always anticipates a reader's acknowledgment. It is frequently intended to continue providing information until the reader acknowledges it. The WID tag integrated chip is prepared to live temperature during this examination and sends this information to an international RFID reader.



Figure 1: RFID

The following characteristics are included in the RFID tags used in the analysis:

- active, MasterCard-sized tag type;
- memory capacity is 48 bytes with an 8k bytes option;

- field Generator's 433 Hz comes to life frequency;
- the range of the field-initiated wake-up is 3 to 33 meters;
- depending on the reader's sensitivity level, the range of tag browsing can vary from 3 to 85 meters.

In real-world transactional systems, blockchain technology allows privacy, security, auditability, tracking, and monitoring. Blockchain has been used because to its characteristics in many different sectors (Aslam et al., 2021, Hasselgren et al., 2020). SCM, or supply chain management, is one of these crucial applications (Tandon et al., 2020).

In this paragraph, the use of blockchain technology in the healthcare sector has been examined. The goal of using block chain technology is to identify a hospital patient specifically and automatically, securely, and effectively pay the insurance claim. In this regard, a first algorithm has been proposed that generates a unique ID using the user's smart phone and a government-issued ID. The user's smart mobile stores and makes use of the unique ID.

The same ID is used to authenticate transactions after identity formation. The mobile device is used to produce a signature that is transmitted to the insurance company in order to validate the transactions. The patient's claim for insurance was verified by the hospital using the patient's signature. The suggested block chain-based system has been simulated using the JAVA programming language. After installation, simulation tests were conducted, and performance was assessed. Based on time and memory use, the effectiveness of both the certificate generation and authentication processes has been assessed. The results demonstrate the effectiveness, security, and secrecy of the system's transaction management.

4. READER FOR RFID

The reader is made to integrate into systems quickly and easily without sacrificing security, usability, or speed. The RFID reader is a small, standalone module that may be quickly put in any appropriate location. It includes a time processor, packaging, virtual transportable memory, and transmitter-receiver unit.

The purpose of this device is to collect data from an RFID tag that is used to track particular objects. The process of transmitting data from a tag to a reader typically involves the use of radio waves. In theory, RFID might be a technology similar to bar codes. The RFID tag does not, however, have to be physically scanned or in line of sight with a reader. To be read, an RFID tag must be close to one of the three to three-hundred-foot range RFID readers. With the use of RFID technology, a variety of objects may be instantly scanned, and even when they are surrounded by numerous other objects, a single product can still be readily identified. Due to the cost of bar codes and the requirement to uniquely identify each item, they haven't completely replaced them.

The following options are available on the RFID reader used in this analysis:
Memory:

- 10 Megabits of memory;
- the possibility to browse multiple tags is included;
- the tag's working frequency is 916.5MHz;
- tag: 433 rates of coming to life;
- regular RS 232 and RS 485 communication;
- depending on reader sensitivity settings, the tag browsing range is 3 to 45 meters;
- genuine collision avoidance abilities;
- resistance to interference and noise.



Figure 2. Block Diagram

5. RFID TAG TO RFID READER

When the RFID reader is close to the RFID tag, a radio signal is sent by the reader. The radio signal is picked up by the RFID tag, which then uses to power its antenna. The tag sends back a radio signal that contains its unique identification number (ID) to the reader. To get the ID, the RFID reader receives the signal from the tag and decodes the data. The ID is subsequently transmitted by the reader to a computer system for processing and archiving. The computer system uses the ID to access the relevant information associated with the RFID tag, such as product information, inventory data, or security access permissions information associated with the RFID tag, such as product information, inventory data, or security access permissions.

After the RFID reader has collected the ID information from the RFID tag, it needs to be transmitted to a web application for further processing and analysis. RFID reader can be directly connected to a computer or server using an USB port. The information the reader has gathered can then be processed and stored locally or transmitted to a web application using an API or other communication protocol.



Figure 3. RFID Receiver

Once the data is transmitted to the web application, it can be stored in a database, analyzed using data analytics tools, or displayed in a dashboard for real- time monitoring and insights. The web application can also generate alerts or trigger automated actions based on predefined rules or events, such as notifying staff when inventory levels are low or denying access to unauthorized individuals.

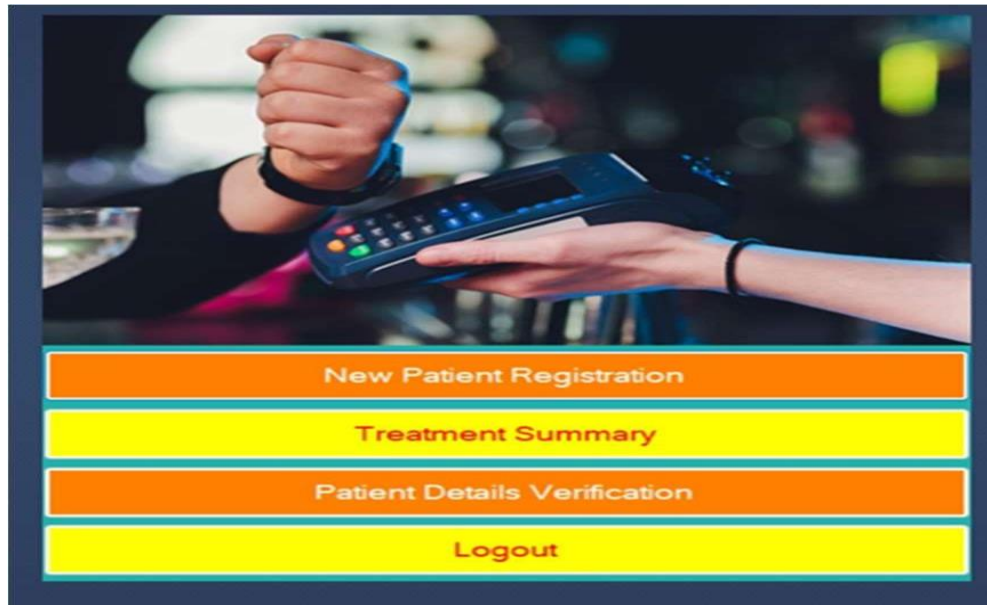


Figure 4. RFID tag setup

Data can be stored in a database for document purposes. Patient details need to be updated regularly to ensure that the medical professionals have access to the most up-to-date information. The process of updating patient details involves the following steps:

- collecting Patient Details: The first step is to collect the patient details such as demographic information, medical history, medication history, allergies, and other relevant information;
- updating the Database: The updated patient details can then be entered into the database. This can be done through a variety of methods such as manually entering the information into the system or using electronic forms that can be filled out by the patient or medical professional;
- verification: The accuracy and completeness of the information must be confirmed after it has been entered into the database.

Patient Details Verification

Scan SmartBand: 0015075074 Mobile Number: 9629279715

Name: Srinath S Address: 7 Eravada Street Ammapet

Date of Birth: 04-Jun-2002 City: Salem

Age: 21 State: Tamil nadu

Father's Name: Sivakumar A Country: India

Mother's Name: Chitra S Username: srinath

E-Mail-ID: srinathrko25571@gmail.co Password: srinath

Patient Health Details

Height (Cms.): 158 Weight (Kgs.): 57 BP Level (L/H): 120

Glucose Level: 85 Temperature: 97 Heartbeat: 72

***Note: HealthBand ID, Username and Photo Cannot be Changed**

Buttons: Upload, Update, Clear, Exit

Modal Dialog (Bottom Screenshot):

Action Completed X

Patient Details Updated Successfully

OK

Figure 5. Patient Monitoring System

One way to achieve this is by cross-referencing the data with other sources, such as the patient's medical records, or by contacting the patient directly.

Login: To validate their identity, the user inputs their login ID and password into the web-based application.

Authorization: After verifying the user's identity, the system examines their access rights to make sure they have the necessary permissions to view the requested information.

Accessing the Data: Upon your authorization, the data must be seen from any location.

6. CONCLUSION

The healthcare industry may benefit significantly from the deployment of a web-based Internet of Things-based patient monitoring system that makes use of RFID reader technology. Healthcare professionals may make better judgments and improve patient outcomes by remotely managing and monitoring patients' health. The system's combination of web-based communication and RFID technology improves patient monitoring, lowering the possibility of mistakes and saving time for healthcare providers.

Healthcare workers may access real-time patient data through the web application component, which offers a safe and convenient platform from any location with an internet connection. Overall, this cutting-edge medical technology may improve patient care, raise healthcare productivity, and save expenses, making it an excellent investment for medical institutions wishing to streamline their patient monitoring procedures.

REFERENCES

- Aich, S., Chakraborty, S., Sain, M., Lee, H. I., Kim, H. C. (2019), "A review on benefits of IoT integrated blockchain based supply chain management implementations across different sectors with case study", In 2019 21st international conference on advanced communication technology (ICACT), 138-141.
- Aslam, J., Saleem, A., Khan, N. T., Kim, Y. B. (2021), "Factors influencing blockchain adoption in supply chain management practices: A study based on the oil industry", *Journal of Innovation & Knowledge*, 6(2), 124-134.
- Barak, D., Singh, K., Ahlawat, P., Sharma, H.K. (2020), "Real time tracking system: An IoT based application", In 5th International Conference on Next Generation Computing Technologies (NGCT-2019). Uttarakhand, India, Dec. 20-21, 2019.
- Batwa, A., Norrman, A. (2020), "A framework for exploring blockchain technology in supply chain management. Operations and Supply Chain Management", *An International Journal*, 13(3), 294-306.
- Bhatia, S., Goel, N., Ahlawat, V., Naib, B. B., Singh, K. (2023), "A Comprehensive Review of IoT Reliability and Its Measures: Perspective Analysis. Handbook of

Research on Machine Learning-Enabled IoT for Smart Applications Across Industries, 365-384.

Dietrich, F., Ge, Y., Turgut, A., Louw, L., Palm, D. (2021), “Review and analysis of blockchain projects in supply chain management”, *Procedia computer science*, 180, 724-733.

Hasselgren, A., Krlevska, K., Gligoroski, D., Pedersen, S. A., Faxvaag, A. (2020), “Blockchain in healthcare and health sciences-A scoping review. *International Journal of Medical Informatics*, 134, 104040.

Singh, K., Singh, Y., Barak, D., Yadav, M. (2023), “Comparative performance analysis and evaluation of novel techniques in reliability for internet of things with RSM”, *Int. J. Intell. Syst. Appl. Eng.*, 11(9s), 330-341.

Singh, K., Singh, Y., Barak, D., Yadav, M., Özen, E. (2023₁), “Parametric evaluation techniques for reliability of Internet of Things (IoT)”, *International Journal of Computational Methods and Experimental Measurements*, Vol. 11, No. 2, 123-134.

Singh, K., Barak, D., Singh, Y., (2021), “IoT Chatbot in insurance. *International Journal of Engineering, Management, Humanities and Social Sciences Paradigms (IJEMHS)*, 33(1): 12-16.

Singh, K., Barak, D., Singh, Y., (2023₂), “Reviewing the IoT systems reliability and accuracy. *The Pharma Innovation Journal*, 12(3): 2775-2780

Singh, K., Yadav, M., Singh, Y., Barak, D. (2023₃), “Reliability Techniques in IoT Environments for the Healthcare Industry”, In *AI and IoT-Based Technologies for Precision Medicine*, 394-412.

Singh, K., Singh, Y., Barak, D., Yadav, M. (2023₄), “Detection of Lung Cancers From CT Images Using a Deep CNN Architecture in Layers Through ML”, In *AI and IoT-Based Technologies for Precision Medicine*, 97-107.

Singh, K., Singh, Y., Barak, D., Yadav, M. (2023₅), “Evaluation of Designing Techniques for Reliability of Internet of Things (IoT)”, *International Journal of Engineering Trends and Technology*, 71(8), 102-118.

Song, J. M., Sung, J., Park, T. (2019), “Applications of blockchain to improve supply chain traceability”, *Procedia Computer Science*, 162, 119-122.

Sood, K., Dev, M., Singh, K., Singh, Y., Barak, D. (2022), “Identification of asymmetric DDoS attacks at layer 7 with idle hyperlink. *ECS transactions*, 107(1): 2171.

Tandon, A., Dhir, A., Islam, A. N., Mäntymäki, M. (2020), “Blockchain in healthcare: A systematic literature review, synthesizing framework and future research agenda”, *Computers in Industry*, 122, 103290.

Optimization of fiscal incentives on sustainability of buoyancy and tax elasticity in the Republic of Moldova

Lilia Șargu¹, Nicu Șargu², Ioan Prigoreanu³, Gabriela Ignat⁴

Abstract

Introduction: The paper analysed fiscal policy in the Republic of Moldova, which has a significant impact on multiple aspects of the economy and plays a key role in ensuring the stability of the state budget, promoting investment, encouraging economic growth and achieving the country's fiscal sustainability objectives.

Aim: The paper details how fiscal policy in the Republic of Moldova influences income mobilization, the amount of capital and labour employed, the share of private savings and capital formation, the level of output, resource allocation, present and future consumption, government revenues, foreign savings and investment.

Method: The study was based on a number of indicators and methods on fiscal buoyancy and elasticity, which are key concepts in public finance and have a significant impact on budgetary stability and fiscal policies. These concepts help to understand how the fiscal system reacts to economic changes and to assess fiscal efficiency.

Findings: The results provide clear indications on the optimal direction for optimizing tax incentives for the sustainability of buoyancy and tax elasticity in the Republic of Moldova.

Originality and value: The research proposed the optimization of tax incentives on the sustainability of buoyancy and tax elasticity in the Republic of Moldova, using a metric model based on economic valuation indicators of buoyancy and tax elasticity.

Key Words: efficiency, optimization, buoyancy, elasticity, tax incentives, revenue

Jel Codes: E01, E27, E62, E64

1. INTRODUCTION

Tax policy can influence the level of revenue collected by the government through income taxes, corporate taxes and other taxes. By regulating these taxes, the government can stimulate or discourage economic activities. For example, low taxes on profits may encourage investment and business expansion, while high taxes may discourage investment.

¹ PhD, Assoc. prof., University of European Studies of Moldova, Faculty of Economics, Chisinau, Republic of Moldova

² PhD, student, Academy of Economic Studies of Moldova, Chisinau, Republic of Moldova

³ PhD, student, University of Life Sciences “Ion Ionescu de la Brad”, Faculty of Agriculture, Iasi, Romania

⁴ PhD, Prof., University of Life Sciences “Ion Ionescu de la Brad”, Faculty of Agriculture, Iasi, Romania

Tax policy can influence firms' hiring decisions through tax credits or deductions for investment in equipment and labour, these tax measures can increase the capital intensity of production and stimulate job creation.

By regulating taxes on income and interest, tax policy can influence the degree of household saving. Lower taxes can stimulate private saving, which in turn leads to more capital formation available for investment in the economy.

The level of output is closely related to the employment of labour and the use of the capital stock in the economy. Fiscal policy can influence these variables through measures that affect employment costs or capital investment.

The tax regime applied to labour and capital income can influence how resources are allocated in the economy, and lower taxes on investment can stimulate sectors with growth potential, while higher taxes can adversely affect certain industries.

By regulating taxes on income and interest, tax policy can influence individual consumption choices. Lower taxes may encourage consumption now, while higher taxes may encourage saving for the future.

Tax policy affects the level of government revenue and spending, through tax collection the government can finance public projects and services, including investment in infrastructure, education and health.

Tax policy can influence both foreign savings, through aid policy or foreign direct investment agreements, and foreign investment in the country.

2. LITERATURE REVIEW

Tax incentives are an important aspect of a country's fiscal policy and investment climate. However, from the previous discussions and international experience, it can be seen that tax incentives may have certain shortcomings and may not be effective tools for promoting foreign direct investment (FDI).

Research shows that tax incentives are only one of the factors influencing the investment decisions of foreign companies. Other issues, such as government transparency, investment protection and ease of setting up a business, may be equally, if not more, important. This means that lower taxes or tax incentives are not always the main factor in investment decisions. It is essential that tax incentives are linked to clear policy objectives and have a measurable impact on investment. For example, providing incentives to increase employment should have a direct impact on job creation. If measures do not have a direct impact or are not well targeted, they may be ineffective.

Tax incentives, such as outright tax breaks, can lead to significant revenue losses for the government. If these losses are not offset by increased investment and economic activity, they can have a negative impact on the government budget. In some cases, tax incentives may trickle down to investors who would have invested anyway, resulting in a net loss for the government and an inefficient use of resources. Tax exemptions can be difficult to administer and control as they can give rise to transfer pricing or other tax avoidance schemes. This can undermine the integrity of the tax system and lead to

additional revenue losses for the government. International experience suggests that there are more effective alternatives for promoting investment. Investment tax credits or accelerated depreciation of assets can be better targeted and linked directly to investment.

A number of academic papers and studies provide insights into various aspects of Moldova's economy and its relations with other countries, e.g. Popa D. (2015) examines how changes in export and import prices in Moldova have influenced the country's economic growth, and Roscovan M., et al. (2004). Investigates the problems of tax evasion and smuggling of petroleum products in Moldova.

Prohnițchi (2021) focuses on the impact of macroeconomic policies in the Republic of Moldova, Popa A., et al. (2021) delves into the theoretical aspects of how economic growth relates to the economic system in the Republic of Moldova. Clichici et al. (2019) explores trade relations between the Republic of Moldova and Russia, given historical ties and political considerations, changes in these relations can have significant economic implications.

Each of these papers contributes to a deeper understanding of different facets of the economy, trade relations, and economic policies of the Republic of Moldova. Researchers and policymakers can use this knowledge to make informed decisions and formulate strategies to support economic growth and stability in the Republic of Moldova, and Clichici et al. (2019) explores trade relations between the Republic of Moldova and Russia, examining how they have evolved from a state of dependence to a phase of export reorientation.

Other academic works provide a broad overview of various aspects of fiscal policy and public finance in the context of the Republic of Moldova and other countries such as: the evolution of public finances in the Republic of Moldova: Morozov (2014) takes an in-depth look at the public finance system in the Republic of Moldova over two decades of independence, providing an overview of how public finances have developed over this period and the changes that have taken place; Tax reform in transition countries: Martinez-Vazquez et al. (2000) review tax reform initiatives in transition countries, including the Republic of Moldova, highlighting the importance of adapting tax policy to evolving economic needs; tax optimality: Slemrod (1990) and Abuselidze (2015, 2020) address the topic of optimal taxation and optimal tax systems, these papers discuss how different tax policies can be optimized to promote economic development; the relationship between taxation and economic growth: Koatsa et al. (2021) examine the relationship between tax burden and economic growth in Lesotho, this topic reveals the importance of finding an optimal tax burden to support economic development; the impact of multinationals: the paper by Horst (1971) explores the behaviour of multinational firms in the context of varying tax rates and tariffs being a key issue in today's globalised economies; tax decentralisation: Trusova et al. (2019) examines the impact of fiscal decentralization in Ukraine and European Union countries, bringing into question the influence of this process on fiscal policies and economic governance; economic security in the customs context: the paper by Rudnichenko et al. (2019)

focuses on the impact of customs processes and regulations on the economic security of firms.

Tax competition among Central and Eastern European countries, known as the „demonstration effect”, is often a driving force in maintaining different tax incentives in this region. In other words, a country may feel pressure to provide incentives to be as competitive as its neighbours. However, research shows that there are other factors that are much more important in determining a country's attractiveness to foreign investors.

In the context of the Republic of Moldova, with a low tax rate structure, the aim should be to phase out tax incentives and broaden the tax base. This could help reduce the economic distortions induced by tax incentives and provide additional revenue to improve the country's infrastructure and regulatory environment. However, these changes need to be carefully managed to minimise any negative impact on the business environment.

3. RESEARCH METHODOLOGY

3.1. Research Model and Hypothesis

Buoyancy refers to the ability of a tax system to maintain or increase tax revenue in proportion to the growth in economic activity or national income, which is the tax base. Ideally, tax revenues should grow in line with the growth of the economy so as to ensure fiscal stability and sustainability. Buoyancy reflects the efficiency and responsiveness of a tax system to changes in the economy without requiring frequent adjustments in the tax rate or other tax measures.

Elasticity refers to the extent to which tax revenues respond to changes in the tax base or GDP. If tax revenues increase more than proportionally to economic growth, the tax system is considered elastic, indicating an increased sensitivity to economic changes. On the other hand, if tax revenues increase less than proportionally to economic growth, the tax system is considered inelastic, which can lead to fiscal instability and difficulties in financing government spending.

The overall velocity of a tax system is measured by calculating the percentage change in total tax revenue relative to the percentage change in the tax base or, more broadly, GDP. In other words, it assesses how responsive tax collection is to economic changes. A high tax rate indicates greater elasticity and ability to adapt revenues to economic growth.

Basic formula for fiscal buoyancy:

$$R = \alpha + \beta * PIB + \varepsilon \quad (1)$$

Tax buoyancy refers to the way tax revenues change in relation to GDP or national income. The parameter α is a constant term, β is the long-term buoyancy coefficient, and ε is the stochastic or error term. This formula shows how tax revenues vary with the rise or fall in GDP.

To obtain a long-term assessment of buoyancy, the econometric method of ordinary least squares (OLS) is used. This involves analysing the time series of tax revenue and GDP and estimating the coefficient β , which reflects long-term buoyancy. The closer β is to 1, the more buoyant tax revenues are and the more responsive they are to changes in GDP.

The ordinary least squares (OLS) formula is used to estimate the coefficients in a simple linear regression model. In a linear regression model, we have one dependent variable (Y) and one independent variable (X), and the objective is to find the best straight line (linear regression) that best fits the observed data.

The OLS formula for estimating the coefficients is: the ordinary least squares (OLS) team formula for the regression coefficient (b_0 and b_1):

$$b_1 = \frac{N(\sum(XY)) - (\sum X)(\sum Y)}{N(\sum X^2) - (\sum X)^2} \quad (2)$$

$$b_0 = \frac{(\sum Y)(\sum X^2) - (\sum X)(\sum XY)}{N(\sum X^2) - (\sum X)^2} \quad (3)$$

Where:

- b_1 is the regression coefficient for the independent variable X.
- b_0 is the intercept (the value of Y when X = 0).
- N is the number of observations in the data set.
- \sum symbolizes the sum.
- X represents the values of the independent variable.
- Y represents the values of the dependent variable.
- XY represents the product of the corresponding values of X and Y.
- X^2 represents the square of the values of X.

This formula allows the calculation of the coefficients b_0 (the intercept) and b_1 (the influence of the independent variable on the dependent variable) for a simple linear regression.

These coefficients can be used to construct the linear regression equation, which allows you to make predictions or interpret the relationship between variables.

To obtain meaningful results using the OLS method, at least 10 years of data on tax revenues and GDP are required. This ensures a robust analysis of the long-term relationship between these variables. However, in this case, sectoral data were only available for a limited period, which could influence the robustness of the results of the econometric analysis.

Tax elasticity refers to the extent to which tax revenues react to changes in the tax base or changes in the tax rate. Essentially, the higher the tax elasticity of an economy, the more tax revenues change in response to economic changes. Tax elasticities can be calculated for different taxes to assess how they react to changes in economic conditions.

Estimating tax elasticities is important for understanding how effective a tax system is in capturing economic growth and maintaining fiscal stability. An ideal tax system should be sufficiently elastic to reflect the growth of the tax base and thus be able to finance public spending even without changing tax rates.

3.2. Explanation of Indicators

The concepts of buoyancy and elasticity are two key issues in Moldova's tax system, they are used to assess how tax policy and the tax system can respond to economic changes to ensure that the government can mobilise sufficient revenue and maintain financial stability under various conditions.

Fiscal buoyancy refers to the ability of a tax system to adapt and generate sufficient revenue in the face of economic changes. It is the ability of the government to adjust fiscal policy to respond to economic variations without causing major imbalances.

Adequate fiscal buoyancy is crucial for maintaining budgetary stability and avoiding budget deficits. If the fiscal system cannot react to changes, this can lead to under- or over-financing of government expenditure. To increase buoyancy, governments can adjust tax rates, introduce additional taxes or change tax exemptions according to economic needs. Constant monitoring and analysis of the economy is essential to ensure adequate fiscal buoyancy.

Tax elasticity refers to the extent to which tax revenues vary with changes in the economy. If tax revenues rise significantly more or fall less than the growth or decline of the economy, then we are dealing with high tax elasticity. If tax revenues vary in line with the economy, then tax elasticity is low.

Tax elasticity is important for assessing the extent to which the tax system can raise sufficient revenue to finance government spending. It is also relevant for determining the impact of tax policies on the economic behaviour of taxpayers.

There are different types of tax elasticity, such as price elasticity, income elasticity and revenue elasticity. Each of these focuses on how changes in price, income or other factors may affect tax revenues.

In the Republic of Moldova, knowledge and proper management of tax buoyancy and elasticity are essential to ensure an efficient and stable tax system. The government needs to be able to adjust tax policy to cope with economic changes, while taxpayers need to understand how they will be affected by these adjustments. Ongoing evaluation of these concepts can contribute to better tax planning and administration.

3.3. Data Analysis

3.3.1. Demographics

Revenue performance in the Republic of Moldova is a crucial issue for the country's economy and fiscal policy. We observe some significant trends and developments in tax revenues and the ratio of revenues to Gross Domestic Product (GDP). The Republic of

Moldova has seen an increase in tax revenues and in the ratio of revenues to GDP. However, it is important to stress that this increase in revenues has not been accompanied by balanced expenditure management. The Republic of Moldova spent more than similar countries in the region.

The revenue-to-GDP ratio peaked at 41.72% in 2007. This peak was probably influenced by a period of economic growth or specific fiscal policies. However, thereafter, this ratio gradually declined, reaching 35.5% in 2021. This phenomenon may indicate economic or fiscal changes that occurred during this period.

Tax revenues showed a similar evolution, peaking at 33.58% of GDP in 2007. Subsequently, they have slightly decreased, reaching 31.4% in 2016 and around 32% in 2021. This may mean that the state's tax resources have been used differently or that certain categories of tax revenue have declined in importance.

Social insurance and health insurance contributions: about 9-10% of tax revenues come from social insurance and health insurance contributions. This contribution is important for the financing of the social security system and health care in the Republic of Moldova. It is relevant to monitor how these contributions evolve, as they can have a significant impact on the social assistance and health sector.

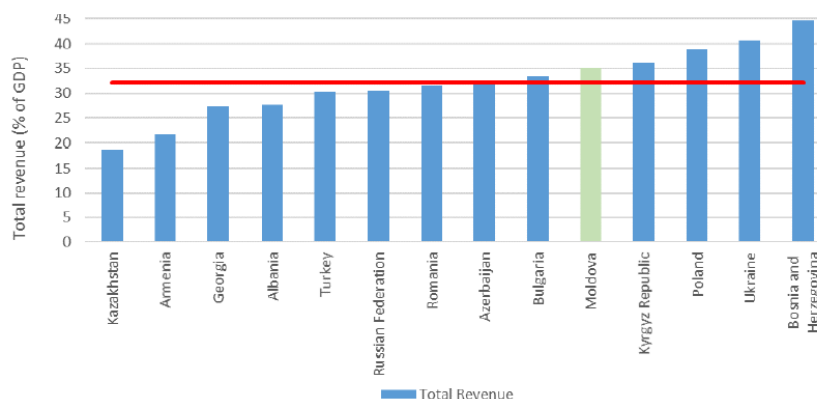


Figure 1 - Revenue performance in the Republic of Moldova compared to neighbouring countries

Source: IMF revenue database and World Bank

The composition of tax revenues in the Republic of Moldova is a key aspect of the country's fiscal and economic policy. The text indicates that tax revenues accounted for a significant share of tax revenues, peaking at around 24% of GDP in 2016 and 2017. This peak can be attributed to a period of economic growth or specific tax policies. However, this figure declined to 21.5% in the period 2018-2021, suggesting significant changes in the revenue structure.

After the period of decline, tax revenues started to increase again from 2016, reaching around 23% of GDP in 2021. This increase may be influenced by tax changes or economic developments.

Corporate income tax and personal income were significant parts of total tax revenue. However, income tax (PIT) generally remained below 5% of GDP, and total direct taxes, including social insurance payments, accounted for about 15% of GDP. This shows that a significant share of tax revenue comes from indirect taxes or other sources.

The revenue structure has changed significantly over time. In the past, the focus has been on taxes on goods and services, which reached a high of 19% of GDP in 2017 and 2018. However, these taxes now account for only around 15-16% of GDP. Excise duties contributed 3.5% of GDP, and the share of trade taxes decreased significantly from 2% in 2006 to 1% in 2015 and 2016.

Value added tax (VAT) revenues have fluctuated significantly. For example, VAT was 14.5% of GDP in 2018, but fell to 11% in 2016 and 2021. About two-thirds of total VAT receipts come from VAT on imports, while domestic VAT has typically been below 4% of GDP.

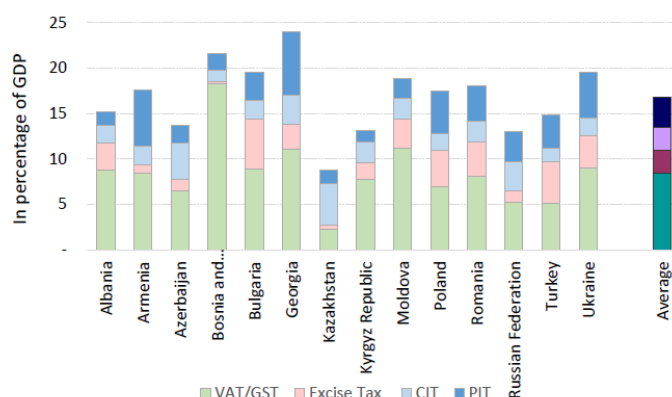


Figure 2 - Income structure in the Republic of Moldova compared to neighbouring countries

Source: IMF Revenue Database; Republic of Moldova STC; World Bank

The share of corporate revenues from small-medium and large enterprises remained relatively constant until 2021. This may reflect the stability of the corporate sector in Moldova in terms of tax contributions. However, it is important to investigate why corporate revenues from medium-sized enterprises deteriorated in 2021 despite the increase in the number of firms. This may be influenced by various factors, such as economic developments or changes in the tax structure.

Small businesses have a stable share in total tax revenues, contributing around 3% of total revenues. Although this share may seem small compared to large enterprises, small

enterprises play an important role in Moldova's economy, as they are often the engine of innovation and job creation.

Large firms contribute the largest share of tax revenue collection, ranging from 50 to 55%. This shows that, although numerically fewer than small businesses, large businesses have a significant impact on total tax revenues in Moldova.

Different factors can influence the corporate revenue share of enterprises of different sizes, such as tax regulations, the level of economic activity of these enterprises and the way they organise their business activities. It is important to examine these factors in detail in order to better understand the dynamics of corporate income in the Republic of Moldova.

Among large companies, corporate tax revenues have grown faster than the number of firms. In other words, corporate tax revenues have grown more than proportionally to the number of existing firms. This may reflect a better performance in terms of profitability and/or the level of corporate tax levied by these companies.

On the other hand, VAT receipts did not grow as fast or did not follow the same growth trend. This shows that there is a discrepancy between the evolution of corporate tax revenue and VAT revenue and that VAT revenue has not been proportional to the growth in the number of firms.

Excessive tax expenditure in VAT has affected tax revenue collection in most sectors and all categories of firms. This may mean that an increased level of tax expenditure or exemptions in the VAT system has reduced the effective collection of this tax (Figure 3).

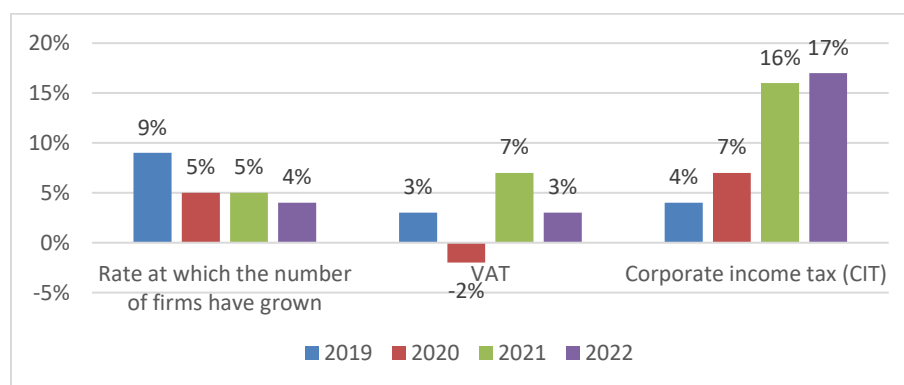


Figure 3 - VAT and CIT growth rates in the Republic of Moldova
Source: Republic of Moldova STC

Corporate income tax expenditures, in particular tax incentives and exemptions, play a significant role in Moldova's fiscal policy with an impact on business and the economy as a whole, especially in terms of resource allocation, stimulating economic growth and promoting investment.

The Republic of Moldova offers one of the lowest tax rates on corporate profits compared to other countries in the region. The corporate income tax rate is only 12%, which can attract foreign investment and promote economic growth.

The government offers a wide range of incentives for various economic sectors. For example, companies that expand their workforces receive tax reductions based on the number of new employees. In addition, companies that invest in energy efficiency receive state funding for equipment and loan guarantees. These measures are designed to stimulate investment and economic development.

Tax expenditures for incentives can influence the allocation of economic resources. For example, tax relief for companies that invest above a certain level may increase investment in those companies at the expense of other sectors or companies. This can have significant impacts on economic growth and equity.

At the same time, the provision of tax incentives and exemptions can lead to a decrease in government revenue from corporate income taxes. It is important to strike a balance between promoting investment and providing the necessary resources for public services and government investment.

3.3.2. Normality and Validity of Scales

Fiscal buoyancy refers to the ability of a tax system to generate stable revenues in the face of economic changes without causing significant variations in tax receipts. It implies the ability of the tax system to maintain its revenue over a relatively constant range, even when the economy is experiencing periods of growth, recession or cyclical fluctuations.

In the context of Moldova, fiscal buoyancy can be analysed from several perspectives: if Moldova's tax system is heavily dependent on a single source of revenue, such as import or export taxes or income tax, it can become vulnerable to changes in that source of revenue. Thus, diversification of tax revenue sources can contribute to greater buoyancy.

Part of tax buoyancy involves the ability of the tax system to generate constant revenue even in times of economic downturn. If tax revenues are strongly correlated with economic cycles, then this can cause instability in the budget and may require significant fiscal adjustments in response to economic developments.

A fiscal policy that responds to cyclical changes in the economy can help maintain fiscal buoyancy. For example, in times of recession, the government could cut taxes or increase spending to stimulate growth.

Figure 4 shows the revenue response to GDP growth by sector (superability per head of tax) 2019-2022, it shows how tax revenues have changed relative to GDP growth over 2019-2022 for each sector. Sectors with positive tax buoyancy (value greater than 1) react more strongly to growth, while sectors with negative buoyancy react less than proportionally to GDP growth.

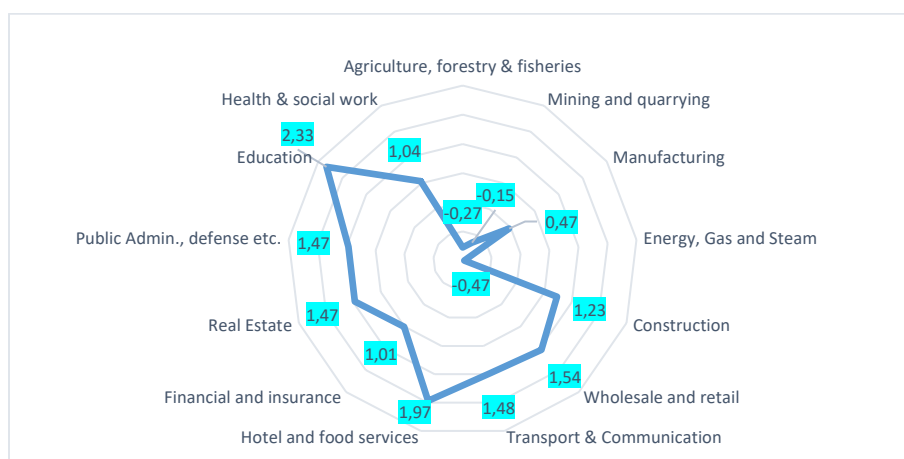


Figure 4 - Responsiveness of revenues to GDP growth by sectors (Buoyancy by tax head) 2019-2022

Source: World Bank based on Republica Moldova STC data

Figure 4 provides information on how tax revenues of different economic sectors reacted to GDP growth over the period 2019-2022, using the concept of "superability per tax head":

- Agriculture, forestry and fisheries (-0.27): this negative figure indicates that tax revenues in this sector have declined relative to GDP growth. In other words, tax revenues from agriculture, forestry and fisheries have not grown as fast as economic growth.
- Mining and quarrying (-0.15): similar to the agricultural sector, this sector experienced negative buoyancy. Tax revenues have declined or not grown as fast as GDP growth.
- Production (0.47): this sector recorded positive buoyancy. Tax revenue grew faster than GDP growth, this may indicate a better capture of economic growth in the production sector.
- Energy, gas and steam (-0.47): the energy and gas sector had a strongly negative buoyancy, this suggests that tax revenues in this sector fell significantly relative to GDP growth.
- Construction (1.23): the construction sector experienced positive buoyancy, with tax revenues growing faster than economic growth
- Wholesale and retail sales (1.54): this sector had significant positive buoyancy, indicating strong growth in tax revenues relative to GDP growth. This can be linked to the growth in sales and consumption in the wholesale and retail sector.

- Wholesale and retail sales (1.54): this sector had significant positive buoyancy, indicating strong growth in tax revenues relative to GDP growth. This can be linked to growth in sales and consumption in the wholesale and retail sector.
- Wholesale and retail sales (1.54): this sector had significant positive buoyancy, indicating strong growth in tax revenues relative to GDP growth. This can be linked to growth in sales and consumption in the wholesale and retail sector.
- Wholesale and retail sales (1.54): this sector had significant positive buoyancy, indicating strong growth in tax revenues relative to GDP growth. This can be linked to growth in sales and consumption in the wholesale and retail sector.
- Transport and communications (1.48): this sector also recorded significant positive buoyancy. Tax revenues have increased considerably in relation to GDP growth, which may reflect an increase in transport and communication activities.
- Hotels and food services (1.97): this sector had the highest positive buoyancy. Tax revenues increased significantly relative to GDP growth, which may be linked to an increase in tourism and hospitality.
- Financial and insurance services (1.01): this sector had a slightly negative buoyancy, indicating that tax revenues declined slightly relative to GDP growth.
- Real estate (1.47): the real estate sector recorded significant positive buoyancy, with tax revenues increasing considerably relative to GDP growth, this may be related to construction and real estate activities.
- Public administration, defence, etc. (1.47): this sector recorded significant negative buoyancy. Tax revenues fell more than GDP growth, which may be related to budget cuts or changes in the public sector.
- Education (2.33): had the highest positive buoyancy, indicating a significant increase in tax revenue relative to GDP growth, this may be related to investment in education.
- Health and social assistance (1.04): this sector also recorded positive buoyancy, indicating an increase in tax revenue relative to growth.

Taxation of capital income, which includes company profits, dividends, capital gains and interest income, has a significant impact on investment and the business climate in the country. The tax rate for companies in Moldova is relatively low at 12%, making it among the lowest in the region. This should provide an incentive for business development and investment in the country. There is also a low tax rate of 3% for small and medium-sized enterprises, which is beneficial as this sector has a significant impact on GDP and employment in the Republic of Moldova.

However, it is important to note that despite the low tax rates, the Republic of Moldova faces a low share of corporate income tax (CIT) revenues in GDP of around 2.5%. This is partly due to the characteristics of the Moldovan economy and also to the need to improve revenue collection in this area.

To put these tax rates in perspective, Table 9 compares the tax rates on labour income and corporate income in the Republic of Moldova with those in other Eastern European

countries, the Russian Federation and the EU. It can be seen that both labour income tax (PIT) and corporate income tax (CIT) in the Republic of Moldova are generally below the average for other countries. Therefore, in terms of capital income taxation, the Republic of Moldova offers a favourable investment and business climate. However, it is important to ensure that such low taxation translates into a significant increase in investment and economic growth, and to monitor effective tax collection to avoid significant declines in tax revenues.

Figure 5 shows tax rates on labour income (PIT) and corporate profits (CIT) in the Republic of Moldova, as well as in other Eastern European countries, the Russian Federation and the European Union (EU). These rates vary significantly from country to country and play an important role in determining the business and investment climate in each jurisdiction.

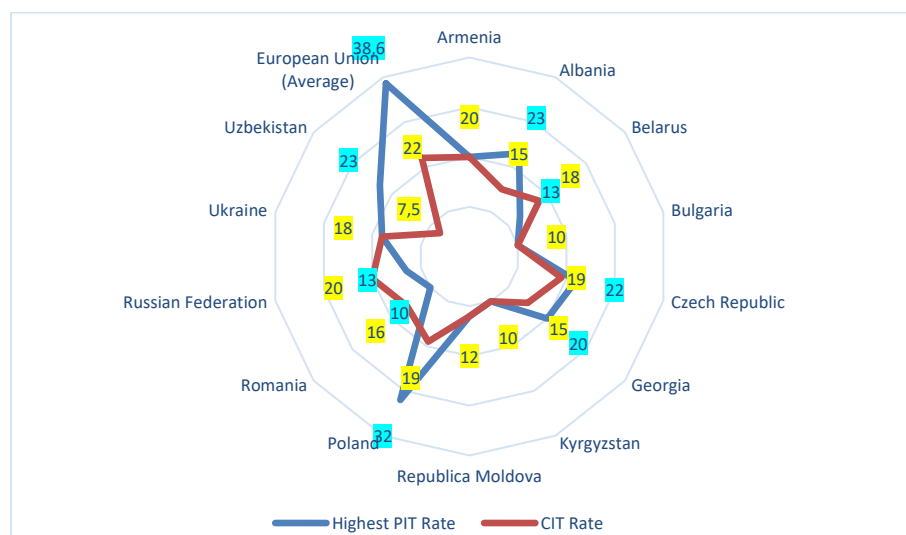


Figure 5 - PIT and CIT Rates in Republic of Moldova, eastern European countries and the EU

Source: World Bank based on Republic of Moldova STC data

The Republic of Moldova has moderate tax rates compared to countries in the region. With a 12% tax rate on labour income (PIT) and corporate income tax (CIT), the Republic of Moldova offers attractive tax opportunities for companies and individuals. Importantly, these low rates should be backed up by efficient tax collection to support public services and the country's economic development.

The Moldovan government has taken several measures on the taxation of capital income, such as company profits, dividends, capital gains and interest income:

- Corporate income tax: the corporate tax rate is 12%, which is one of the lowest in the region.

- Dividend tax: companies paying dividends have to pay 12% corporate tax. However, this payment can be credited against any taxes levied on shareholders receiving dividends. If the amount of tax credits exceeds the income tax payable in that tax year, the excess will be refunded to the taxpayer
- Tax on interest income: a recent change in tax legislation reduced the rate of withholding tax on interest paid to resident individuals from 15% to 12%. Interest income on deposits made in the Republic of Moldova is also exempt from tax.
- Capital gains: the value of capital gains for tax purposes has recently been reduced to 20% of the difference between the sale proceeds and the base value of the asset. Capital losses can only be deducted to the extent of capital gains. Non-deductible capital losses in one tax year can be carried forward to future years.

However, despite these relatively low taxes on capital income, there are opportunities to improve Moldova's tax system. For example, measures could be considered to broaden the tax base by rationalising various tax exemptions and incentives offered to certain sectors or regions. The Republic of Moldova could also adopt the OECD transfer pricing guidelines and establish a specialised unit to manage these tax issues. These measures can contribute to improving tax fairness and more efficient collection of tax revenues.

These measures could help improve the transparency and effectiveness of investment incentives in Moldova. The government should provide detailed and reliable information on available investment incentives and the application of tax laws and rules. Maintaining an up-to-date database of all investment incentives granted to firms through different measures and mechanisms could provide transparency and facilitate monitoring of the use of these incentives.

To ensure transparency and avoid potential abuse, administrative discretion in the granting of incentives should be removed and clear eligibility criteria should be established.

Instead of focusing exclusively on tax incentives, the government should also consider the use of other measures, such as concessional loans and simplification of administrative reporting and licensing procedures.

To ensure that Moldova can meet these challenges, it is essential to increase the efficiency of collection of major taxes such as income tax and VAT. This could involve a combination of measures such as reducing tax evasion, improving tax control and encouraging tax compliance.

Another approach could be to reassess the proportion of revenue from different types of taxes. For example, there could be a shift from an excessive focus on consumption taxes to income or property taxes. This shift could help support investment and encourage long-term economic growth.

To compensate for potential revenue losses from tax reform, Moldova should continue to improve and restructure tax incentives. The aim would be to make these

incentives more effective and reduce their fiscal cost. This would help attract investment in key sectors and stimulate economic growth.

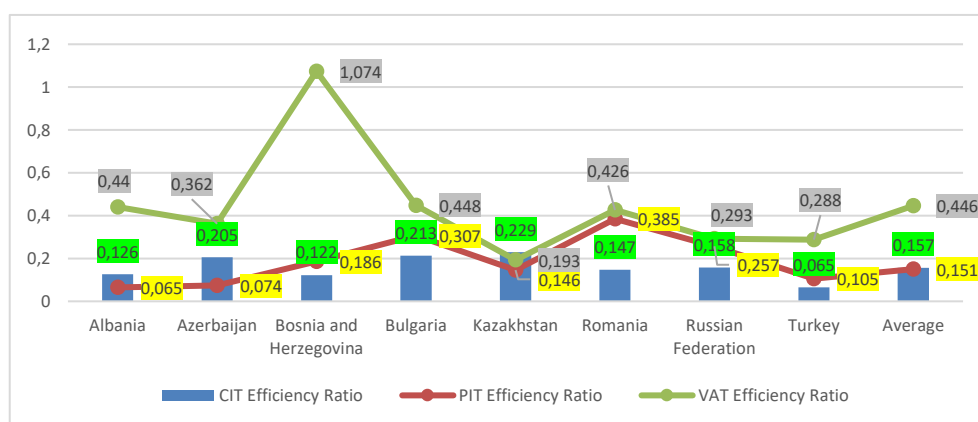


Figure 6 - Tax efficiency in Republic of Moldova and regional peers in 2022 - Upper middle income

Source: IMF Revenue Database and World Bank

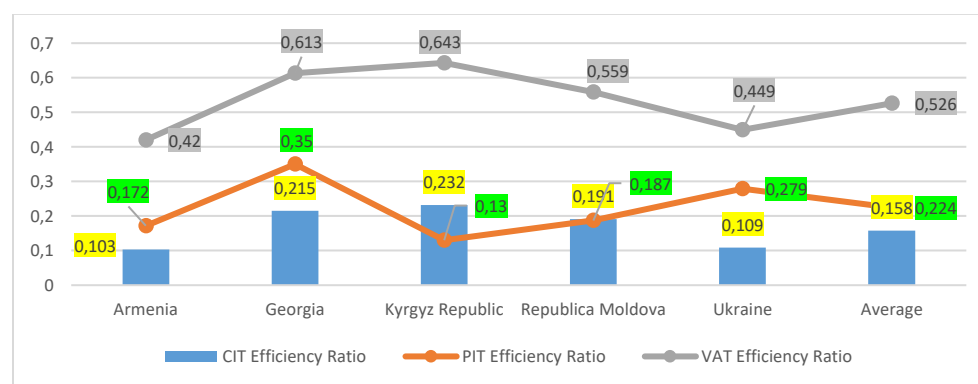


Figure 7 - Tax efficiency in Republic of Moldova and regional peers in 2022 - Lower middle income

Source: IMF Revenue Database and World Bank

Streamlining Moldova's tax system is a crucial step towards improving tax efficiency and strengthening government resources. This reform addresses several key aspects of the tax system, each with its own objectives and benefits.

The first stage of the reform focuses on personal and corporate income taxes, which have been harmonised at a reduced rate of 12%. This harmonisation has created a competitive tax environment in the Republic of Moldova compared to other countries in the region. However, in order to compensate for low revenues, it is proposed to broaden

the tax base by eliminating multiple tax exemptions and incentives. This will ensure that the government collects more tax revenue needed to finance public services. It is also proposed to tax income from dividends, interest and capital gains at higher rates, which would correct a discrepancy in the taxation of these sources of income. In addition, social security contributions should be subject to taxation either when contributions are made or when distributions are received, thus ensuring that social security is more sustainable.

The Republic of Moldova faces a complex VAT system with three different rates plus a zero rate. This can create administration and compliance problems. In order to simplify the system, it is proposed to reduce the exemptions and restrict the application of zero-rating to exports.

Reducing and phasing out tax incentives that have not proven to have clear benefits is a move in the right direction. It will help reduce economic distortions and help increase tax revenues. Using additional tax revenues to improve infrastructure and the regulatory framework will create a more attractive business environment and support economic development.

These tax reforms should help increase tax efficiency and stimulate sustainable economic growth in Moldova, while ensuring adequate financing for public services and social programmes.

4. CONCLUSION

Moldova's tax system follows a double income taxation model, where labour income is taxed more heavily than capital income.

Labour income is taxed at a flat rate of 12%. However, the employee and the employer must also pay social security and health insurance contributions, which amount to 22.5% of the gross salary. This high level of labour taxation can reduce incentives for employees and affect job creation.

Capital income, such as company profits, dividends, capital gains and interest income, is taxed at lower rates than labour income. For example, corporate income tax is 12%. There are also lower rates for certain categories of taxpayers, such as small and medium-sized enterprises, which pay just 3% of income.

The difference between tax rates for labour and capital income is significant. This can create a distortion in the choice of inputs. Employers may be encouraged to substitute capital for labour in order to save costs, which can negatively affect job creation and economic efficiency.

The current tax system, with different rates for labour and capital income, can create arbitrage opportunities and erodes horizontal equity. Taxpayers may try to optimise their income to benefit from lower tax rates, which may not be fair to all taxpayers.

Overall, this dual income tax model raises questions about tax fairness and the impact on employment and investment. The Moldovan government could consider revising this model to ensure fairer taxation and eliminate distortions that can affect economic growth and employment.

REFERENCES

- Abuselidze, G. (2015). Formation of Tax Policy in the Aspect of the Optimal Tax Burden. *International Review of Management and Business Research*, 4(3), 601-610.
- Abuselidze, G. (2020). Optimality of tax policy on the basis of comparative analysis of income taxation. *European Journal of Sustainable Development*, 9(1), 272-293.
- Abuselidze, G. (2020). Optimality of tax policy on the basis of comparative analysis of income taxation. *European Journal of Sustainable Development*, 9(1), 272-293.
- Chen, T., Qiu, Y., Wang, B., Yang, J. (2022). Analysis of effects on the dual circulation promotion policy for cross-border e-commerce B2B export trade based on system dynamics during COVID-19. *Systems*, 10(1), 13.
- Clichici, D., Iordachi, V. (2019). Trade relations of the Republic of Moldova with the Russian Federation: from dependence to export reorientation.
- Horst, T. (1971). The theory of the multinational firm: Optimal behavior under different tariff and tax rates. *Journal of political economy*, 79(5), 1059-1072.
- Koatsa, N., Paramaiah, C., Scona, M. (2021). Tax burden and economic growth in Lesotho: An estimate of the optimal tax burden. *Accounting*, 7(3), 525-534.
- Martinez-Vazquez, J., McNab, R. M. (2000). The tax reform experiment in transitional countries. *National Tax Journal*, 53(2), 273-298.
- Morozov, B. (2014). Republic of Moldova: 20 years of Independence and Experiments with Public Finance System. *International Public Management Review*, 15(2), 133-165.
- Munteanu, M., Stanciu, S. Comparative Aspects of Food Security in the Republic Of Moldova and Romania.
- Popa, A., Gîrneț, S. (2021). Analysis of the theory of the relationship between economic growth and the economic system: the case of the republic of moldova.
- Popa, D. (2015). The evolution of export and import prices in republic of moldova and their effect on the economic growth. *evolution*, 15(2).
- Prohnițchi, V. (2021). Impact of the macroeconomic policies based on the computable general equilibrium model (the case of the Republic of Moldova). Summary of the doctoral thesis in economics.
- Roscovan, M., Rusu, V., & Rosca, I. (2004). Study on Tax Evasion and Smuggling on Petroleum Products in the Republic of Moldova. Transparency International.
- Rudnichenko, Y., Korchevska, L., Mykolaichuk, V., Berezhniuk, I., Havlovska, N., Nagorichna, O. (2019). Customs Qualitative Impact on the System of Enterprise Economic Security: Modeling and Evaluating the Results. *TEM Journal*, 8(4).

Slemrod, J. (1990). Optimal taxation and optimal tax systems. *Journal of economic Perspectives*, 4(1), 157-178.

Slemrod, J. (1990). Optimal taxation and optimal tax systems. *Journal of economic Perspectives*, 4(1), 157-178.

Trusova, N. V., Kohut, I. A., Osypenko, S. A., Radchenko, N. G., Rubtsova, N. N. (2019). Implementation of the results of fiscal decentralization of Ukraine and the countries of the European Union. *Journal of Advanced Research in Law and Economics*, 10(6 (44)), 1649-1663.

Cost-Benefit Analysis in Sports Organisations

Mustafa Ertan Tabuk¹, Selçuk Kendirli²

Abstract

Introduction: The Provincial Organizing Committee, which is set up to organize local sports events, submits the annual program of activities to the Provincial Directorate and the Sports Federation at the beginning of the season, has the program approved and carries out the activities. In the process, it takes the necessary steps to appoint organizing officers.

Aim: In this study, the cost-benefit analysis of the organizing officers appointed by the provincial organizing committee was carried out.

Method: The research used the document analysis method. The research examined the cost of a seasonal organizing officer.

Findings: According to the results of the sports activities, the costs of 47785.11 TL in competitions with a total of 186 athletes in 3 categories in school sports class, 8679.45 TL in competitions with a total of 112 athletes in 2 categories in sports clubs class and 37807.72 TL in competitions with a total of 523 athletes in 6 categories in special organisations class were calculated. A total of 97006.98 TL was spent on organizing officials (19995.36 TL), referees (39333.57 TL) and other expenses (23280 TL).

Originality and value: Although cost-benefit analysis is not used in the dissemination and massification of sports, it is necessary to evaluate the results of the Organisations which are subject to the examination. According to the results obtained through the evaluation of the collected data, both the organisations are carried out by incurring more costs than necessary, and the athletes who are ranked with the results of the organisations do not have a significant success. The results of the study will be communicated to the relevant stakeholders with a recommendation for reorganisation planning.

Key Words: Sport organisations, cost-benefit analysis, financing of sport organisations, sport success

Jel Codes: I22, I28, Z20, Z23

1. INTRODUCTION

In Türkiye, since 1938, a complete state authority has been established with a state-based sports organisation (Law No. 3530). State support of sports organisations is a

¹ Assoc. Prof. Dr., Hitit University, Sport Science Faculty, Sport Management Department, Türkiye

² Prof. Dr., Hitit University, Faculty of Economics and Administrative Sciences Faculty, Banking and Finance Department, Türkiye

common practice in many countries. In Türkiye, the state supports the management and administration of sports in the fields of education, dissemination, and facilities, etc., and ensures the development and dissemination of amateur sports. In this context, the Ministry of Youth and Sports of the Republic of Türkiye works for the development of Turkish sports through the Provincial Directorates of Youth and Sports and supports sports activities in all branches.

In Türkiye, sports federations (n=63) operating under the central organisation of the Ministry of Youth and Sports (MYS) work in coordination with the provincial organisation of the Ministry and provincial representatives of sports branches in order to carry out local activities. Sports federations are responsible for ensuring that sports competitions organized throughout the country are carried out in accordance with international game rules (Presidency of the Republic of Türkiye, 2022). The main purpose of federations is to carry out activities for the popularization of sports and representation at the international level. They carry out these activities by using income sources such as state contribution, registration-visa-penalty-appeal fees, broadcasting rights and sponsorship (art.15, Official Gazette of the Republic of Türkiye, 19.07.2012, 28358).

Considering a one-week period in Türkiye, there is no statistical data on the number of events organized by school sports, sports clubs and private organisations. Considering that each sports federation organizes competitions in different categories, there are countless competitions in approximately 80 sports branches in 81 provinces and 922 districts. In this study, only the activities of a single sport branch in a small-scale province (population= <300,000) for one season were analyzed. In this context, it is important to evaluate the cost-benefit analysis that will emerge by calculating the results throughout the country.

The importance of the financial picture that will emerge nationwide, the minimization of costs by using resources effectively and efficiently, and the importance of ensuring that the service is carried out without interruption in these processes is tried to be emphasized when it is considered that the amount of savings to be made in a local organisation will be around 50% with the changes to be made in legal legislation and practices. In this study, a cost-benefit analysis of amateur sports competitions realized with public support and financing from high ideals was conducted. The results obtained from the study will be shared with the academic community, officials, organisations and the sports community.

2. LITERATURE REVIEW

Under this heading, the literature review will be given in two parts. One of these is related to sports organisations. The other part is about cost benefit analysis.

2.1.Sports Organisations

An organisation is a social community where people come together to achieve certain goals (Daft, & Armstrong 2021). Since there are many details about organisation and

contest management, it is only possible to make brief explanations about some of the most important issues. It is important to manage the organisation effectively and efficiently to make a good organisation. There should be a responsible person (Krotee & Bucher, 2007, p. 165). The official responsible of the sport organisations at local level is the provincial representative of the sport branch. The provincial representative carries out many technical and official procedures in the process of organizing the competitions included in the annual activity programme. At the end of the organisation, he/she carries out the registration and notification of competition results and officials. All competitions, competitions and competition sports, organisations, schools, universities, etc. organized must obtain the approval of other authorities and comply with the sanctions imposed by them. Organisation, competition, facility and training scheduling must be managed in a fair manner, giving equal time, opportunity and access to all participants. Only in this way can the universality of sport be realized. Legal sanctions to be complied with in the organisation process are subject to both sportive and public financial audits.

Some studies in this field are analyzed; Değer (2022) provides a brief description of the development process of the sports economy in Türkiye, shows an increase of 31% in 2022, when comparing the budget allocated to sports and state funding in 2021 and 2022. In the study conducted by Altuğ (2022), he tried to reveal with examples the costs of the Olympic Games and how host cities/countries can make a profit through smart planning. Düzen et al. (2022) found that mega sporting events lead to an increase in the number of spectators, contribution to employment, sponsorship and a positive increase in ancillary stakeholders in the cities and countries where they are organized. Çetin (2023) found that with careful planning and implementation in sports organisations, sports tourism can have a positive impact on the tourism industry as well as on the societies and environments it affects.

2.2. Cost-Benefit Analysis

Yıldırım and Gökten (2018) argue that the organisations have gone far beyond the ideals of sporting competition and that an economically oriented political dimension has emerged. The most important finding of the study is that the Olympic and World Cup organisations are no longer financed by public funds, but have taken their place in the relational network of global capital as an area of capital valuation. Tınaz et al. (2018) evaluated Türkiye's Olympic candidature process in their study. As a result of the research, some cost-benefit outputs such as contribution to the promotion of the city and the country, acceleration of transport and infrastructure development, increased capacity to host sports events, formation of inter-institutional co-operation, and development of sports networks were identified.

According to the study of Cebeci and Zülfiolu (2023), the Olympic budgets and the achieved and targeted results were compared. In the study, the huge budgets spent on games were examined. In the study, the economic dimension and the sporting dimension of the games were evaluated together. The risk of projects remaining idle after the games

brings the economic aspect of the Olympics into question. Large investment projects, sports centers, their financing, and the failure to actively evaluate the projects after the games have been evaluated within the framework of "white elephant syndrome" in the literature on the Olympics. In the study, the economic and financial dimensions of the Olympics, specifically the Rio 2016, London 2012, Beijing 2008 and Athens 2004 Olympics, were discussed within the framework of the white elephant syndrome.

Bülbül and Yamaçlı (2023) examined football organisations and the Olympics in their study. According to the study, the costs as well as the energy and resources spent during the construction of stadiums built for football matches played every fifteen days and short-term sports organisations such as the European Football Championship, FIFA World Cup and the Olympics are high.

In the study conducted by Ahadov (2023), the financial situation of Azerbaijani sports organisations was discussed. According to the results obtained in the study, it was determined that these types of businesses made losses in terms of cost benefits. Çakır et al. (2023) brought to the agenda the cumbersome structures, defined in the literature as 'white elephants', which were built by the host cities to organize the Games, but which remained unused at the end of the Games due to the need to build the structures, millions of which were spent, built for short-term organisations and could not be used efficiently.

3. RESEARCH METHODOLOGY

The research examined the costs and results of local sports organisations in athletics in a city in Türkiye for one season. The document analysis method was used for this purpose. The document analysis method that was used in the research is defined as the process of inquiry (Bowen, 2009) for the development and interpretation of the production of knowledge (Corbin & Strauss, 2008). The documents that were analysed in the research are: the assignment of the competition staff, the referee records and the competition result reports. In the relevant documents, the number of personnel assigned, the payments made and the sporting results of the competition can be accessed. These documents are prepared separately for all sports organisations and are official documents, thus ensuring full data reliability. These documents are kept in the offices of the competent sports delegate, in the competent units of the Provincial Directorate of Youth and Sport and in the archives of the sports federations. The documents analysed in the research are presented in a table.

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Table 1. Staff wage statistics

	01.01 / 31.06.2023		01.07 / 31.12.2023	
	Normal Fee (TL)	Ministry of Youth and Sports Personnel 50% more (657 CSL 4A, 4B Civil Servant Status) (TL)	Normal Fee (TL)	Ministry of Youth and Sports Personnel 50% more (657 CSL 4A, 4B Civil Servant Status) (TL)
Competition Manager	108,42	162,63	127,45	191,175
Facility Supervisor	108,42	162,63	127,45	191,175
Technical Staff	108,42	162,63	127,45	191,175
Provincial Sports Branch Representative	108,42	162,63	127,45	191,175
Health Officer	108,42	162,63	127,45	191,175
Field Arrangement	108,42	162,63	127,45	191,175
Sport Referee	173,47	260,205	202,37	303,555

Table 1, which has been drawn up within the framework of the Circular on the salaries to be paid to those to be assigned to the implementation of youth and sports services (General Directorate of Sports Services, 2023), shows the wages to be paid to the officials of the organisation in question. According to Table 1, it can be seen that the staff of the Ministry of Youth and Sports is paid a 50% higher wage.

3.1. Results

In this part of the research, the results are presented on the basis of the tables created from the data obtained.

Table 2. Data on organisation staffing and remuneration

	Activity Name	Type	Athletes	Categories	Staff	MYS Staff	MYS Staff Payment	Health Staff	Staff Payment Health	Personnel on Duty Net Paid
March	Athletics Competition 1	School Sports	80	4	11	10	1.626,30	1	108,42	1.734,72
March	Athletics Competition 2	School Sports	73	8	11	10	1.626,30	1	108,42	1.734,72
April	Athletics Competition 3	School Sports	33	6	11	10	1.626,30	1	108,42	1.734,72
May	Athletics Competition 4	Special Organisation	30	2	11	10	1.626,30	1	108,42	1.734,72
May	Athletics Competition 5	Sports Clubs Organisation	82	8	11	10	1.626,30	1	108,42	1.734,72

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

May	Athletics Competition 6	Special Organisation	105	10	11	10	1.626,30	1	108,42	1.734,72
May	Athletics Competition 7	Special Organisation	200	10	11	10	1.626,30	1	108,42	1.734,72
May	Athletics Competition 8	Sports Clubs Organisation	30	8	11	10	1.626,30	1	108,42	1.734,72
July	Athletics Competition 9	Special Organisation	90	12	11	10	1.911,75	1	127,45	2.039,20
July	Athletics Competition 10	Special Organisation	80	2	11	10	1.911,75	1	127,45	2.039,20
August	Athletics Competition 11	Special Organisation	18	8	11	10	1.911,75	1	127,45	2.039,20
			821		121		18.745,6 5		1.249,71	19.995,3 6

As can be seen in Table 2, only 1 of the 11 organizers is a Ministry of Health employee. All other organizers were found to be Ministry of Youth and Sports staff and all wages were paid with a 50% increase.

Table 3. Data on referee appointment and remuneration

	Activity Name	Type	Athletes	Categories	Refrees	MYS Personnel Referee	MYS Referee Payment	Referee	Referee Payment	Referee on Duty Net Paid
March	Athletics Competition 1	School Sports	80	4	29	7	1.821,44	22	3.816,34	5.637,78
March	Athletics Competition 2	School Sports	73	8	28	5	1.301,03	23	3.989,81	5.290,84
April	Athletics Competition 3	School Sports	33	6	15	4	1.040,82	11	1.908,17	2.948,99
May	Athletics Competition 4	Special Organisation	30	2	8	3	780,62	5	867,35	1.647,97
May	Athletics Competition 5	Sports Clubs Organisation	82	0	8	4	1.040,82	4	693,88	1.734,70
May	Athletics Competition 6	Special Organisation	105	10	22	4	1.040,82	18	3.122,46	4.163,28
May	Athletics Competition 7	Special Organisation	200	10	13	1	260,21	12	2.081,64	2.341,85

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

May	Athletics Competition 8	Sports Clubs Organisation	30	8	13	3	780,62	10	1.734,70	2.515,32
July	Athletics Competition 9	Special Organisation	90	12	18	5	1.517,78	13	2.630,81	4.148,59
July	Athletics Competition 10	Special Organisation	80	2	21	5	1.517,78	16	3.237,92	4.755,70
August	Athletics Competition 11	Special Organisation	18	8	19	3	910,67	16	3.237,92	4.148,59
Total			821		194	32	12.012,57	105	27.321,00	39.333,57

As can be seen in the section of the study's findings on referees, there were 194 referees in 11 sports organisations. 32 of these referees were MYS employees. The referees were paid a total of TL 12,012.57 with a 50% increase. This amount corresponds to approximately 30.6 per cent of the total amount paid to referees. The amount paid for 105 referees was 27,321 TL. It was calculated on the basis of the normal fee.

Table 4. Cost of medals and cups

	Activity Name	Type	Athletes	Categories	Medal	Cup	Price of medal	Medal Cost	Price of cup	Trophy Cost
March	Athletics Competition 1	School Sports	80	4	200	8	30	6.000,00	200	1.600,00
March	Athletics Competition 2	School Sports	73	8	128	16	30	3.840,00	200	3.200,00
April	Athletics Competition 3	School Sports	33	6	80	0	30	2.400,00	200	0
May	Athletics Competition 4	Special Organisation	30	2	8	0	30	240	200	0
May	Athletics Competition 5	Sports Clubs Organisation	82	8	0	0	30	0	200	0
May	Athletics Competition 6	Special Organisation	105	10	40	0	30	1.200,00	200	0
May	Athletics Competition 7	Special Organisation	200	10	40	0	30	1.200,00	200	0
May	Athletics Competition 8	Sports Clubs Organisation	30	8	32	0	30	960	200	0
July	Athletics Competition 9	Special Organisation	90	12	48	0	30	1.440,00	200	0
July	Athletics Competition 10	Special Organisation	80	2	8	0	30	240	200	0

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

August	Athletics Competition 11	Special Organisation	18	8	32	0	30	960	200	0
			616	24				18,480,00	4,800,00	

Depending on the organisation's results, trophies and/or medals are used for awards. As can be seen in Table 5, it was found that trophies were only awarded in school sports competitions (n=2). Medals were given to athletes in 8 of the other 9 organisations, and no awards were given in only one children's festival. The total value of all the awards that were given during the season amounted to TL 23230. This amount was determined to be approximately 18.5 per cent of the total expenses incurred during the season.

Table 5. Statistics on the cost of organisation

Activity Name	Type	Athletes	Officers	Personnel on duty net paid	Official Referees	Referee in charge net paid	Sessions	Net Paid Total	Trophy Cost	Medal Cost	Total Cost per activity
Athletics Competition 1	School Sports	80	11	1734,72	29	5637,775	2	14744,99	6000	1600	22344,99
Athletics Competition 2	School Sports	73	11	1734,72	28	5290,835	2	14051,11	3840	3200	21091,11
Athletics Competition 3	School Sports	33	11	1734,72	15	2948,99	1	4683,71	2400	0	7083,71
Athletics Competition 4	Special Organisation	30	11	1734,72	8	1647,965	1	3382,685	240	0	3622,685
Athletics Competition 5	Sports Clubs Organisation	82	11	1734,72	8	1734,7	1	3469,42	0	0	3469,42
Athletics Competition 6	Special Organisation	105	11	1734,72	22	4163,28	1	5898	1200	0	7098
Athletics Competition 7	Special Organisation	200	11	1734,72	13	2341,845	1	4076,565	1200	0	5276,565
Athletics Competition 8	Sports Clubs Organisation	30	11	1734,72	13	2515,315	1	4250,035	960	0	5210,035
Athletics Competition 9	Special Organisation	90	11	2039,2	18	4148,585	1	6187,785	1440	0	7627,785
Athletics Competition 10	Special Organisation	80	11	2039,2	21	4755,695	1	6794,895	240	0	7034,895
Athletics Competition 11	Special Organisation	18	11	2039,2	19	4148,585	1	6187,785	960	0	7147,785
Total				19995,36		39333,57		73726,98	18480	4800	97006,98

According to the general financial table of the sports organisations during the season, 110 organisation officials and 11 health officials worked in the organisations. The total

fee for the organising officials per session in the competitions was (19995,36 TL), the total fee for the referees was (39333,57 TL) and the cost of the awards was (23280 TL). In two organisations, the fees for officials and referees were doubled (73726.98 TL) due to the longer duration of the competitions. According to the costs per competition, the most expensive organisations are the school sport competitions held in two sessions.

4. CONCLUSION

Organisations can achieve significant savings by using both economies of scale, by saving money through mass production of goods and services, and economies of scope, by saving money through the most efficient organisation and use of available resources (Parks et al., 2003). In Türkiye, the management elements of the sports organisation (federations - central and provincial organisations - provincial representative offices) are the main elements in the effective and efficient realization of the organisations.

All the activities of the federations are audited by the general assembly, the supervisory board (internal audit) and the auditors appointed by the Minister (external audit) (art. 17, Official Gazette of 19.07.2012, 28358). These audits cover issues such as the conformity of the work and transactions carried out with the objectives of the federation in the management and administration of sport, as well as the results of their implementation and the degree of success. In addition, since the federations receive financial support from the State, all expenditure is also audited for compliance with the law. The purpose of this audit is to determine the compliance with the budgeting and archiving standards, the registration records (coaches-athletes-referees), the appropriateness of the state aid for the purpose and the implementation within the framework of the legislation, based on the principles of transparency and accountability.

Conducting legal and sportive audits may not affect the organisation costs. The most important result of the research is related to the number of organisation officials. The number of people to be assigned in the organisations is legalized as "maximum 11 people". The provincial representative, who is officially responsible for determining and assigning the organisation officials, has to make strategic decisions in order to reach the planned targets in the shortest time and with the lowest cost. According to the results of the research, it was determined that the number of athletes and other characteristics were not taken into consideration and 11 people were assigned in each organisation. Another important finding is that in an organisation where there is a provincial representative, there are personnel such as competition manager, facility supervisor, technical staff and field layout. While all the technical processes of the competition are carried out by the referees, the presence of a director of this competition, the assignment made in a competition held in a public facility despite the presence of a facility supervisor who is already salaried, the presence of technical personnel whose purpose and duty are unclear, and the presence of field layout officials seem to be the most important factor that reduces economic efficiency. Practices that cause re-payment of wages to the personnel who are already salaried cause an increase in costs. On the other hand, the payments made to public employees with a 50% increase are extremely difficult to understand.

Referees, who undertake the entire burden of the competition, also have an imbalance in payment in terms of public employees.

As a result, it is considered that a new practice should be adopted to determine a new assignment standard and limitations specific to sports branches. It is suggested that additional practices for public personnel that create payment imbalance should be abolished. In this way, it has been determined that serious reductions will occur in organisation costs. In addition, it is recommended to investigate social issues such as nepotism or mobbing that may occur in assignments.

REFERENCES

- Ahadov, V. (2023). Financing problems of enterprise structures operating in the field of sports business in Azerbaijan. *Turan-Sam*, 15(57), 251-257. <http://dx.doi.org/10.15189/1308-8041>
- Altuğ, H. (2022). What the Olympics brought to the country. *Düzce University Journal of Sports Sciences*, 2(2), 67-79.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2):27-40. <https://doi.org/10.3316/QRJ0902027>
- Bülbül, E., & Yamaçlı, R. (2023). Evaluation of the social structuring of stadiums in the city from the perspective of Türkiye. *Bartın University International Journal of Natural and Applied Sciences*, 6(1), 71-83. <https://doi.org/10.55930/jonas.1299228>
- Çakır, V. O., Özkan, Korkmaz, S. & Özkan R.T. (2019). Necessary site selection criteria to ensure continuity of use of international facilities and recreation areas. *The Journal of Academic Social Science*, 52(52), 405-416. <https://doi.org/10.16992/ASOS.12605>
- Cebeci, K. & Zülfiuoğlu, Ö. (2023). Evaluations on the economic and financial dimensions of the Olympics within the framework of white elephant syndrome. *Third Sector Journal of Social Economics*, 58(3), 1895-1916. <https://doi.org/10.15659/3.sektor-sosyal-ekonomi.23.08.2177>
- Çetin, A. (2023). A compilation on sports tourism and sports events. *Turkish Journal of Sports Sciences*. 7 (1), 48-58. <https://doi.org/10.32706/tusbid.1293281>
- Corbin J, & Strauss A. (2008). *Basics of qualitative research*. Sage Publication Ltd.
- Değer, R. (2022). Development of sports economy in Türkiye and government support, *Scientific Journal of Finance and Financial Law Studies*, 2(1), 61-70
- Düzen, A. Ç., Kargün, M., & Çelik, T. (2022). Socio-economic impacts of mega sports events. sportive perspective: *Journal of Sports and Educational Sciences*, 9(2). <https://doi.org/10.33468/sbsebd.288>

General Directorate of Sports Services (2023). Wage circular - principles regarding the wages to be paid to those assigned in the youth and sports services application. <https://shgm.gsb.gov.tr/Sayfalar/189/241/mevzuat-genelgeler.aspx> (Accessed: 19.10.2023).

Krotee, M. L., & Bucher, C. A. (2007). *Sport management*. Kasap, H. & Kesim, Ü. (Eds.). In Interscholastic, Intercollegiate and other competitive sports. White Publishing.

Law on Physical Education (1938). Physical Education Law, Law no: 3530. Official Gazette, 29.06.1938,

Official Gazette of the Republic of Türkiye. (2012). Regulation on the working procedures and principles of independent sports federations. 19.07.2012. No: 28358, Prime Ministry Press Office.

Parks, J., Quarterman, J., & Thibault L. (2003). *Contemporary sport management* (3. Edt.). In Management and application theories in sport organisations (Sevimli D., Trans.). Akademician Publishing (3rd Edt.), 316-317.

Presidency of the Republic of Türkiye. (2022). Sports clubs and sports federations law, T.C. Official Gazette, 31821, 26.04.2022. <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=7405&MevzuatTur=1&MevzuatTip=5>

Tınaz, C., Leopkey, B., & Salisbury, P. (2018). Could we win while losing? Examining the outcomes of İstanbul's unsuccessful Olympic candidacies. *SPORMETER Journal of Physical Education and Sports Sciences*, 16(4), 205-224. <https://doi.org/10.33689/spormetre.486245>

Yıldırım, Y., & Gökten, K. (2018) An economic-political perspective on Olympic and World Cup organisations. *Education Science Society Journal*, 16 (62), 74-94.

Evolving Logistics Landscape: A Comparative Analysis of Logistics Performance Index (LPI) Reports with a Focus on Digitalization Trends

Elif Koç¹

Abstract

Introduction: The Logistics Performance Index (LPI) is a key tool for assessing and monitoring the logistics industry, which is crucial for global trade and economic development. The index measures the efficiency of logistics infrastructure, the simplicity of trade procedures, and the effectiveness of cross-border trade, and is therefore a valuable resource for businesses, governments, and academics when making strategic choices.

Aim: This study aims to conduct a comparative content analysis of LPI reports for the years 2018 and 2023, with a special emphasis on the prominent theme of digitalization and its significant impacts.

Method: Through a meticulous examination of LPI reports covering these two distinct time frames, this analysis reveals the dynamic nature of the industry and provides essential knowledge for devising forthcoming strategies. The study, facilitated by the application of MAXQDA 2020, investigates the intricacies of logistics performance, providing insight into the future of the sector.

Findings: In the five years between 2018 and 2023, the study's results demonstrate the ever-changing character of the logistics sector. The reveal the substantial influence that digitalization has had on the performance of logistics.

Originality and value: The research outcomes presented in this study are of utmost importance to parties involved in logistics. They furnish a thorough comprehension of the dynamic logistics environment and the impact of digitalization

Key Words: Logistics Performance Index (LPI), Content Analysis, Logistics Performance, Digitalization, Comparative Analysis

Jel Codes: L91, O33, F18

1. INTRODUCTION

The logistics industry plays a crucial role in facilitating trade, reducing transport costs, and fostering economic expansion (Bugarčić et al., 2020). High-quality trade logistics play a crucial role in increasing trade volume. Conversely, inadequate logistics infrastructure and underdeveloped operational processes can significantly impede global trade interactions (Devlin & Yee, 2005; Hausman et al., 2013). A well-functioning logistics industry helps greatly to the optimization of international trade operations (Tang et al., 2018). It gives economic entities more power by increasing their ability to import and export products and services more effectively. This efficiency is the result of a well-organized flow of products, shorter transit times, and cost-effective transportation options. In essence, an efficient logistics sector serves as a critical facilitator for enterprises, facilitating easier cross-border commerce and supporting the

¹ Assist.Prof, Bandirma Onyedi Eylul University, Omer Seyfettin Faculty of Applied Sciences, Department of International Trade and Logistics, Turkey

worldwide movement of goods and services (Yeo & Deng, 2020). In the context of supply chains, logistics performance is crucial for organizational performance as emphasizes the integration of business flow, physical flow, cash flow, and information flow in the supply chain (Green et al., 2008). Strong logistics performance improves the supply chain's ability to deliver value to customers, thereby attracting and retaining customers. Within the framework of international trade, logistics performance is crucial for facilitating the movement of products and minimizing transport costs (Siddiqui & Vita, 2019).

One of the recognized measures of logistics efficiency and effectiveness is the Logistics Performance Index (LPI), introduced by the World Bank in 2007 and subsequently revised (Martí et al., 2017; Uca et al., 2016). The LPI evaluates several facets of logistics performance, such as customs procedures, infrastructure quality, logistics costs, and shipment timeliness (Martí et al., 2014). It provides a comprehensive picture of a country's logistics capabilities based on surveys of logistics professionals (Rezaei et al., 2018). As global trade continues to evolve, it becomes increasingly important to comprehend the dynamics and trends of logistics performance as measured by the LPI. Digitalization has the potential to significantly impact logistics performance by enhancing efficiency, visibility, and coordination throughout the supply chain. The adoption of digital technologies, such as RFID, Internet of Things (IoT), and data analytics, can enhance supply chain operations, optimize inventory management, and enable real-time tracking and monitoring of goods (Lin & Ho, 2009). These digital advancements can contribute to improvements in key logistics performance indicators, including timeliness, reliability, and tracking and tracing capabilities, all of which are components of the LPI (Martí et al., 2014).

In light of these developments, this study conducts a comparative content analysis of LPI reports for the years 2018 and 2023 to identify prominent themes and logistics industry development trends, with a particular focus on the transformative potential of digitalization. By comparing LPI reports from these two distinct time periods, this analysis offers invaluable insights for identifying shifts in the logistics industry and developing future strategies. MAXQDA 2020, a professional computer-assisted qualitative data analysis program, is utilized to decipher the fundamental themes. This research ultimately functions as a vital source of information for all logistics industry stakeholders, enhancing their understanding of highlighted themes and facilitating more informed decision-making in the field.

2. LOGISTICS PERFORMANCE INDEX (LPI)

The Logistics Performance Index (LPI) is an interactive benchmarking tool that helps countries identify the challenges and opportunities they encounter in their trade logistics performance and what they can do to enhance their performance (Pan et al., 2019). It evaluates numerous facets of logistics, including customs procedures, infrastructure quality, and logistics costs. It provides a comprehensive assessment of a nation's logistical capabilities and supply chain effectiveness (Martí et al., 2014).

The LPI has significant importance in the realm of international trade. It assists researchers and policymakers in formulating measures to enhance logistics and freight transportation. It provides insight into the assets and weaknesses of a country's logistics system by analyzing the distinctions between countries. This information helps discover trade logistics difficulties and possibilities (Martí et al., 2014; Rezaei et al., 2018). The LPI scores, ranging across countries on a scale of one to five, are assessed by six key dimensions of trade: trade and transport infrastructure quality (infrastructure), the effectiveness of customs and border clearance procedures (customs), the simplicity of

arranging cargoes at competitive prices (ease of arranging shipments), the competency and quality of logistics services, including transportation, freight forwarding, and customs brokerage (quality of logistics services), the capacity to monitor and trace consignments (tracking and tracing), the timeliness of shipments reaching consignees within scheduled or expected delivery times (timeliness) (World Bank, 2023).

Countries with a high LPI average have several common characteristics that make them successful. These nations have developed robust transportation and infrastructure networks (Wang et al., 2020). By aligning their logistics services with green logistics and sustainable development objectives, they are able to provide environmentally beneficial logistics services. They also utilize the capabilities of technology to accelerate business processes (Setia et al., 2013). In addition, they prioritize the effectiveness of customs operations by employing digital technologies. Through the use of digital technologies, they aim to improve the speed and effectiveness of customs operations (Lu et al., 2019; Castagna et al., 2020).

According to the Logistics Performance Index (LPI) 2023 report, recent disruptions in global value chains have once again highlighted the importance of logistics systems. In this context, the significance of developing agile and resilient logistics networks has increased, particularly in the digital age. Similarly, supply chain security has emerged as a major concern highlighted by the pandemic. Despite the numerous obstacles encountered during the reporting period of 2018-2023, countries at both extremes of the performance spectrum have generally demonstrated resilience. Even in the face of COVID-19-related disruptions and the global supply chain crisis, logistics efficiency remained relatively stable and the gap between the top-performing and bottom-performing nations remained. The fact that the top 12 countries on the 2023 LPI are all high-income countries is an illustration of this consistency, with Singapore ranking at the top since 2007 and 2012 on a consistent basis. Europe has a significant presence in this category, with eight of the top 12 ranked countries coming from Finland, Denmark, the Netherlands, Switzerland, Austria, Belgium, Belgium, Germany and Sweden. Canada, the United Arab Emirates and Hong Kong SAR, and China are also notable performers. These economies have historically had a significant influence on global supply chain networks, demonstrating their enduring presence and consequential impact (World Bank, 2023).

3. METHODOLOGY

This research presents a comparative analysis of the Logistics Performance Index (LPI) reports used to assess and monitor the logistics sector. The study was conducted through qualitative content analysis. The objective of qualitative content analysis is to systematically analyze textual data and reveal specific themes and patterns (Elo & Kyngas, 2008). The Logistics Performance Index (LPI) reports for 2018 and 2023 were utilized, as these reports are published by the World Bank and contain in-depth analyses of various aspects of the logistics industry. These texts constituted the primary data for the study.

To analyze the data, we used Maxqda qualitative data analysis software. Initially, the text data from the LPI reports was uploaded to Maxqda, and specific keywords and concepts were defined to code the text fragments. These codes served as the fundamental elements for analysis. Subsequently, the process of analyzing the text's content using the codes commenced. Each code was employed to identify pertinent topics and themes. By combining and categorizing the codes, distinct patterns and themes were uncovered. The results of the analysis facilitated the identification of

specific themes and changes in the LPI reports, ultimately highlighting significant developments and strategic orientations within the logistics industry.

4. FINDINGS AND DISCUSSION

The obtained data indicate significant differences in the content of the LPI reports for 2018 and 2023. Figure 1 visually represents the distribution of the codes in both documents based on the findings. In 2018, sustainability and climate change concepts were more frequently mentioned, whereas in 2023, technology and digitalization concepts are more prevalent. This shift may reflect the logistics industry's growing interest in digitalization and technology, which has the potential to enhance the efficiency of logistics processes, thereby improving international trade and logistics performance.



Figure 1. The intensity of the themes in each report

Upon reviewing the reports, it becomes evident that both reports touch upon the concepts of "green logistics" and "sustainable services." Notably, the 2018 report emphasizes the statement, "The 2018 LPI survey confirms that demand for sustainable

supply chain management goes hand in hand with logistics performance. This is especially true for environmentally sustainable services (green logistics)." Besides, the 2023 report underscores the expanding significance of pursuing implementable "green logistics" policies for policymakers. The sentence "For policymakers this means that the search for implementable 'green logistics' policies is becoming more important." conveys this focus. These observations illustrate the growing importance of sustainable services and green logistics in the logistics industry. In the minds of policymakers, the applicability of green logistics policies is now of greater importance.

The most significant difference between two reports is the emphasis on technology and digitization. Especially, the importance of big data emerging with digitization is highlighted in 2023. In the 2023 report, statement such as "Digitalizing supply chain operations generates granular high-frequency datasets by recording data at each step in a supply chain process. This Big Data approach also brings new business opportunities (relevant for the private sector) and analytical applications (relevant for both the private and public sectors), which push technological innovation further" emphasize the importance of big data. Looking at both reports, we can also see that e-commerce is present in both years, but it is emphasized more in the report for 2023. In 2018, it is declared that "The logistics sector is rapidly changing in terms of the nature of demand (e-commerce), players, use of technology, new risks (cybersecurity), and policy concerns." Cybersecurity is another critical issue highlighted in both reports. The report for 2023 contains the following statement: "...Because of these disruptions, supply chain resilience and its national security implications have emerged as top concerns. These concerns are often linked with supply chain security, including cybersecurity—a key consideration in a highly digitalized and globally connected service industry."

Both reports emphasize the qualified skill shortage in the logistics industry. As seen in Figure 1, this issue was emphasized more in the 2018 report. The 2018 report indicates that developing nations struggle to fill management-level positions, while developed nations face a shortage of blue-collar workers, particularly vehicle drivers. In the same report, the following statements are included: "In 2017, the World Bank and the Kühne Logistics University published a report on skills, competencies, and training in the logistics sector. It highlighted a general perception that qualified logistics-related labor is in short supply at all levels in both developed and developing countries, suggesting that the problem is likely to remain or worsen over the next five." The 2023 report also emphasizes that high-performing nations are investing more in training and skills development, and that it is crucial to attract qualified individuals to logistics positions. It also points out that problems such as shortages of transport drivers, logistic employees and seagoing personnel around the globe have persisted before and after the pandemic. The proposed solutions presented in the reports focus on improving workforce competence and logistics skills. The recommendations are as follows: First, investment should be made in training and skills development programs, which is important to attract qualified people to logistics positions and to strengthen the skills of existing employees. Second, increasing the skills and qualification of the workforce through training and skills development programs to address the shortage of skilled labor, thereby attracting them to logistics jobs. Finally, the focus should be on global logistics challenges, particularly the shortage of truck drivers, logistics personnel and seagoing personnel. Solving these problems is directly related to improving workforce competence and logistics skills and can contribute to making the logistics sector more efficient and effective.

In the 2023 report, the logistical challenges of landlocked countries are emphasized in particular. This emphasis is intended to draw attention to the fact that landlocked countries encounter greater logistical challenges compared to coastal countries. Such

nations frequently experience brief delays at import destinations, but encounter much lengthier delays in transit corridors and ports of entry. Landlocked developing countries have substantially longer dwell times than coastal transit countries at the same port of entry. The report incorporates several recommendations aimed at mitigating these challenges. Firstly, fostering cross-border collaboration is highlighted as a pivotal step in surmounting these challenges. This entails establishing cooperative models, akin to the robust transit regimes witnessed in Europe, to streamline transit corridors and expedite the movement of goods and services, particularly beneficial for landlocked nations. Secondly, improving connectivity by sea and air is emphasized. Improving these modes of transportation is crucial for landlocked countries to facilitate international trade and expand their access to global markets. Efficient use of sea and air routes can help overcome logistical barriers effectively. Third, long-term planning and infrastructure expenditures are crucial. Landlocked nations must develop comprehensive, forward-looking policies to promote competitiveness and economic development. Logistics may be more efficient with long-term planning.

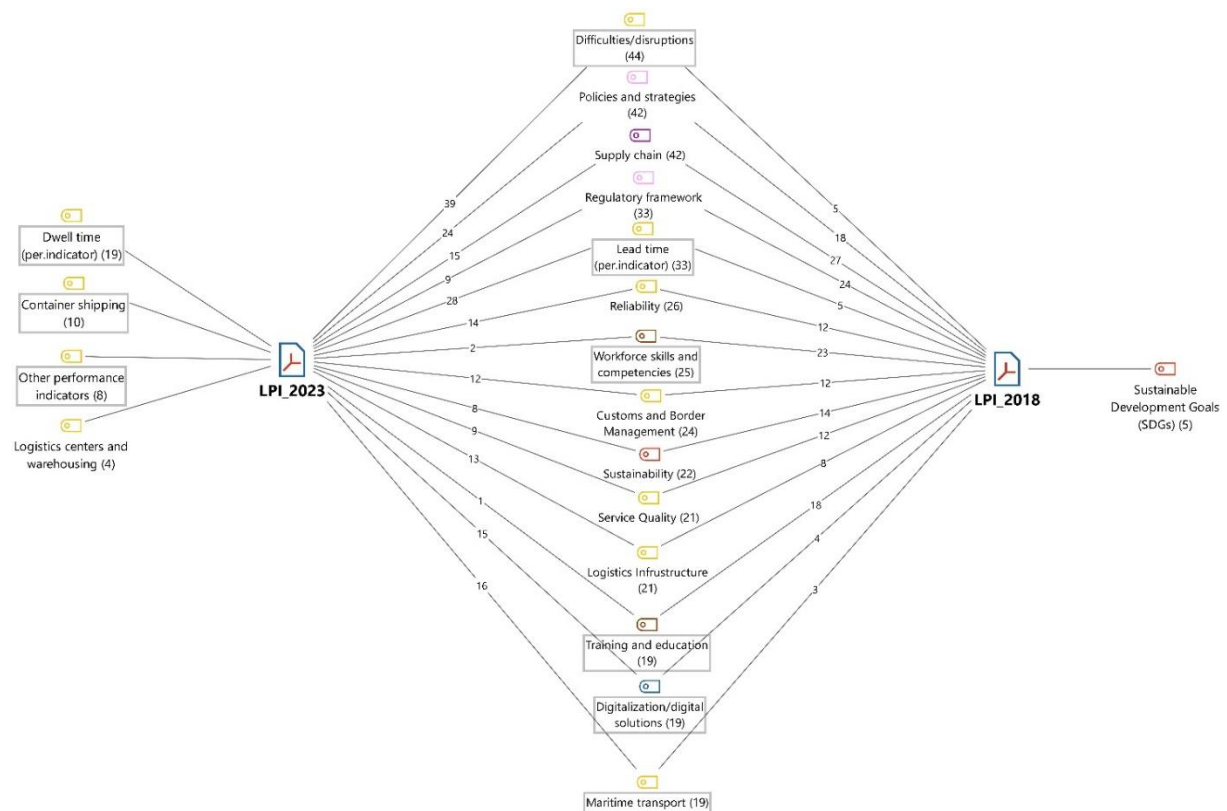


Figure 2. Two case model of 2018 and 2023 reports.

In Figure 2, the documents subject to the study are compared with the two case models. The figure visually illustrates common and uncommon codes found in both documents. As can be observed, the terms "disruption", "difficulties" and "crisis" are extensively mentioned in the 2023 report. The global logistics industry underwent a significant transformation between 2018 and 2023, primarily catalyzed by the emergence of the COVID-19 pandemic and various political and economic upheavals. The pandemic disrupted global supply chains, thereby highlighting the importance of reliability, notably referred to as "timeliness of delivery" in the Logistics Performance

report particularly emphasizes the concepts of supply chain and value chain. Supply chain and value chain management exert substantial influence on logistics performance. While value chain management enhances the ultimate value of a product or service, supply chain management optimizes the flow of products and supply processes. Both concepts are crucial for improving logistics performance within the context of enterprises. In the 2023 word cloud, prevalent concepts encompass 'time' 'dwell', 'shipping', 'delays,' 'container,' and 'tracking,' as well as 'freight.' These findings suggest that, in 2023, the logistics industry will place a strong emphasis on time management and the efficient, reliable execution of logistics operations, particularly in the context of maritime transportation and container shipments. The presence of terms such as 'container' and 'shipping' indicates a focus on optimizing container-related logistics processes and addressing potential shipping delays. Notably, the terms 'delays' and 'time' highlight the significance of timely and seamless execution of logistics processes in the maritime and container transportation sectors.

5. CONCLUSION

The comprehensive analysis of the Logistics Performance Index (LPI) reports for the years 2018 and 2023 has revealed profound shifts in the priorities and challenges facing the logistics industry. The findings offer invaluable insights into the evolving landscape of global logistics, conveying significant implications for various stakeholders. Recent disruptive events, most notably the global COVID-19 pandemic and geopolitical changes, have shone a bright light on the imperatives of dependability and resilience within logistics networks. The capacity to adapt to unanticipated obstacles and to maintain operations even in the midst of crises has emerged as indispensable attributes of modern logistics systems.

In the 2023 LPI report, technology and digitization emerged as central themes, with a strong emphasis on the transformative potential of big data. Furthermore, e-commerce also acquired prominence in the 2023 report, highlighting its expanding impact on the dynamics of international trade. It is evident that global technological advancements have a significant impact on the logistics industry, highlighting the need for nations to adopt cutting-edge technologies in order to remain competitive internationally. This integration incorporates a variety of technologies, including but not limited to blockchain, the Internet of Things (IoT), artificial intelligence, machine learning, big data analytics, cybersecurity, smart city applications, and smart logistics solutions.

The persistent problem of a lack of qualified workers in the logistics industry remains a pressing issue. Investment in training and skills development programs is essential to attract and retain qualified individuals in logistics roles. The transportation and logistics sector continues to place a high premium on resolving workforce issues such as labor shortages for truck drivers and logistics workers. Moreover, the logistical issues encountered by landlocked nations have been prominently emphasized in 2023. The report emphasizes the need for international cooperation, enhanced connectivity, and long-term infrastructure development in order to successfully offset these challenges. In conclusion, this comparative study of LPI reports provides a vital road map that may guide decision-makers, enterprises, and policymakers in their strategic planning endeavors. This, in turn, leads to the growth of a more sustainable and resilient logistics industry that is also better prepared to negotiate the complex problems and opportunities of the future. These results are an accurate reflection of the dynamic character of the logistics industry, which encourages all players to maintain their agility and forward-looking thinking in their pursuit for improved performance and resilience in this essential sector.

REFERENCES

- Bugarčić, F. Ž., Skvarciany, V., & Stanišić, N. (2020), “Logistics performance index in international trade: Case of Central and Eastern European and Western Balkans countries”, *Business: Theory and Practice*, 21(2), 452-459.
- Castagna, F., Centobelli, P., Cerchione, R., Esposito, E., Oropallo, E., & Passaro, R. (2020), “Customer knowledge management in SMEs facing digital transformation”, *Sustainability*, 12 (9), 3899.
- Devlin, J., & Yee, P. (2005), “Trade logistics in developing countries: the case of the Middle East and North Africa”, *The World Economy*, 28(3), 435–456.
- Elo, S., & Kyngäs, H. (2008), “The qualitative content analysis process”, *Journal of Advanced Nursing*, 62(1), 107-115.
- Faria, R. N. D., Souza, C. S. D., & Vieira, J. G. V. (2015), “Evaluation of logistic performance indexes of brazil in the international trade”, *RAM- Revista de Administração Mackenzie*, 16, 213-235.
- Green, K. W., Whitten, D., & Inman, R. A. (2008), “The impact of logistics performance on organizational performance in a supply chain context”, *Supply Chain Management: An International Journal*, 13(4), 317-327.
- Hausman, W. H., Lee, H. L., & Subramanian, U. (2013), “The impact of logistics performance on trade”, *Production and Operations Management*, 22(2), 236–252.
- Lin, C. Y., & Ho, Y. H. (2009), “RFID technology adoption and supply chain performance: an empirical study in China's logistics industry”, *Supply Chain Management: An International Journal*, 14(5), 369-378.
- Lu, M., Xie, R., Chen, P., Zou, Y., & Tang, J. (2019), “Green transportation and logistics performance: An improved composite index”, *Sustainability*, 11(10), 2976.
- Martí, L., Puertas, R., & García, L. (2014), “The importance of the Logistics Performance Index in international trade”, *Applied Economics*, 46(24), 2982-2992.
- Martí, L., Martín, J. C., & Puertas, R. (2017), “A DEA-logistics performance index”, *Journal of Applied Economics*, 20(1), 169-192.
- Pan, X., Dresner, M., & Xie, Y. (2019), “Logistics IS resources, organizational factors, and operational performance: An investigation into domestic logistics firms in China”, *The International Journal of Logistics Management*, 30(2), 569-594.
- Rezaei, J., van Roekel, W. S., & Tavasszy, L. (2018), “Measuring the relative importance of the logistics performance index indicators using Best Worst Method”, *Transport Policy*, 68, 158-169.
- Setia, P., Setia, P., Venkatesh, V., & Joglekar, S. (2013), “Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance”, *MIS quarterly*, 565-590.
- Siddiqui, A. A., & Vita, S. (2021), “Impact of logistics performance on trade with specific reference to garment sector in Cambodia, Bangladesh and India”, *Global Business Review*, 22(2), 517-531.

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Uca, N., İnce, H., & Sümen, H. (2016), “The mediator effect of logistics performance index on the relation between corruption perception index and foreign trade volume”, *European Scientific Journal*, 12(25), 37-45.

Wang, L., Xue, X., & Zhou, X. (2020), “A new approach for measuring the resilience of transport infrastructure networks”, *Complexity*, 2020, 1-16.

World Bank (2023). The World Bank Logistics Performance Index. <https://lpi.worldbank.org/>, (Accessed): 14.08.2023).

Yeo, A. D., & Deng, A. (2020), “Logistics performance as a mediator of the relationship between trade facilitation and international trade: A mediation analysis”, *South African Journal of Economic and Management Sciences*, 23(1), 1-11.

A comparison between ChatGPT-3.5 and ChatGPT-4.0 as a tool for paraphrasing an English Paragraphs

Thaeer Mueen Sahib^{1,2,*}, Osamah Mohammed Alyasiri^{3,4}, Hussain A.Younis^{4,5}, Dua'a Akhtom⁴, Israa M. Hayder⁶, Sani Salisu^{4,7}, Muthmainnah⁸

Abstract

Introduction: In recent years, there has been a proliferation of online platforms and tools aimed at enhancing English language learning, including prominent ones such as TikTok, Instagram, and Duolingo. Among these, a noteworthy addition emerged in September 2022 in the form of an artificial intelligence-based platform, ChatGPT-3.5, which was subsequently updated to ChatGPT-4.0.

Aim: This paper investigates the performance of these platforms in rephrasing and proofreading a specific paragraph, with a particular focus on their ability to generate text devoid of pronouns.

Method: We selected a specific paragraph as the focal point of our study and conducted a comparative analysis between ChatGPT-3.5 and ChatGPT-4.0, utilizing different user accounts and initiating distinct chat sessions. Pronouns generated by each version were closely examined and highlighted.

Findings: While the proprietary software, ChatGPT-4.0, exhibited only marginal disparities in terms of paraphrasing and proofreading, it continued to encounter challenges in completely eliminating pronouns from the paragraph, despite our utilization of a single user account. Conversely, the open-source software, ChatGPT-3.5, demonstrated the ability to generate a paragraph free from pronouns when different user accounts were employed.

Originality and significance: This study offers valuable insights and practical recommendations for researchers looking to leverage ChatGPT in their English language endeavors, emphasizing the feasibility of selecting a pronoun-free paragraph, particularly when utilizing ChatGPT-3.5.

Key Words: ChatGPT-3.5, ChatGPT-4.0, Paraphrasing, Proofreading, English Language.

1. INTRODUCTION

Digital technologies have advanced rapidly in recent years, along with software and social media platforms that enable human communication. TikTok, Instagram, Facebook, and many others are examples of platforms that have been applied in various

¹School of Electrical and Electronic Engineering, Universiti Sains Malaysia, Penang 14300 Nibong Tebal, Malaysia

² Kufa Technical Institute, Al-Furat Al-Awsat Technical University, Kufa 540011, Iraq

³ Karbala Technical Institute, Al-Furat Al-Awsat Technical University, Karbala 56001, Iraq

⁴ School of Computer Sciences, Universiti Sains Malaysia, Penang 11800, Malaysia

⁵ College of Education for Women, University of Basrah, Basrah 61004, Iraq

⁶ Qurna Technique Institute, Southern Technical University, Basrah 61016, Iraq

⁷ Department of Information Technology, Federal University Dutse, Dutse 720101, Nigeria

⁸ Universitas Al Asyariah Mandar, Sulawesi Barat Indonesia

*Corresponding author

fields and domains (Sahib & Ali, 2023;Thurnes, 2023). Language skill has become a crucial and competitive factor among these platforms (Lee, 2023).

After the COVID-19 pandemic ended, the world faced a challenge to create a powerful platform based on artificial intelligence (AI) that could provide easy and sufficient knowledge for humanity. In response to this challenge, researchers developed ChatGPT-3.5 version and upgraded it to ChatGPT-4.0 (Hill-Yardin, 2023).

ChatGPT (ChatGPT Playground) Chat Generative Pre-Trained Transformer) is an OpenAI-developed AI tool that generates text depending on user input. It is programmed to comprehend natural language and produce intelligent and pertinent replies to user requests. It has been trained on vast quantities of data (Fitria, 2023; Halaweh, 2023).

ChatGPT has potential uses in many fields, such as software engineering, healthcare, marketing, and education. In education, ChatGPT can analyze writing for grammar, punctuation, spelling errors, and offer suggestions to improve the overall structure (Fraivan, 2023). Such as provide guidelines on crafting accurate queries helps reduce the likelihood of using incorrect language and including irrelevant references (Alyasiri et al., 2023).

Even though ChatGPT speeds up the academic and scientific writing process for writers, especially students and early-career researchers, one of its primary benefits is the rapid analysis of large amounts of data. Using approaches, researchers may examine many research articles in half the time required to read them (Zohery, 2023). From another point of view, a question arises about the quality of the texts that ChatGPT produces. Consequently, this paper has discussed some limitations.

A study conducted by (Shahriar et al., 2023) employed ChatGPT to compose a literature review on the function of digital twins in healthcare. Despite the promising outcomes, significant similarities were detected by a plagiarism checker when rephrasing sentences. In another study carried out by (Koos & Wachsmann, 2023) AI language models become more prevalent in academic writing and research, and text writing is likely to lose much of its relevance leading to a shift from text design to intelligent and creative steering of AI systems by users and sophisticated control of the generated text. Eventually, a study presented by (Halaweh, 2023) discussed three argument, first, ChatGPT provide high-quality outputs that have a high likelihood of passing plagiarism detection software, Second, AI can determine with high precision whether a sentence was created by a person or by OpenAI's classifier. Thirdly, ChatGPT is readily available to all users (Mohammed, O., Sahib, 2023)

Based on our knowledge, no study employed depth focusing on creative ways to help the researchers and users in enhancing their writing. This study makes a simple comparison between ChatGPT-3.5 and ChatGPT-4.0 to measure their abilities in terms of re-writing the paragraphs without pronouns. The paragraphs have been tested in both platforms based on two methods, the first included different user accounts, and the second examined in single user account but in a different new chat.

The remainder of this paper includes Section 2 research methodology, Section 3 results and discussion, and Section 4 conclusion.

2. RESEARCH METHODOLOGY

To support the argument presented in this paper, various indicators and facts must be obvious and experimentally described through the steps in Figure 1.

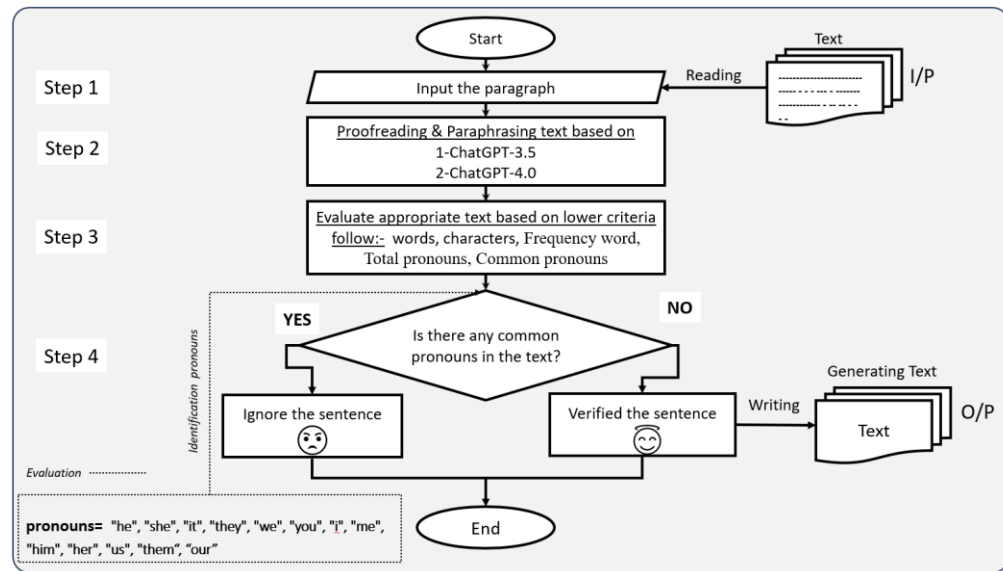


Figure 4. Flowchart of comparison between ChatGPT3.5 and ChatGPT-4.0 in terms of re-writing text without pronouns.

Step 1- Configure four different user accounts from ChatGPT-3.5 platform (Open-source software) and a single user account from ChatGPT-4.0 platform (close source software), and an entire certain text four times into ChatGPT-3.5 version, the original text illustrated in Figure 2.

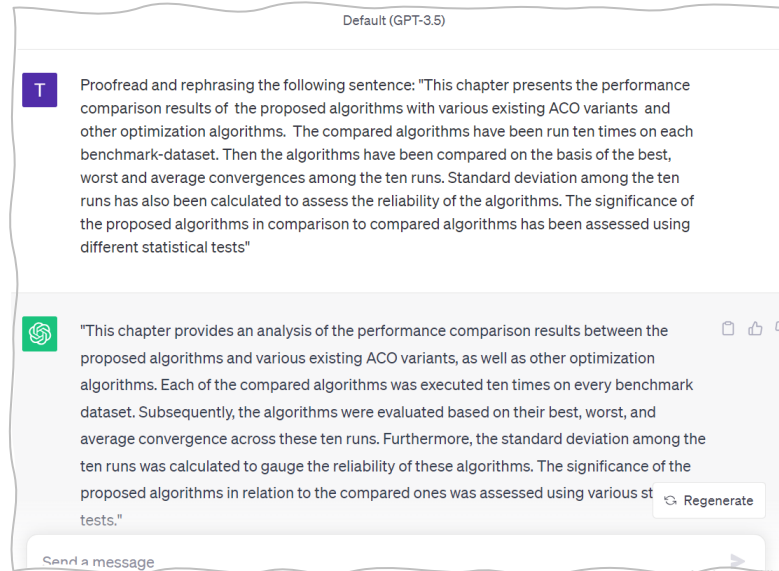


Figure 2. Sample of asking and response ChatGPT-3.5 about proofread and paraphrasing a paragraph.

Step 2- Paraphrasing and proofreading the text in terms of different user accounts. As well as inputting the same paragraph again, into ChatGPT-4.0 version for the same purpose. Eventually, entering the same paragraph into ChatGPT-3.5 version in terms of several new chats four times to examine what the text would look like. **Step 3-** Verified

the best paragraphs that match the criteria including evaluating appropriate text based on a lower criterion as follows: - words, characters, frequency word, total pronouns, and common pronouns.

Step 4- Comparing the new text generated by ChatGPT-3.5 and ChatGPT-4.0 versions in terms of texts free from pronouns. In this paper, the identify the list of most pronouns using Spyder (python 3.8) environment, detecting the pronouns with compare to the original text, then compute the total number of pronouns used in the entire paragraphs, configured as follows: common pronouns = ["he", "she", "it", "they", "we", "you", "i", "me", "him", "her", "us", "them"] as step 3 shown in Table 1.

Table 1: Pesudocode identification the text without pronouns

1	text =Initialize the paragraph
2	text_lower = text.lower() # Convert text to lowercase for case-insensitive matching
3	common_pronouns = Initialize the pronounce
4	pronoun_count = 0 # Initialize a counter for pronoun occurrences
5	words = text_lower.split() # Split text into words and count pronouns
6	For word := words do
7	if word := common_pronouns then
8	pronoun_count += 1
9	End if
10	End for
11	Print (Total common pronouns in the text: {pronoun_count})
12	for word := words do
13	for common_pronoun := common_pronouns do
14	if word==common_pronoun then
15	Print ("The pronoun is",word)
16	End if
17	End for
18	End for

The next section leads to describe the results and discussion.

3. RESULTS AND DISCUSSION

As ChatGPT is a relatively new technology, it is highly likely that many faculty and students are uninformed of it or have only heard about it without using it. To ensure using best paraphrasing and proofreading properly. Entering the original text in ChatGPT-3.5 and ChatGPT-3.5, the best paragraph evaluated based on (lower criteria / fewer words, characters, frequency word, and total common pronouns), after proofreading and paraphrasing the response of ChatGPT-3.5 provides the different answers based on text analysis operations using natural language processing (NLP) as described in Table 2.

*Table 2: Responses of Prephrasing and Proofreading by ChatGPT-3.5 in
Terms of Different User Account*

User Account (UA)	The response	Metrics of Text Analysis
1	This chapter <u>presents</u> the performance comparison results of the proposed algorithms <u>with</u> various existing ACO variants and other optimization <u>algorithms</u> . The compared algorithms <u>have been run</u> ten times on each benchmark-dataset. <u>Then</u> the algorithms <u>have been compared on the basis of the</u> best, worst and average convergences <u>among</u> the ten runs. Standard deviation among the ten runs has also been calculated <u>to assess the reliability of the algorithms</u> . The significance of the proposed algorithms in comparison to compared algorithms <u>has been</u> assessed using <u>different</u> statistical tests.	Words= 86 Characters = 586 Frequency word (FW)= 92 Total common pronouns= 0 Common pronouns= None
2	This chapter presents the performance comparison results of the proposed algorithms against various existing ACO variants and other optimization techniques. The compared algorithms were executed ten times on each benchmark dataset. Subsequently, the algorithms were assessed based on their best, worst, and average convergence across the ten runs. Additionally, we calculated the standard deviation among the ten runs to evaluate the algorithms' reliability. The significance of the proposed algorithms, in comparison to the other algorithms, was assessed using various statistical tests.	Words= 81 Characters = 588 Frequency word (FW)= 93 Total common pronouns= 0 Common pronouns= None
3	This chapter provides the results of a performance comparison between the proposed algorithms and various existing ACO variants, as well as other optimization algorithms. The compared algorithms were executed ten times on each benchmark dataset. Subsequently, the algorithms were evaluated based on the best, worst, and average convergence achieved in these ten runs. The standard deviation among these ten runs was also calculated to gauge the algorithms' reliability. To assess the significance of the proposed algorithms in comparison to the other algorithms, various statistical tests were employed.	Words= 87 Characters = 603 Frequency word (FW)= 87 Total common pronouns= 0 Common pronouns= None
4	This chapter provides a presentation of the performance comparison results between the proposed algorithms and various existing ACO variants, as well as other optimization algorithms. These compared algorithms underwent ten separate runs on each benchmark dataset. Subsequently, these algorithms were assessed based on their best, worst, and average convergences across the ten runs. Additionally, the standard deviation among these ten runs was calculated to evaluate the reliability of the algorithms. To gauge the significance of the proposed algorithms in comparison to the compared algorithms, various statistical tests were employed.	Words= 89 Characters = 639 Frequency word (FW)= 100 Total common pronouns= 0 Common pronouns= None

The Zigzag line is obvious in the text of user account 1 the most paraphrased words. All criteria have been obtained in the second column which represents the analysis of text metrics in terms of different user accounts. Where the lower metric value is the best text considered. Frequency distribution of words refers to the number of words repeated in the paragraph entered. The variations of matrices between four user accounts represent the quality of proofreading and paraphrasing as visualized in Figure 3.

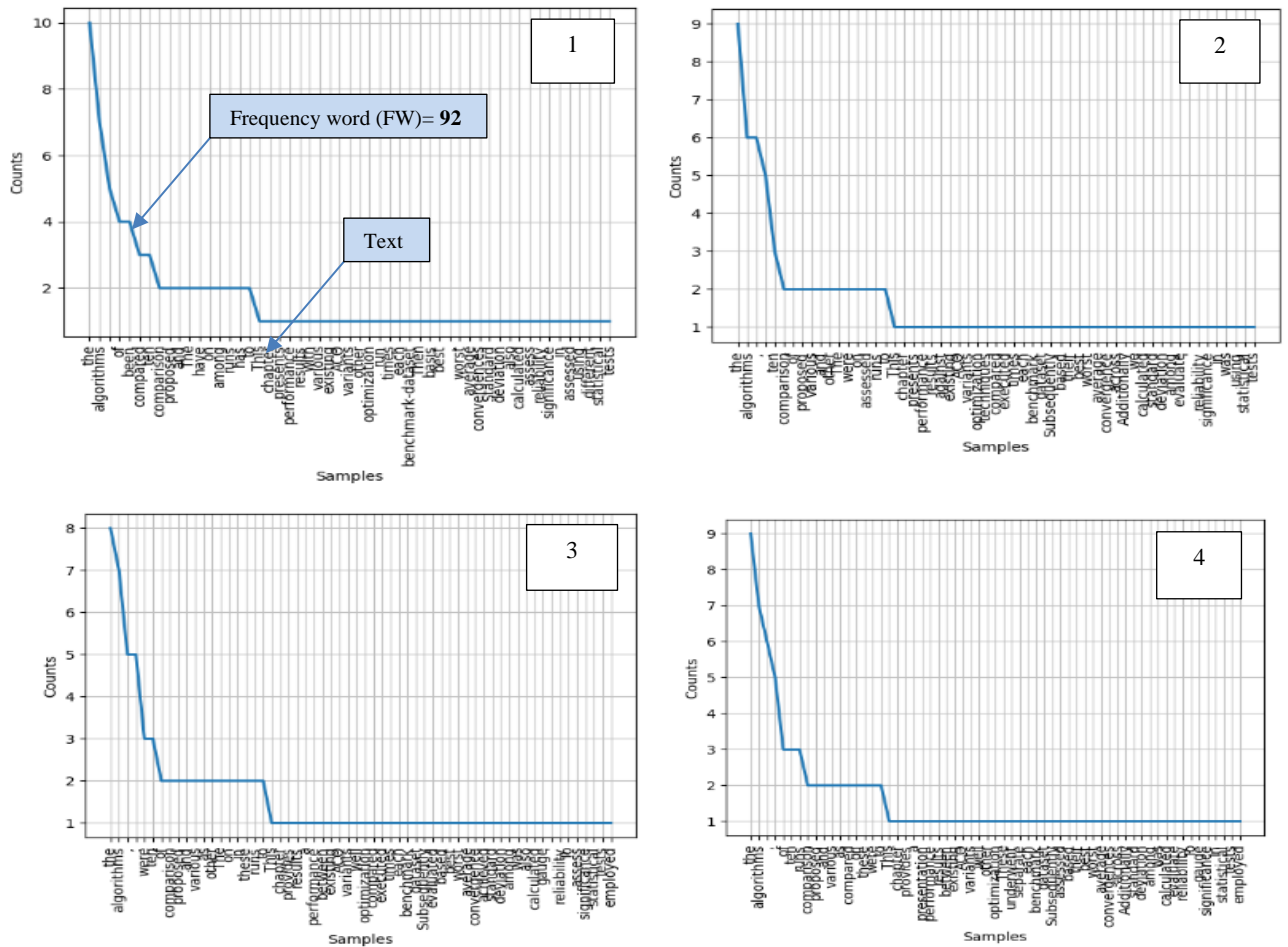


Figure 3. Frequency distribution of words in ChatGPT-3.5 as follows:
1) User account 1 in FW=92, 2) User account 2 in FW=93, 3) User account 3 in FW=78
4) User account 4 in FW=100.

According to the output paragraph in each user account, the best text is user account 2 because the significant criteria among the others, as well as its total common pronouns, is 0 which refers to this paragraph empty from pronoun elements as displayed in Figure 4.

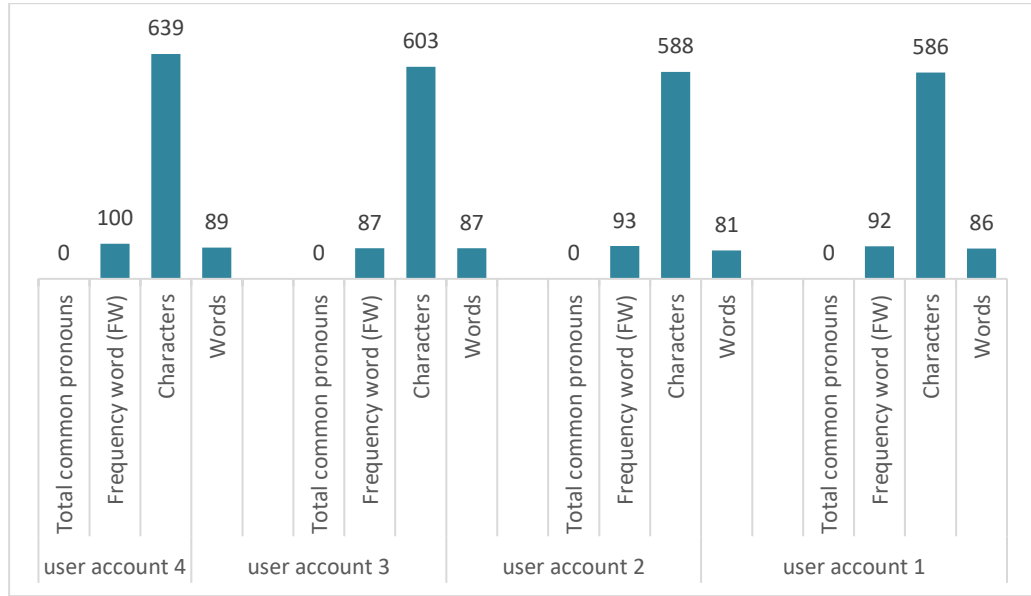


Figure 4. Histogram illustrate the best paragraph between different user account

As regards the second experiment followed the same procedure as the previous test but entering the text in the ChatGPT-4.0, this test suffered from the existing two pronouns in addition to the number of words equal to 92. Also, the number of characters being very high 620 with compared to the paraphrasing and proofreading by ChatGPT-3.5. as clear in Table 3.

Table 2: Responses of Paraphrasing and Proofreading by ChatGPT-4.0 in Terms of Different User Account

User Account	The response	Text Analysis Metrics
1	This chapter <u>provides</u> a comparative analysis of the performance of our proposed algorithms against various existing variants of Ant Colony Optimization (ACO) as well as other optimization algorithms. Each algorithm was executed ten times on each benchmark dataset. Performance metrics such as best, worst, and average convergence rates were evaluated across these ten runs. Additionally, the standard deviation was calculated for each set of ten runs to gauge the reliability of the algorithms. To assess the significance of <u>our</u> proposed algorithms relative to the compared ones, various statistical tests were employed.	Words= 91 Characters = 620 Frequency word = 102 Total common pronouns= 2 Common pronouns= our, our

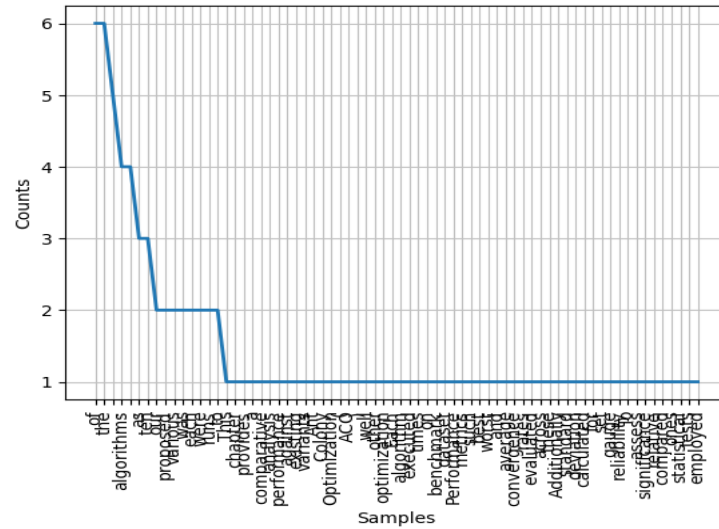


Figure 5. Frequency distribution of words in ChatGPT-4.0 in terms of single user account

Eventually, we are involved in the same paragraph in a single user account with a different new chat in ChatGPT-3.5, as results in Table 4.

Table 4: Responses of Paraphrasing and Proofreading by ChatGPT-3.5 in Terms of Single

New Chat	The Responses	Metrics of Text Analysis
1	"This chapter <u>unveils</u> the performance comparison findings between the proposed algorithms and several existing ACO variants, as well as other optimization algorithms. The compared algorithms underwent ten separate runs on each benchmark dataset. Subsequently, these algorithms were assessed based on the best, worst, and average convergence across the ten runs. To gauge algorithm reliability, <u>we</u> also calculated the standard deviation among the ten runs. Furthermore, <u>we</u> evaluated the significance of the proposed algorithms in comparison to the <u>forementioned ones</u> through various statistical tests."	Words= 83 Characters = 600 Frequency word (FW) = 94 Total common pronouns=2 Common pronouns= we, we
2	"This chapter <u>showcases</u> the results of performance comparisons between the proposed algorithms and various existing ACO variants, as well as other optimization algorithms. These comparative analyses involved running the algorithms ten times on each benchmark dataset. Subsequently, the algorithms were evaluated based on their best, worst, and average convergence across the ten runs. Additionally, <u>we</u> calculated the standard deviation among these ten runs to gauge the algorithms' reliability. To gauge the significance of the proposed algorithms relative to the compared algorithms, different statistical tests were employed."	Words= 86 Characters = 626 Frequency word (FW) = 98 Total common pronouns=1 Common pronouns= we
3	"This chapter showcases the results of a performance comparison between the proposed algorithms and various existing ACO variants as well as other optimization algorithms. Each of these algorithms has been executed ten times on individual benchmark datasets. Subsequently, <u>we</u> assess these algorithms by examining their best, worst, and average convergence over the ten runs. Additionally, <u>we</u> calculate the standard deviation among these ten runs to gauge the reliability of the algorithms. Finally, <u>we</u> evaluate the significance of the proposed algorithms relative to the compared algorithms using various statistical tests."	Words=89 Characters = 622 Frequency word (FW) =99 Total common pronouns=3 Common pronouns= we, we, we
4	"This chapter <u>provides</u> a presentation of performance comparison results for the proposed algorithms <u>when pitted against</u> a range of existing ACO variants and other optimization algorithms. Each of these algorithms <u>underwent</u> ten <u>separate</u> runs on various benchmark datasets. Subsequently, these runs were compared based on their best, worst, and average convergence <u>across</u> the ten <u>iterations</u> . Furthermore, a calculation of the standard deviation among these ten runs was performed to evaluate the algorithms' reliability. To gauge the significance of the proposed algorithms in relation to the compared algorithms, various statistical tests were conducted."	Words=92 Characters =652 Frequency word (FW) =103 Total common pronouns=0 Common pronouns= None

Table 4 exhibits the minimum number of words is 83 in the new chat 1, in opposite directions, suffering from two pronouns (we, we), the new chat 2 and new chat 3 both suffer from pronouns. We consider the new chat 4 to be the best paragraph because not have any pronouns based on its Metrics total common pronouns=0 and common pronouns=None. Figure 5 The variation of the Frequency word shows the increasing Frequency word, the words, and characters to avoid using pronouns anymore as shown in Figure 6.

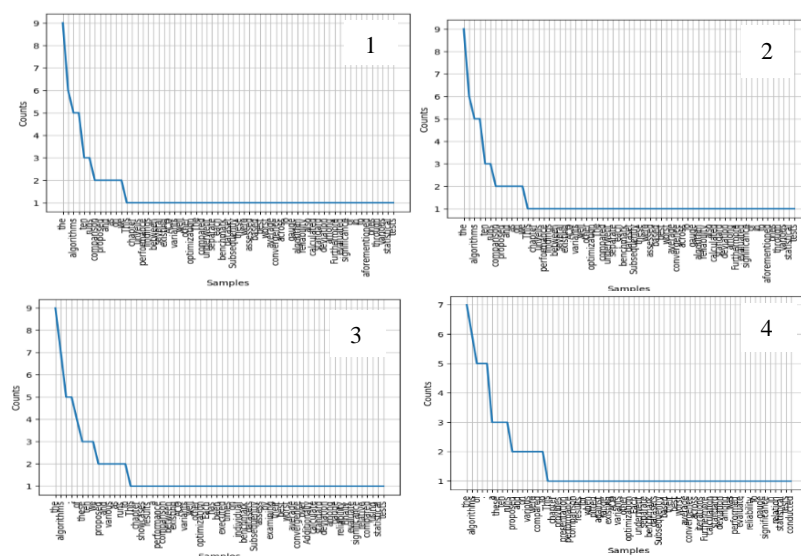


Figure 6. Frequency distribution of words in ChatGPT-3.5 in terms of single user account different new chats as follows: 1) New chat 1 in FW=94 2) New chat 2 in FW=98 3) New chat 3 in FW=99, 4) New chat 4 in FW=103.

4. CONCLUSION

Embedding and improving AI language models, such as ChatGPT, in many disciplines presents issues and concerns for academic institutions responsible for maintaining research quality and ensuring fair evaluations. It is vital to strike a balance between the potential benefits of AI technologies and the maintenance of academic standards to enable students to learn essential skills for a rapidly evolving professional context. We conclude that the close source software (ChatGPT-4.0) doesn't have a big difference in terms of paraphrasing and proofreading, although we used just a single user account, still suffering from the existence of three pronouns in the paragraph. While the free source software (ChatGPT-3.5) but using different user accounts we can create a paragraph without pronouns, this technique is very beneficial for scientific academics when talking about paraphrasing and proofreading a particular paragraph, for example paraphrasing a certain abstract in a specific manuscript, in this paper recommend that any user can adding the word (paraphrasing without pronouns) to get a perfect paragraph.

REFERENCES

- Alyasiri, O. M., Salisu, S., & Younis, H. A. (2023). ChatGPT Revisited: Using ChatGPT-4 for Finding References and Editing Language in Medical Scientific Articles. Available at SSRN: <https://Ssrn.Com/Abstract=4621581> Or, November. <https://doi.org/http://dx.doi.org/10.2139/ssrn.4621581>
- Fitria, T. N. (2023). Artificial Intelligence (AI) techology in OpenAI ChatGPT application: A review of ChatGPT in writing English essay. *Journal of English Language Teaching*, 6(1), 44–28. <https://journal.unnes.ac.id/sju/index.php/elt/article/view/64069>
- Frairwan, M. et al. (2023). A Review of ChatGPT Applications in Education, Marketing, Software Engineering, and Healthcare: Benefits, Drawbacks, and Research Directions. *ArXiv Preprint ArXiv*, 74(1934), 535–546.
- Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology*, 15(2). <https://doi.org/10.30935/cedtech/13036>
- Hill-Yardin. (2023). A Chat(GPT) about the future of scientific publishing. *Brain Behav Immun*.
- Koos, S., & Wachsmann, S. (2023). *Navigating the Impact of ChatGPT/GPT4 on Legal Academic Examinations: Challenges, Opportunities and Recommendations*. 6(2), 255–270. <https://doi.org/10.20473/mi.v6i2.45270>
- Lee, Y. J. (2023). Language learning affordances of Instagram and TikTok. *Innovation in Language Learning and Teaching*, 17(2), 408–423. <https://doi.org/10.1080/17501229.2022.2051517>
- Mohammed, O., Sahib, T. M. (2023). ChatGPT Evaluation: Can It Replace Grammarly and Quillbot Tools? *British Journal of Applied Linguistics*, 3((2)), 34–46. <https://doi.org/doi.org/10.32996/bjal.2023.3.2.4>
- Sahib, T. M., & Ali, A. H. (2023). *ChatGPT in Waste Management : Is it a Profitable*. February, 2021–2023.
- Shahriar et al. (2023). Let’s Have a Chat! A Conversation with ChatGPT: Technology, Applications, and Limitations. *Artificial Intelligence and Applications*, April, 1–16. <https://doi.org/10.47852/bonviewaia3202939>
- Thurnes, C. M. (2023). Tiktok and Instagram – using social media for teaching innovation. *ISPIM Conference Proceedings*, 1–5.
- Zohery, M. (2023). ChatGPT in Academic Writing and Publishing: A Comprehensive Guide. *Artificial Intelligence in Academia, Research and Science: ChatGPT as a Case Study*. (Frist Edition), Achtago Publishing., April. <https://doi.org/10.5281/zenodo.7803703>

Investigation the Science Critical Thinking Skills in terms of Various Variables of Secondary School Students¹

Elif Özdemir Onaç², Esra Benli Özdemir³

Abstract

Introduction: While the importance of information increases; It is important to examine mental processes in the effort to obtain knowledge. For this reason, critical thinking skill, which is one of the sub-skills of rational thinking, has emerged.

Aim: The purpose of this research is to investigate the science critical thinking skills in terms of various variables of secondary school 5th, 6th, 7th and 8th grade students.

Method: In this research, the descriptive scanning method was used. The research was conducted in four different secondary schools in a metropolitan city in the fall semester of the 2023-2024 academic semester. The study group of the research consisted of 787 students (n5th grade = 193, n6th grade = 201, n7th grade = 208, n8th grade = 185).

Findings: As a result of the analysis of the data, the science critical thinking skills levels of secondary school students; it doesn't vary according to gender, age and mother's educational status, whether or not they take relevant courses. However, it has been observed that critical thinking skills levels in science courses differ in terms of secondary school students' positive attitude towards science class, their father's education level and grade level. It was noted that this difference was in favor of students who like science classes, follow a scientific journal So, these students had a high average success rate in science classes.

Originality and value: The findings obtained in this study may contribute to detecting and improving the current situation.

Key Words: Critical thinking, science, secondary school students

1. INTRODUCTION

While the importance of information increases; It is important to examine mental processes in the effort to obtain knowledge. Therefore, critical thinking skill, one of the sub-skills of rational thinking, emerged (Çetinkaya, 2011).

Critical thinking is an individual necessity that includes the tendency to evaluate one's own and others' opinions, find alternatives, and think productively by making inferences (Norris, 1985). Critical thinking does not mean eliminating emotions and replacing thought with emotion. It prevents making hasty and random decisions based solely on emotions. Therefore, critical thinking is not a system of thinking that aims to defend the views adopted by either the individual or any society. Critical thinking is a thinking that helps solving problems or making judgments or even finding the problem (Gündoğdu, 2009).

¹ This study was developed from the master's thesis prepared by the first author under the supervision of the second author.

² Ministry of National Education Ankara, Türkiye.

³ Gazi University, Gazi Faculty of Education, Department of Mathematics and Science Education, Department of Science Education Ankara, Türkiye.

With the inclusion of critical thinking in education, the individual tries to ask the right questions, discover assumptions and find flaws in the logic he/she carries out (Browne and Keeley, 2004).

2. LITERATURE REVIEW

After 2006, the Ministry of National Education started to include critical thinking in its curriculum starting from the 6th grade and aims to raise individuals who have critical thinking skills, question events, are aware of their own competence, and can look at events from different perspectives. The rapid change in science and technology, the changing needs of individuals and society, innovations and developments in learning and teaching theories and approaches have directly affected the roles expected from individuals. This change involves people who produce knowledge, use it functionally in life, solve problems, think critically, be enterprising, determined, have communication skills, empathize, contribute to society and culture, etc. It describes an individual with certain qualities. As can be seen, the development of critical thinking skills was emphasized in the science curriculum updated in 2013 (MEB, 2013).

What is science? Science is the effort to systematically examine observed nature and natural events and to predict events that have not been observed yet (Kaptan, 1999). For a philosopher; It is a method of questioning the accuracy of information. Each of these are correct definitions in themselves. However, a definition that includes all of these definitions and is accepted by the majority can be made as follows; science; It is the process of thinking about the nature of knowledge, understanding the existing knowledge and producing new knowledge (Sifoğlu, 2007).

2.1. General Purposes of Science

The vision of the Science Curriculum is defined as "To raise all students as scientifically literate individuals." Scientifically literate individuals who research and question, have effective decision-making skills, can solve problems, have self-confidence, are open to collaboration and have strong communication skills, and are lifelong learners; "They have knowledge, skills and positive attitudes towards science (MEB, 2013)."

General purposes of science

- By activating scientific thinking, helping students express their own critical thoughts, express their own judgments and gain self-confidence.
- Ability to establish relationships between scientific and technological events in daily life.
- To gain the ability to be a good observer, to draw conclusions from research and investigations and to make comments.
- Helping students apply what they have learned to daily life.
- To teach concepts such as sharing, cooperation, solidarity, justice and being a good citizen.
- Living in harmony with the social and natural environment and helping them continue their lives.
- To teach students how to apply their knowledge to the changing society, environment, invention and technology.
- Helping him use his time effectively and rationally.
- Developing an open mind and the idea of working for social benefits.
- Ability to think independently and help them make the right decisions.

- Becoming literate in science.
- Making people understand that any problem encountered can only be solved with scientific methods. (Yıldırım, Şensoy & Hançer, 2003)

3. RESEARCH METHODOLOGY

The purpose of this research is to investigate the science critical thinking power and self-efficacy of secondary school students in 5th, 6th, 7th and 8th grades in terms of various variables.

3.1. Research Model and Hypothesis

This research is a descriptive study and a survey model was used in the research. It is a study aimed at determining the situation.

Sub-problem 1. Among the secondary school students (5th, 6th, 7th and 8th grade), in terms of the levels of critical thinking power in Science class;

- 1.1. Is there a significant difference by gender?
- 1.2. Is there a significant difference according to grade levels (5th, 6th, 7th and 8th grade)?
- 1.3. Is there a significant difference according to father's education level?
- 1.4. Is there a significant difference according to the frequency of in-class experiments and activities?
- 1.5. Is there a significant difference in terms of average success in Science Course?
- 1.6. Does it differ according to the variable "Whether or not to take an Elective Science Applications Course"?

Sub-problem 2. What are the critical thinking power levels of secondary school 5th, 6th, 7th and 8th grade students in Science course?

To investigate students' Science critical thinking levels, the 'Science Lesson Critical Thinking Power' scale, which consists of 21 items with 3 factors consisting of micro skills, macro skills and affective characteristics, developed by Gülen, (2019) was used. It is a three point Likert scale and optional scale with three options.

Table 1. Science Lesson Critical Thinking Scale Reliability Values

Science Critical Thinking Scale Sub-Dimensions	Gülen, S. (2019) α Value	α Value in the Study
Likert Scale	0,699	0,711
Optional Scale	0,755	0,726

3.2. Data Analysis

The data collected for the purposes of the research are using statistical techniques using SPSS (Statistical Package for The It was analyzed using the Social Sciences) program. SPSS 27.0 program was used to analyze the data. One-Way Analysis of

Variance (ANOVA), Unrelated Group t-test and Games and Howell multiple comparison technique were used for the relationships between sub-dimensions. It is stated that the Games and Howell multiple comparison technique produces results close to the significance level by controlling error situations in cases where there are more than three groups (Kesselman & Rogan, 2012).

3.2.1. Demographics

The study group of the research consists of 5th, 6th, 7th and 8th grade students studying in five different secondary schools in Ankara center in the fall semester of the 2023-2024 Academic Year (ntotal = 787; n5th grade = 183, n6th grade = 199, n7th grade = 207, n8th grade = 198).

Out of total 787 respondents, 293 were male and 494 were female. As can be seen, all of the students were in the 9-15 age group and were secondary school students. Table 2 shows the number of participants in each age group with their current grade level by region.

Table 2. Age and Grade Level Distribution by Region

Region			Gender		Total
			Female	Male	
Keçiören	Grade level	5 th grade	33	37	70
		6 th grade	39	37	76
		7 th grade	39	34	73
		8 th grade	33	34	67
	Total		144	142	286
Mamak	Grade level	5 th grade	36	27	63
		6 th grade	35	32	67
		7 th grade	32	27	59
		8 th grade	40	28	68
	Total		143	114	257
Gölbaşı	Grade level	5 th grade	21	29	50
		6 th grade	25	31	56
		7 th grade	43	32	75
		8 th grade	25	38	63
	Total		114	130	244
Total	Grade level	5 th grade	90	93	183
		6 th grade	99	100	199
		7 th grade	114	93	207
		8 th grade	98	100	198
	Total		401	386	787

3.2.2. Normality and Validity of Scales

The data was first put into normality tests to find out that if the collected data is normally distributed or not. The skewness value for the macro skills sub-dimension of the Science Lesson Critical Thinking Scale for students was calculated as 0.087 and the kurtosis value as 0.174, the skewness value for the micro skills sub-dimension was calculated as 0.087 and the kurtosis value as 0.174, and the skewness value for the affective characteristics sub-dimension was calculated as 0.087 and kurtosis value as 0.174. These results prove that all sub-dimensions of the Science Lesson Critical Thinking Scale show normal distribution.

3.2.3. Analysis Results

The results obtained are summarized in the tables below.

Table 3. t-Test Results According to the Mean Levels of Critical Thinking Power Levels of Female and Male Students in Science Lessons

Dimensions	Gender	N	\bar{X}	SS	t	p
Macro Abilities	Female	401	2,29	,397	1,916	,056
	Male	386	2,23	,424		
Micro Abilities	Female	401	2,16	,477	3,791	,000
	Male	386	2,03	,465		
Affective Properties	Female	401	2,55	,377	3,066	,002
	Male	386	2,47	,409		

Looking at Table 3., according to the gender of the students, the scores of the students' Science Lesson Critical Thinking scale sub-dimension, the students' science course critical thinking scale sub-dimension macro abilities [$t(787)=1.916$, $p > 0.05$] sub-dimension. While there was no significant difference between the mean scores of micro skills [$t(787)=3.791$, $p < 0.05$] and affective characteristics [$t(787)=3.066$, $p < 0.05$], there was a significant difference between the mean scores of the subscales. This difference differs in favor of female students ($\bar{X} = 2.15$) in the micro skills sub-dimension and in favor of female students ($\bar{X} = 2.55$) in the affective characteristics sub-dimension.

Table 4. Single-Factor Variance Analysis of Students' Science Course Critical Thinking Scale Scores According to Grade Level Variable

Dimensions	Variance Source	Sum of Squares	Standard Deviation	Mean Squares	F	p
Macro Abilities	Intergroup	,214	3	,071	,457	,712
	In-group	122,225	783	,156		
	Total	122,439	786			
Micro Abilities	Intergroup	,779	3	,260	1,152	,327

	In-group	176,449	783	,225		
	Total	177,228	786			
	Intergroup	1,629	3	,543		
Affective Properties	In-group	131,175	783	,168	3,241	,022
	Total	132,804	786			

According to Table 4., students' science course critical thinking scale macro skills ($F(3,783)=0.457$, $p>0.05$) and micro skills ($F(3,783)=1.152$, $p>0.05$) subscale average scores It was observed that there was no significant difference according to the grade level variable. However, it was observed that the affective characteristics ($F(3,783)=3.241$, $p<0.05$) dimension score averages differed significantly according to the grade level variable. Games and Howell multiple comparison technique was used to test between which groups this differentiation occurred.

According to the Games and Howell multiple comparison analysis results, the macro skills subscale mean scores of 8th grade students and 7th grade students differ significantly ($S.H=0.406$, $p<0.05$). This difference differs in favor of 8th grade students ($\bar{X}=2.32$) in the macro skills sub-dimension. However, when looking at the average scores, it is seen that the average scores of 8th grade students ($\bar{X}=2.32$) and 7th grade students ($\bar{X}=2.20$) are close to each other.

Table 5. Single-Factor Variance Analysis of Students' Science Course Critical Thinking Scale Scores According to Father's Education Level Variable

Dimensions	Variance Source	Sum of Squares	Standard Deviation	Mean Squares	F	p
Macro Abilities	Intergroup	,176	4	,044	,259	,904
	In-group	132,628	782	,170		
	Total	132,804	786			
Micro Abilities	Intergroup	1,441	4	,360	1,602	,172
	In-group	175,787	782	,225		
	Total	177,228	786			
Affective Properties	Intergroup	1,750	4	,438	2,836	,024
	In-group	120,688	782	,154		
	Total	122,439	786			

According to Table 5., students' science course critical thinking scale macro skills ($F(4,782)=0.259$, $p>0.05$), micro skills ($F(4,782)=0.172$, $p>0.05$) subscale average scores. It was observed that there was no significant difference according to the father's education variable. However, it was observed that students' science course critical thinking scale affective characteristics ($F(4,782)=2.836$, $p<0.05$) differed significantly according to the father's education variable.

Table 6. Single-Factor Variance Analysis of the Science Course Critical Thinking Scale According to the Experiment Frequency Variable

Dimesions	Variance Source	Sum Squares	ofStandard Deviation	Mean Squares	F	p
Macro Abilities	Intergroup	,054	3	,018	,106	,956
	In-group	132,750	783	,170		
	Total	132,804	786			
Micro Abilities	Intergroup	1,414	3	,471	2,100	,099
	In-group	175,813	783	,225		
	Total	177,228	786			
Affective Properties	Intergroup	2,559	3	,853	5,572	,001
	In-group	119,879	783	,153		
	Total	122,439	786			

According to Table 6., students' science course critical thinking scale macro skills ($F(3,783)=0.106$, $p>0.05$), micro skills ($F(3,783)=2.100$, $p>0.05$) subscale average scores It is seen that there is no significant difference according to the test frequency variable. However, it is seen that the students' science course critical thinking scale affective characteristics ($F(3,783)=0.389$, $p>0.05$) subscale mean scores differ significantly according to the experiment frequency variable.

Table 7. Single-Factor Variance Analysis of the Science Course Critical Thinking Scale According to the Science Course Achievement Average Variable

Dimensions	Variance Source	Sum Squares	ofStandard Deviation	Mean Squares	F	p
Macro Abilities	Intergroup	2,490	4	,622	3,735	,005
	In-group	130,314	782	,167		
	Total	132,804	786			
Micro Abilities	Intergroup	4,049	4	1,012	4,571	,001
	In-group	173,179	782	,221		
	Total	177,228	786			
Affective Properties	Intergroup	5,118	4	1,280	8,529	,000
	In-group	117,320	782	,150		
	Total	122,439	786			

According to Table 7., students' science course critical thinking scale macro skills ($F(4,782)=3.735$, $p<0.05$), micro skills ($F(4,782)=4.571$, $p<0.05$) and affective characteristics ($F(4,782)=8.529$, $p<0.05$) subscale mean scores were found to differ significantly according to the science course success level variable.

Table 8. Single-Factor Variance Analysis of the Science Course Critical Thinking Scale According to the Variable of Taking/Not Taking the Elective Science Applications Course

Dimensions	Choice	N	\bar{X}	SS	t	p
Macro Abilities	Take	327	2,2791	,38561	0,922	,357
	Not take	460	2,2516	,42827		
Micro Abilities	Take	327	2,1147	,46979	0,956	,335
	Not take	460	2,0815	,47844		
Affective Properties	Take	327	2,5150	,38942	0,327	,744
	Not take	460	2,5057	,39876		

Looking at Table 8, students' science course critical thinking scale macro skills sub-dimension mean scores do not differ according to the variable of taking science practices course [$t(787) = 0.922$, $p > 0.05$], while micro talents sub-dimension mean scores do not differ according to the science practices course taking course. It is seen that it does not differ according to the variable of taking the science applications course [$t(787) = 0.956$, $p > 0.05$] and the affective characteristics sub-dimension mean scores do not differ according to the variable of taking the science applications course [$t(787) = 0.327$, $p > 0.05$].

Table 9. Arithmetic Mean, Standard Deviation and Standard Error Values for Students' Science Course Critical Thinking Scale Macro Abilities, Micro Abilities and Affective Characteristics Sub-Dimensions

Dimensions	N	\bar{X}	S.S	S.H
Macro Abilities	787	2,26	,41	,014
Micro Abilities	787	2,09	,47	,016
Affective Properties	787	2,50	,39	,014

According to Table 9., the arithmetic mean of macro skills, which is the sub-dimension of the Science Course Critical Thinking Scale, is $\bar{X} = 2.26$, standard deviation $S.S = 0.41$, standard error $S.H = 0.014$; The arithmetic mean of micro-skills is The arithmetic mean of affective characteristics was calculated as $\bar{X} = 2.50$, standard deviation $S.S = 0.39$, standard error $S.H = 0.014$. While it is seen that the highest average value among the dimensions is the value related to the Affective Characteristics dimension, it is seen that the Micro Skills dimension has the least average value.

4. CONCLUSION

In this study, secondary school students' critical thinking power levels in Science class were examined in terms of various variables. It was observed that the participants' critical thinking power levels in Science did not differ according to the variables of age, mother's education level, and gender of the science teacher. On the other hand, the findings and results obtained showed that the frequency of Science experiments, positive attitude towards Science class, grade level, and father's education level play an important role on positive development of students' Science critical thinking levels

Critical Thinking is attached importance by the Ministry of Education starting from the first stage of primary education so that students develop their skills such as asking

the right questions, thinking correctly, making the right decisions, being open and respectful to alternative ideas, not being prejudiced, prediction, inference, observation, classification, deduction and induction. Alternative classes can also be included with similar names like “Debate”. Additionally, classes that examine the discoveries, inventions or lives of famous inventors or explorers who have made positive contributions to social life from past to present can be offered as elective classes.

Teachers have the most important role for improving students' critical thinking levels in Science classes. That's why, providing students with multimedia opportunities during the classes as well as plain lectures, and giving students the opportunity of doing experiments will increase their critical thinking skills

This study which was carried out in Ankara central district schools, was implemented in a limited number of secondary schools. More general results can be achieved by conducting studies on this research topic with different measurement tools, in different provinces, in different settlements and with students at different grade levels.

The findings obtained in this study can be supported by qualitative studies and contribute to the solution of existing problems on this topic.

REFERENCES

- Adams, M. H., Whitlow, J. F., Stover, L. M. & Johnson, K. W. (1999). A longitudinal evaluation of baccalaureate students' critical thinking abilities. *Journal of Nursing Education*. 38(3), 139-141
- Browne, M. N. & Keeley, S. M. (2004). *Asking the right questions: A guide to critical thinking (7. Editiond)*. Upper Saddle River, NJ: Person Prentice Hall.
- Çetinkaya, Z. (2011). Determining the views of Turkish teacher candidates regarding critical thinking. *Ahi Evran University Faculty of Education Journal*, 12 (3), 93-108.
- Epstein, R. L. (1999). *Critical thinking*, Belmont: Wadsworth Publishing Company.
- Gündoğdu, H. (2009) Some misconceptions about critical thinking and teaching critical thinking. *Celal Bayar University Journal of Social Sciences*, 7 (1), 57-74.
- Kaptan, F. (1998). *Teaching Science*. Ankara: Anı Publishing
- Keselman, H. J., & Rogan, J. C. (1978). A comparison of the modified Tukey and Scheffe methods of multiple comparisons for pairwise contrasts. *Journal of the American Statistical Association*, 73(361), 47-52.
- Ministry of National Education (2013). *Primary Education Institutions Science Course Curriculum*. TTKB, Ankara.
- Norris, S. P. (1985). *Synthesis of research on critical thinking*. Educational Leadership.40-45,http://www.ascd.org/ascd/pdf/journals/ed_lead/el_198505_norris.pdf,retrieved on 26.03.2023
- Sifoğlu, N. (2007). *The effect of constructivist learning and problem-based learning approaches on student achievement in primary 8th grade science course*. Master's Thesis, Gazi University Institute of Educational Sciences, Ankara.
- Yıldırım, H. İ. , Şensoy, Ö. and Hançer, A. H. (2003). *Pamukkale University Faculty of Education Journal*, 1(13), 82-101.

An Evaluation of the Restaurant Image of Kayseri, the City of Gastronomy: The Case of TripAdvisor

Özlem Özdemir Süzer¹

Abstract

Introduction: Restaurants are the most important actors in gastronomy tourism, which has become a new global trend. In the competitive restaurant industry, it is important to create a positive brand image in the minds of consumers. A positive restaurant image creates positive feelings about the restaurant in customers and leads to customer satisfaction. Online user reviews of customer satisfaction with a restaurant's dining and service experience have become a source of e-WOM, influencing potential customers' decisions.

Aim: This study aims to evaluate the online reviews and ratings on TripAdvisor of restaurants in Kayseri, which was included in the UNESCO Creative Cities Network National list in the field of gastronomy in 2021, within the scope of restaurant image.

Method: In the study, TripAdvisor reviews about Kayseri restaurants were analysed by content analysis. The codes (variables) of food quality, menu variety, cleanliness, price, interior design and decoration, personnel behaviour, restaurant location, waiting time, and service quality were used to evaluate restaurant image.

Findings: When the results are examined, it is seen that positive comments are mostly concentrated on food quality, staff behaviour and service quality, while negative comments are concentrated on food quality, price, and service quality. It is understood that the average of the scores given by the customers to the restaurant businesses (3,75) is at a very good level. It was determined that foreign customers (3.97) had a higher average score than local customers (3.72).

Originality and value: The study's results will likely provide essential insights into creating a positive image for restaurant businesses operating in Kayseri, which has taken the first step towards becoming a gastronomy city.

Key Words: Gastronomy Tourism, TripAdvisor, Restaurant Image, E-Wom, Content Analysis

Jel Codes: L830, M310, Z330.

1. INTRODUCTION

In marketing, branding is the image and sign of a product or service easily identifiable by consumers. In the context of tourism, a destination brand is an identity that expresses the distinctiveness and attractiveness of a place, and many studies agree that destination image is an important factor when marketing a destination (Sio et al., 2021). Culinary culture is one of the factors affecting the formation of the destination image. Local cuisines reflect culture in tourism and are a source of incentive for touristic activities. Developing brand value and image for local and modern food and beverages brings economic value and reveals the importance of gastronomy tourism that supports regional and national development (Özer, 2021).

The most important actors of gastronomy tourism are restaurant businesses. To have a good position in the target market, restaurant businesses try to create an image by revealing the features of their products and services and the aspects that they are

¹ Asst. Prof. Dr., Kayseri University, Pinarbasi Vocational School, Marketing, Turkey

different from their competitors (Erol et al., 2019). In the competitive restaurant industry, it is very important to create a positive brand image in the minds of consumers. Positive restaurant image plays a vital role in evoking positive feelings about the restaurant in customers, which leads to customer satisfaction (Riduan Bahauddin et al., 2020).

Online user reviews of customer satisfaction with a restaurant's dining and service experience are increasingly becoming a source of electronic word-of-mouth (e-WOM), influencing the decisions of other potential customers. In the tourism and gastronomy industry, most people need to read other people's reviews when choosing a restaurant (Cassar et al., 2020). On online review platforms, customers mention food quality, atmospheric characteristics, location, consumption process, willingness to recommend to others, and expressions of loyalty. Customers who have had a restaurant experience cognitively and emotionally analyse the services they have received and express their opinions and satisfaction levels through online reviews, reducing uncertainty or risk (Kim et al., 2022). Most consumers view online user reviews as a reliable source of information (Norazha et al., 2022). TripAdvisor, which comes to the fore at this point, is an e-WOM application that allows satisfied or dissatisfied restaurant customers to create and share their experiences voluntarily. While TripAdvisor greatly influences a consumer's restaurant selection decision, it also provides restaurant managers with feedback that will enable them to identify the factors that cause dissatisfaction, thanks to the comments made by customers. In this respect, TripAdvisor is a platform for customers and restaurant managers to support customer satisfaction, intention to visit again positively, and restaurant image (Cassar et al., 2020).

This study analysed online comments and evaluations of restaurant businesses on TripAdvisor in Kayseri province, which has a rich culinary culture in gastronomy and was included in the UNESCO Creative Cities Network National list in 2021. The study aims to evaluate these online comments within the scope of restaurant image. The study's results will provide important opinions on creating a positive image for restaurant businesses in Kayseri province, which has taken the first step towards becoming a gastronomy city.

2. LITERATURE REVIEW

2.1. Gastronomy Tourism and Kayseri

Gastronomy is derived from the Greek words *gastros*, meaning stomach, and *gnomos*, meaning knowledge or rule (Arslan, 2022) and is defined in Turkish as "curiosity to eat food well" and "health-friendly, well-organized, pleasant and delicious cuisine, food order and system" (Türk Dil Kurumu, 2023). Gastronomy has recently been considered as an important reason for tourism. Gastronomy tourism is a type of tourism in which tourists seek new experiences related to local cuisine and allow them to experience local culture. Gastronomy experiences obtained through gastronomy tourism are expressed as participating in another culture by trying new recipes and flavors, meeting local people, and visiting places with a solid culinary identity (Kovalenko et al., 2023).

Gastronomy tourism is a way for a destination to enrich itself and contribute to the brand image of the destination by showcasing local culinary cultures and local products. In addition, gastronomy tourism plays a vital role in regional development (Arslan, 2022). Gastronomy tourism enables domestic and foreign tourists to come to the relevant destination, thus increasing tourism expenditures, creating employment opportunities in enterprises such as food and beverage, etc., in this destination, and

promoting the cultural heritage elements specific to the destination to a wide area (Altay, 2022).

To make regional development sustainable, UNESCO brings cities from various regions together to develop the creative, economic, and social aspects of local cultural values within the scope of the UNESCO Creative Cities Network Programme developed in 2004. The Creative Cities Network covers the themes of design, literature, craft and folk arts, music, gastronomy, media arts, and film. Kayseri was included in the UNESCO Creative Cities Network National List in 2021 (UNESCO Türkiye Milli Komisyonu, 2021). The fact that Kayseri is one of the last cities from Türkiye to be included in this list, it would not be wrong to say that the studies carried out to make Kayseri a gastronomy city are still at the beginning stage and that restaurant businesses are significant duties to be known as a gastronomy destination. In fact, Özer (2021) who investigated the feasibility of Kayseri as a gastronomy city and received stakeholder opinions on gastronomy tourism for this purpose, emphasized that Kayseri has a large number of local food and beverages, but the number of restaurants and the quality of presentation offered in these businesses are insufficient. Therefore, Özer (2021) suggests that restaurant businesses should carry out activities to improve their service quality. For this, restaurant businesses need to create a positive brand image.

2.2. Restaurant Image

Restaurant image is defined as the sum of a customer's beliefs, ideas, and impressions about a particular restaurant (Pan & Ha, 2021). Restaurant image is a measurable construct consisting of the sum of consumers' perceptions, emotions, and influences as they relate to the physical and operational components of a restaurant that make up the overall environment (Remar et al., 2022). In the restaurant industry, a consumer's perception of a restaurant image reflects the totality of consumption experiences (food, atmosphere, service) (Ryu et al., 2012).

Restaurant image plays a role in developing behavioural intention in the relevant destination. A positive image of a restaurant increases customers' willingness to become repeat customers; and stay longer in the restaurant, leading to behavioural intentions such as spending more money and recommending the restaurant to others (Patma et al., 2022). It also has an important role in creating customer satisfaction (Sinta Dewi et al., 2022) and customer loyalty (Tuhin et al., 2020).

According to Ryu et al. (2008) restaurant image is the customer's perception of restaurant attributes such as food quality, cleanliness, personnel behaviour, price, restaurant location, menu variety, interior design/decoration, and waiting time, and these attributes are measured and evaluated. Among these restaurant attributes, **food quality** refers to fresh food, presentation, flavour, and the amount/portion of food. Food quality is considered as food safety, the contribution of nutrition to health, and food products that can comply with consumer satisfaction served (Tuhin et al., 2020). The **behaviour of the personnel**, who are the first point of contact in the service experience, is also customers can perceive the performance of the personnel through their appearance, qualifications, and behaviours. Customers can perceive the performance of the staff through their appearance, qualifications, and behaviour. The behaviours of service personnel include their sincerity, empathy, and tendency and predisposition to meet customer needs (Nguyen, 2006). **Waiting time**, another important image variable, is when customers wait after placing an order or requesting a service until the order/service is realised. As the waiting time increases, customers become impatient and negatively evaluate their experience (Norazha et al., 2022). **Cleanliness**, another feature, refers to the hygienic condition of the dining areas, food contact surfaces, employees, toilets, and the environment in general. Customers feel comfortable while

eating in a clean restaurant; otherwise, they avoid eating there by worrying about catching unwanted diseases (Krishnan et al., 2022). The **price** demanded by the restaurant in return for the products and services it offers is an important image variable. Food prices are defined as consumer judgment regarding average prices compared to competitors (Riduan Bahauddin et al., 2020). Customers review the difference between quality and price throughout their experience in restaurant businesses and evaluate the service accordingly (Kim et al., 2022). **Menu variety**, which is important for restaurant businesses to respond to all kinds of demands, means a complete menu ranging from the variety of food and beverages offered by restaurants to the availability of products. In order to meet the needs of customers with different expectations, a wide range of food should be offered (Krishnan et al., 2022). Considering the importance of physical evidence in service businesses, **interior design, and decoration** come to the fore. Interior design and restaurant decoration refer to various elements such as accessories, colors, music, lighting, and seating arrangements (Tuhin et al., 2020). In addition, it also includes the shape and comfort of tables and chairs and the harmony of the equipment used in the restaurant. The decoration and relaxing environment of the restaurant is an important restaurant image factor that encourages customers to spend more time inside (Jantasri & Srivardhana, 2019). The **restaurant's location**, another factor affecting the accessibility of the restaurant and the restaurant image, is also important in many ways. The fact that it is located close to the residential area that customers can easily reach, allows customers to eat within a short walking distance whenever they want, and offers car parking facilities increases the opportunities for customers to visit regularly for meals. Strategic restaurant location can attract more customers and positively impact customer loyalty (Oh et al., 2021). In addition to these variables, **service quality** which includes dimensions such as service according to order, fast service, staff willing to help, and response to customer complaints, is an issue that should be emphasized in service businesses (Tuhin et al., 2020). It is stated that the higher the service quality that customers receive from a restaurant business, the more positive the restaurant's brand image will be placed in the customers' minds (Sinta Dewi et al., 2022). Therefore, service quality can be considered a restaurant image variable.

2.3. Electronic Word-of-Mouth (E-WOM) - Online User Reviews

With the development of technology, word-of-mouth marketing has taken the form of electronic word-of-mouth marketing (e-WOM). It has become an important tool for sharing and obtaining product/service-related information online (Jain et al., 2023). E-WOM is "all informal communications to consumers through internet-based technology about the use or features of a particular product, service or vendor" (Jalilvand & Samiei, 2012). This form of marketing has gained importance with the development of online platforms and is recognized as the most reliable source of information on the Internet, especially in the tourism and service sector (Huete-Alcocer, 2017).

It is challenging for consumers to make a pre-use evaluation for the product offered by service businesses such as tourism and restaurant businesses, and word-of-mouth marketing provides information about a service and helps consumers evaluate service quality. In this way, consumers gain an impression of a restaurant business, and when they perceive the image expressing the impression positively, the intention to use the service offered by that restaurant is formed (Jalilvand & Samiei, 2012). E-WOM is more reliable than traditional media. While consumers previously relied on e-WOM messages from friends and family members, today, they count on online customer reviews to get information about a product or service (Nieto et al., 2014). E-WOM has an important role in tourist or visitor decisions. Consumer reviews, including positive and negative

reviews, influence consumers' behavioural intentions and the image of a destination (Setiawan et al., 2020).

TripAdvisor is considered one of the most important e-WOM platforms in the tourism sector. The comments and opinions created by TripAdvisor users generate trust in the relevant restaurant and the service they offer. Therefore, it is important to manage the content on this platform correctly (Martínez-Navalón et al., 2021).

3. RESEARCH METHODOLOGY

This study analysed online comments and evaluations of restaurant businesses on TripAdvisor in Kayseri province, which has a rich culinary culture in gastronomy and was included in the UNESCO Creative Cities Network National list in 2021. The study aims to evaluate these online comments within the scope of restaurant image.

The data used in this study were obtained from the travel website TripAdvisor. The reason for using the TripAdvisor website in the research is that it is one of the most visited worldwide in travel and tourism. In fact, TripAdvisor ranked second in the list of the most visited travel and tourism websites worldwide, with 207 million visitors as of July 2023 (Statista, 2023). In addition, TripAdvisor is an important data source for researchers as a travel guidance company that serves its visitors in 22 languages in 43 markets with more than 1 billion reviews and evaluations of 8 million businesses worldwide (Tripadvisor, 2022).

The research population consists of comments and evaluations made until 31.07.2023 about Kayseri restaurants registered on TripAdvisor. On this date, 324 restaurants and 7923 user comments were found. While there were no comments and ratings for 87 of these restaurants, it was observed that customers did not rate 175 restaurants in terms of food, service, value, and atmosphere. In the examination made using the complete census method, restaurants with no previous reviews and ratings and restaurants where customers made no ratings in food, service, value, and atmosphere were excluded from the research. Thus, 62 restaurants and 6749 scores and comments of these establishments were considered. Among these restaurants, the first 10 restaurants with the highest number of comments and ratings, 100 comments of each restaurant, the last of which was dated 31.07.2023, were analysed. These comments were recorded on 01.08.2023, and an offline evaluation was made. While the total number of reviews of the restaurant businesses examined was 4194, the number of reviews examined in this study was limited to 1000.

The 1000 user comments were analysed by content analysis. The coding technique, in which a combination of predetermined codes and codes that emerged later, was applied to the user comments considered in the content analysis (Creswell, 2017). In the study, the restaurant image scale used by Ryu et al. (2008) utilized behaviour to evaluate the restaurant image of restaurants operating in Kayseri province. The restaurant image scale used by the authors consists of eight short statements. These statements in the scale include food quality, menu variety, cleanliness, price, interior design and decoration, personnel behaviour, restaurant location and waiting time. The statements in the restaurant image scale were handled as predetermined codes. In addition, based on the comments in the study, the service quality code was included in the study as a restaurant image variable with the code method that emerged later. Each statement in the restaurant image scale used by Ryu et al. (2008) is graded as very good +3 and very bad -3. However, in this study, to get clear results from the evaluations made using the content analysis method, the codes determined were evaluated positively and negatively. In this way, as in the research conducted by Erol et al. (2019), it was ensured to obtain precise results from user comments.

4. FINDINGS

Descriptive information about the top 10 restaurants with the most comments and ratings is given in Table 1.

Table 1: Findings on the General Conditions of Restaurants

Restaurant Businesses	General Score*	Validation Status	Web Site	Menu Info	Rate of Return to Comments
Restaurant A	3.5	Verified	Yes	No	0
Restaurant B	4	Verified	Yes	No	0.02
Restaurant C	4.5	Verified	Yes	No	0.44
Restaurant D	3.5	Verified	Yes	No	0.02
Restaurant E	5	Verified	Yes	Yes	0.97
Restaurant F	3.5	Verified	Yes	No	0
Restaurant G	4	Verified	Yes	No	0
Restaurant H	4	Verified	Yes	No	0.90
Restaurant I	4	Not verified	Yes	No	0
Restaurant J	4	Verified	Yes	Yes	0.01

*1: Terrible, 2: Poor, 3: Average, 4: Very good, 5: Excellent

Looking at Table 1, it is seen that three of the businesses are rated above average (3.5 points), five are rated very good (4 points), one is rated above very good (4.5 points), and one is rated excellent (5 points). Verification status refers to whether a business member manages the profiles of the businesses on the TripAdvisor website. Accordingly, it can be said that nine of ten businesses are operated by a business member (employee, owner, manager, etc.). When business profiles are accessed through the TripAdvisor website, it is seen that there is a website and menu information field. It is seen that there is a link to the restaurant's website in all ten businesses, while only two of the ten businesses have a link to the menu information in their profiles. When looking at the return rates for the total of 1000 customer comments, it is seen that a 97% return rate is the highest.

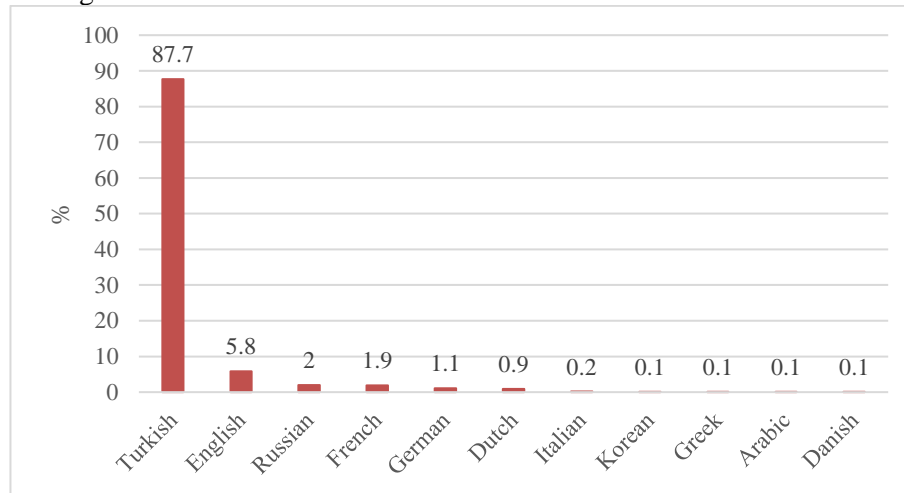


Figure 1. Distribution of Customer Comments to Restaurants According to Languages

The languages in which the 1000 customer comments analysed in the study were made are presented in Figure 1. According to Figure 1, approximately 90% of the participants commented in Turkish, followed by English with 6% and Russian with 2%. The fact that almost all of the comments are in Turkish indicates that the customers who comment on restaurant businesses are mostly local people or domestic tourists, while the fact that 12.3% of the customer comments belong to 10 different languages can be interpreted as customers coming to Kayseri province for tourist visits from countries speaking these languages.

Table 2: Distribution of Customer Comments on Restaurant Image Variables

Variables (Codes)	Positive		Negative		Unspecified	
	n (1000)	%	n (1000)	%	n (1000)	%
Food Quality	708	70.8	208	20.8	84	8.4
Menu Variety	48	4.8	28	2.8	924	92.4
Cleanliness	93	9.3	31	3.1	876	87.6
Price	88	8.8	186	18.6	726	72.6
Interior Design and Decoration	213	21.3	27	2.7	760	76
Personnel Behaviour	322	32.2	124	12.4	554	55.4
Restaurant Location	56	5.6	5	0.5	939	93.9
Waiting Time	45	4.5	65	6.5	890	89
Service Quality	310	31	126	12.6	564	56.4

Table 2 shows the distribution of restaurant image variables and the distribution of customer comments on these variables. Accordingly, 70.8% of the customers stated that the quality of the food was good, while 20.8% stated that the quality of the food was poor. Of the customer comments, 32.2% of the customers were satisfied with the behaviour of the personnel, while 12.4% were not satisfied. Satisfaction with service quality is 31%, while dissatisfaction is 12.6%. Among the variables (codes) discussed in the research, it was determined that they did not comment on restaurant location, menu variety, waiting time, cleanliness, interior design/decoration and price, respectively.

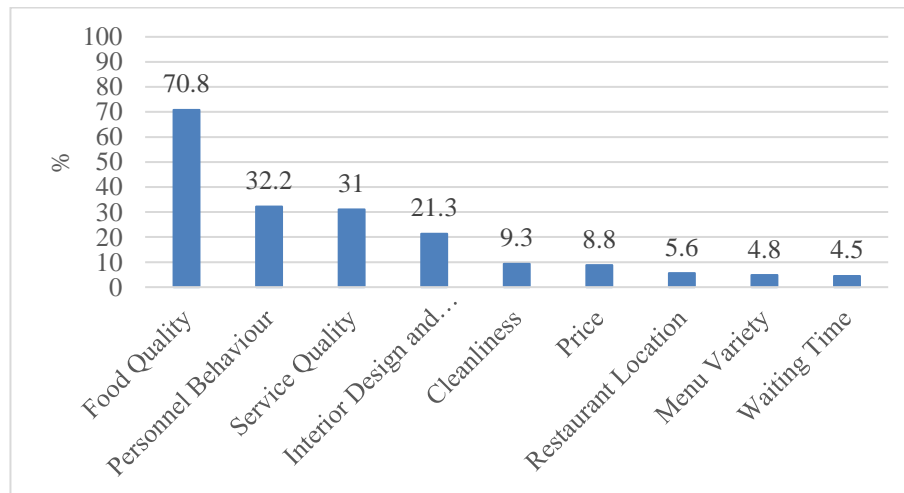


Figure 2. Distribution of Customers' Positive Comments on Restaurant Image Variables

The distribution of positive customer comments regarding restaurant image variables is shown in Figure 2. Accordingly, it is seen that a significant portion of the users have positive comments about food quality, personnel behaviour and service quality. Comments on interior design and decoration, cleanliness, price, restaurant location, menu variety and waiting time follow the positive comments made by customers.

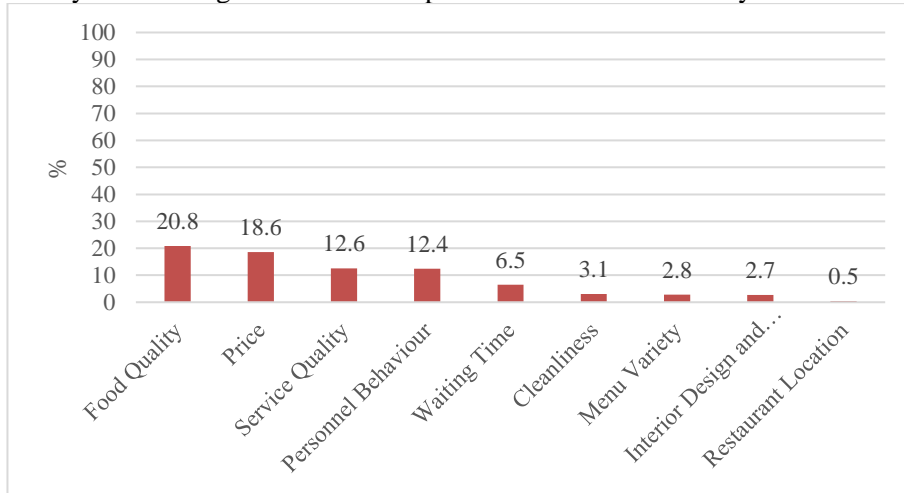


Figure 3. Distribution of Customers' Negative Comments on Restaurant Image Variables

The distribution of negative customer comments analysed in the study is shown in Figure 3. Negative customer comments are at lower rates compared to positive customer comments. As in the customers' positive comments, the highest rate of negative comments belongs to the food quality. The second most common negative comment is about the price. Price is followed by service quality, personnel behaviour, waiting time, cleanliness, menu variety, interior design and decoration and restaurant location.

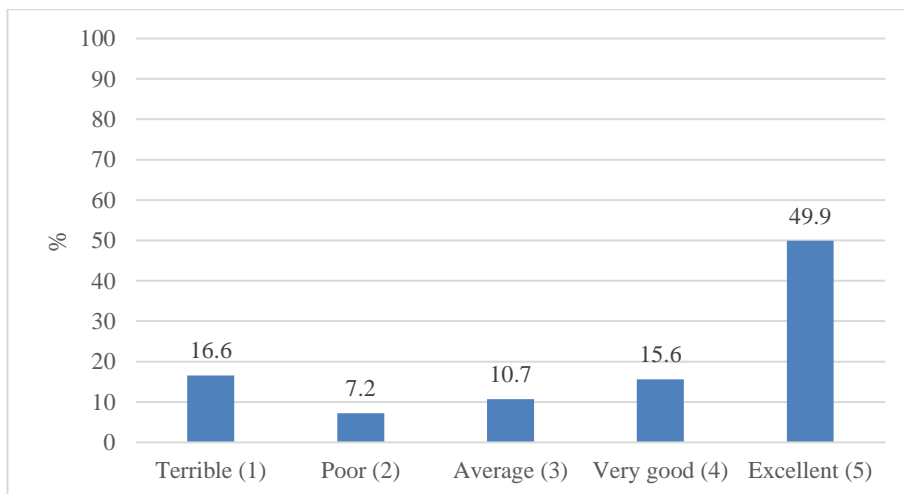


Figure 4. Distribution of the Points Given by Customers to Restaurants

Figure 4 shows the scores given by the customers to the restaurants. Accordingly, approximately 50% of the customers gave the restaurants a score of 5, which means excellent. In Figure 4, it is seen that 16.6% of the customers gave terrible, 15.6% gave very good, 10.7% gave average, and 7.2% gave poor scores. When the average of the ratings was calculated, a score of 3.75 was reached. This value means that customers are satisfied with the restaurants at a very good level in their evaluations.

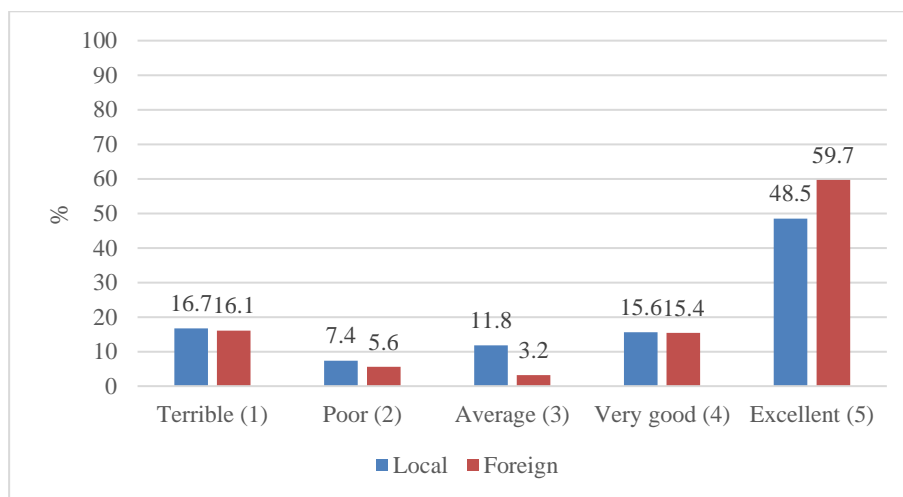


Figure 5. Distribution of Restaurant Scores According to Local and Foreign Customers

The distribution of the scores given to the restaurants by the local and foreign customers whose comments were analysed in the study is shown in Figure 5. Accordingly, it is seen that 48.5% of local customers and 59.7% of foreign customers gave 5 points, which means excellent. It was concluded that 16.7% of local and 16.1% of foreign customers gave 1 point, which means terrible. When the average of the scores given by local customers is calculated, 3.72 points and when the average of the scores given by foreign customers is calculated, 3.97 points are reached. This result shows that foreign customers have a higher average score than local customers. In addition, it can be interpreted that the average scores of both local and foreign customers are above the average, with a value close to very good.

5. CONCLUSION

This study analysed online comments and evaluations of restaurant businesses in Kayseri province, which has a rich culinary culture in gastronomy, on TripAdvisor. As a result of the examination, evaluations were made regarding the restaurant's image.

The overall scores of the restaurant establishments vary between 3.5 and 5 points, and a score above 3.5 indicates that Kayseri province restaurants are above average. According to the research results, the customers who visit the businesses are satisfied with the service they receive. When the profiles on TripAdvisor are analysed, it is seen that an employee or manager manages nine out of ten restaurants. This shows that restaurants consider and control the TripAdvisor platform. In addition, although there are links to business websites that users can access in the profiles of restaurants, it is noticeable that menu information is mostly not shared. According to the research results, the response rate to user comments is above 90% in only two restaurants, while four

have no feedback. This shows that users' comments are not responded to even if an employee or manager verifies the restaurant profiles. Giving feedback to user comments on TripAdvisor is important for customer interaction. Thanking the user who made a positive comment or responding to the user who made a negative comment to explain or compensate for the negative experience he/she has had makes the user feel that his/her comment is considered. At the same time, it shows that the restaurant business is solution-oriented and cares about customer satisfaction (Yeşilyurt et al., 2020). For this reason, it is recommended that restaurants take steps to prevent customer loss by responding to negative online comments (Özdemir et al., 2022).

It was determined that 90% of the analysed comments were made in Turkish. Therefore, it is understood that the restaurants in Kayseri destination are visited mainly by local people or local tourists. Kayseri has an important opportunity to be close to a destination such as Cappadocia, which receives tourists worldwide. This opportunity can be used to attract foreign visitors to Kayseri (Kayseri Büyükşehir Belediyesi, 2020). Kayseri should be marketed as a gastronomy city by including local food and beverages specific to Kayseri cuisine in printed and electronic promotional materials in text and visual form (Eren & Karamustafa, 2022). In addition to hosting foreign visitors in restaurants, they should be encouraged to share their experiences. These shares create a reason for new visitors. For foreign visitors to have positive experiences, it is important that the restaurant personnel are competent in foreign languages (Erdem & Yay, 2017).

When the comments made for restaurant image variables are analysed, it is seen that a significant portion of TripAdvisor users make positive comments about food quality. This situation shows that visitors who receive food and beverage services from restaurants in Kayseri province like the food they have tried. In addition, 32% of the restaurant customers commented positively about personnel behaviour and 31% about service quality. This result shows that the workforce working in restaurant businesses in Kayseri province is appreciated in terms of performance, competence and behavioural aspects. In the tourism sector, especially in restaurant businesses, communication between customers and personnel and the behavioural competence of the personnel play a decisive role in customer satisfaction (Büyükyılmaz & Apak, 2019). For this reason, taking the proper steps in the selection of personnel in service-intensive sectors and supporting the personnel with in-service training will seriously affect the perceptions of customers towards the business (Olçay et al., 2014). In addition, the personnel in the restaurants in Kayseri province are willing to help customers and handle and respond to customer questions and complaints effectively. Considering that service quality is a factor that directly affects customer satisfaction and restaurant image, it can be said that positive comments on this issue have a positive meaning for restaurant businesses and are effective in having a positive image (Biswas & Verma, 2023). In addition, following the three variables mentioned above, positive comments affecting restaurant image are related to interior design and decoration, cleanliness, price, restaurant location, menu variety and waiting time, respectively.

It is seen that the negative comments made by TripAdvisor users are proportionally less than positive comments. However, when the distribution of the negative comments made by the customers regarding the restaurant image variables is examined, it is seen that the negative comments are related to the food quality as in the positive comments. This result shows that there is a large mass of customers who like the food quality as well as a mass of customers who do not like it. Another important result is that the comments are negative about the price. Accordingly, it is revealed that customers cannot reach a satisfactory conclusion in comparing the service they receive and the price they pay. Considering that price is an important factor in restaurant preference, it is recommended that businesses review their price policies. In addition, one of the issues

on which customers make negative comments and which are close to each other is service quality, and the other is personnel behaviour. This result shows that customers think the personnel are professionally inadequate and reluctant to solve problems. For this reason, restaurant employees should be selected among those with professional qualifications, and care should be taken to ensure that the employees are well-equipped, respectful and helpful in all respects. It should be remembered that each negative comment reflects the expectations of the customers and offers an important opportunity for improvement to the business. Following the four variables mentioned above, negative comments affecting the restaurant's image are related to waiting time, cleanliness, menu variety, interior design and decoration, and restaurant location, respectively.

Despite the positive and negative comments, it is also among the results that the users do not express a large part of the variables evaluated to determine the restaurant image in the comments. The incentives of restaurant businesses to encourage their customers to make comments and evaluations are important in defining their views on these issues. The importance of restaurant location, menu variety, waiting time, cleanliness, interior design and decoration variables should be remembered. The fact that customers do not comment on this issue does not mean that they evaluate it positively. Restaurant managers should reflect these variables in the process to create a positive restaurant image and present them to their customers.

The average score value of the restaurants within the study was calculated as 3.75. Considering that TripAdvisor reviews are evaluated on a general scale of 5 points, it is possible to say that the average score of the restaurants in Kayseri province corresponds to a very good value above the average. When the scores given by local and foreign customers were evaluated separately, it was found that foreign customers gave higher average scores than local customers. Accordingly, it can be stated that foreign customers like the restaurants in Kayseri more. This may be due to the familiarity of local customers with Anatolian food culture and their higher expectations (Erol et al., 2019). For this reason, considering that local customers have a high rate of commenting, the reasons that satisfy and dissatisfy local customers should be emphasised, and corrective measures should be taken.

The data in this study was obtained from the last 100 reviews of the 10 most reviewed restaurants in Kayseri. Therefore, this is a limitation for generalising to all Kayseri restaurants. In addition, this study is general research to evaluate the image of restaurants in Kayseri, which is included in the list as a gastronomy city. In future research, restaurants in Kayseri and in Hatay and Gaziantep, which have been on the list for many years, can be compared in terms of image, and the positive and negative differences between them can be revealed. At the same time, researchers can include not only TripAdvisor but also Google Reviews in the research.

REFERENCES

- Altay, U. İ. (2022). *Turizm ve rekreasyon: Akademik çalışmalar* (Y. Seçim, S. Aras, & A. Kaya (eds.)). Konya Büyükşehir Belediyesi Kültür Yayınları.
- Arslan, M. (2022). Türkiye’de belediyelerde örnek gastronomi ve el sanatları turizmi faaliyetleri. *Türk Kamu Yönetimi Dergisi*, 3(1), 14–31.
- Biswas, A., & Verma, R. K. (2023). Augmenting service quality dimensions: mediation of image in the Indian restaurant industry. *Journal of Foodservice Business Research*, 26(3), 496–527. <https://doi.org/10.1080/15378020.2022.2027198>

- Büyükyılmaz, O., & Apak, Ö. C. (2019). Restoran müşterilerinin personel iletişim düzeyi algıları ve memnuniyetleri arasındaki ilişki. *Türk Turizm Araştırmaları Dergisi*, 3(1), 66–78. <https://doi.org/10.26677/tutad.2019.48>
- Cassar, M. L., Caruana, A., & Konietzky, J. (2020). Wine and satisfaction with fine dining restaurants: an analysis of tourist experiences from user generated content on TripAdvisor. *Journal of Wine Research*, 31(2), 85–100. <https://doi.org/10.1080/09571264.2020.1764919>
- Creswell, J. W. (2017). *Araştırma Deseni* (S. B. Demir (ed.); 3rd ed.). Eğiten Kitap.
- Erdem, Ö., & Yay, Ö. (2017). Tripadvisor'daki müşteri şikâyetlerinin değerlendirilmesi: Antalya örneği. *Journal of Tourism and Gastronomy Studies*, 5(4), 227–249. <https://doi.org/10.21325/jotags.2017.147>
- Eren, D., & Karamustafa, A. T. (2022). Kayseri ilinin gastronomi destinasyonu olarak pazarlanması. *Journal of Tourism and Gastronomy Studies*, 10(1), 716–731. <https://doi.org/10.21325/jotags.2022.1012>
- Erol, G., Örgün, E., & Keskin, E. (2019). Sosyal medyada restoran imajı: Kapadokya örneği. *Journal of Tourism and Gastronomy Studies*, 7(4), 3290–3302. <https://doi.org/10.21325/jotags.2019.529>
- Huete-Alcocer, N. (2017). A literature review of word of mouth and electronic word of mouth: Implications for consumer behavior. *Frontiers in Physiology*, 8, 1–4. <https://doi.org/10.3389/fpsyg.2017.01256>
- Jain, M., Dixit, S., & Shukla, A. (2023). Role of e-service quality, brand commitment and e-WOM trust on e-WOM intentions of millennials. *International Review of Retail, Distribution and Consumer Research*, 33(1), 23–43. <https://doi.org/10.1080/09593969.2022.2070860>
- Jalilvand, M. R., & Samiei, N. (2012). The impact of electronic word of mouth on a tourism destination choice: Testing the theory of planned behavior (TPB). *Internet Research*, 22(5), 591–612. <https://doi.org/10.1108/10662241211271563>
- Jantasri, V., & Srivardhana, T. (2019). The impacts of innovativeness and nostalgia among restaurant customers in Bangkok Metropolitan region. *Asian Administration and Management Review*, 2(1), 97–109.
- Kayseri Büyükşehir Belediyesi. (2020). *Kayseri Gastronomi Turizmi Çalıştayı*.
- Kim, J., Lee, M., Kwon, W., Park, H., & Back, K.-J. (2022). Why am I satisfied? See my reviews – Price and location matter in the restaurant industry. *International Journal of Hospitality Management*, 101, 1–9. <https://doi.org/10.1016/j.ijhm.2021.103111>
- Kovalenko, A., Dias, Á., Pereira, L., & Simões, A. (2023). Gastronomic experience and consumer behavior: Analyzing the influence on destination image. *Foods*, 12(315), 1–24. <https://doi.org/10.3390/foods12020315>
- Krishnan, A. R., Hamid, R., Siew Lin, R. Y., Tanakinjal, G. H., & Rathakrishnan, B. (2022). Making informed decisions to improve restaurant image using a hybrid MADM approach: A case of fast-food restaurants in an Island of East Malaysia. *Information (Switzerland)*, 13(5), 1–28. <https://doi.org/10.3390/info13050219>
- Martínez-Navalón, J. G., Gelashvili, V., & Gómez-Ortega, A. (2021). Evaluation of user satisfaction and trust of review platforms: analysis of the impact of privacy and e-WOM in the case of TripAdvisor. *Frontiers in Psychology*, 12, 1–12.

<https://doi.org/10.3389/fpsyg.2021.750527>

Nguyen, N. (2006). The collective impact of service workers and servicescape on the corporate image formation. *International Journal of Hospitality Management*, 25(2), 227–244. <https://doi.org/10.1016/j.ijhm.2005.06.001>

Nieto, J., Hernández-Maestro, R. M., & Muñoz-Gallego, P. A. (2014). Marketing decisions, customer reviews, and business performance: The use of the Toprural website by Spanish rural lodging establishments. *Tourism Management*, 45, 115–123. <https://doi.org/10.1016/j.tourman.2014.03.009>

Norazha, N. S., Faisol, N. F. M., Baki, R. N. M., & Mohi, Z. (2022). Influence of quick-service restaurant 's service quality towards customer online review. *Journal of Tourism, Hospitality & Culinary Arts (JTHCA)*, 14(2), 97–129.

Oh, Z. J., Utama, A. A. G. S., Ong, W. H., Kee, D. M. H., Mane, G., Ganatra, V., Oh, J., Ong, L. Z., & Munisvarar, P. A. A. (2021). Factors influencing the customer dining experience and retention at Marrybrown in Malaysia. *International Journal of Applied Business and International Management*, 6(3), 86–101. <https://doi.org/10.32535/ijabim.v6i3.1332>

Olçay, A., Giritlioğlu, İ., & Çıkmaz, E. (2014). Otel işletmelerinde çalışan personelin iletişim yeterlilik düzeyi: Communication Gaziantep bölgesinde bir araştırma. *İşletme Araştırmaları Dergisi*, 6(1), 385–403.

Özdemir, F., Akatay, A., & Özdemir, S. (2022). Örgütsel değişim ve yenilik sürecinde e-ticaret ve dijital pazarlama alanında müşteri davranışları: Sosyal medyada Yemeksepeti örneği. *Akademik Sosyal Araştırmalar Dergisi*, 10(135), 294–307. <https://doi.org/10.29228/asos.64922>

Özer, O. (2021). Kayseri'nin 'UNESCO gastronomi kenti' olabilirliğine ve gastronomi turizmne dair paydaş görüşleri. In A. Kaya, M. Yılmaz, & S. Yetimoğlu (Eds.), *Gastronomide Alternatif Yaklaşımlar* (pp. 189–206). Necmettin Erbakan Üniversitesi Yayınları.

Pan, H., & Ha, H.-Y. (2021). Service quality and satisfaction in the context of varying levels of restaurant image and customer orientation during the covid-19 pandemic. *Sustainability*, 13(9694), 1–16. <https://doi.org/10.3390/su13179694>

Patma, T. S., Rosalin, S., Kusumawati, A., & Rahayu, K. S. (2022). Restaurant image, information quality and novelty seeking as behavioral antecedents of intention to purchase food services using online transportation. *Proceedings of the 4th International Conference on Innovation in Engineering and Vocational Education (ICIEVE 2021)*, 651, 289–294. <https://doi.org/10.2991/assehr.k.220305.058>

Remar, D., Sukhu, A., & Bilgihan, A. (2022). The effects of environmental consciousness and menu information on the perception of restaurant image. *British Food Journal*, 124(11), 3563–3581. <https://doi.org/10.1108/BFJ-06-2021-0666>

Riduan Bahaiddin, A., Sing Wei, L., & Mantihal, S. (2020). Food sensory factors and restaurant images on customer satisfaction: A comparison of franchise and local fast-food restaurant. *Asian Journal of Entrepreneurship*, 1(4), 62–71. <http://myjms.mohe.gov.my/index.php/aje>

Ryu, K., Han, H., & Kim, T.-H. (2008). The relationships among overall quick-casual restaurant image, perceived value, customer satisfaction, and behavioral intentions. *International Journal of Hospitality Management*, 27(3), 459–469.

<https://doi.org/10.1016/j.ijhm.2007.11.001>

Ryu, K., Lee, H.-R., & Kim, W. G. (2012). The influence of the quality of the physical environment, food, and service on restaurant image, customer perceived value, customer satisfaction, and behavioral intentions. *International Journal of Contemporary Hospitality Management*, 24(2), 200–223. <https://doi.org/10.1108/09596111211206141>

Setiawan, P. Y., Purbadharmaja, I. B. P., Widanta, A. A. B. P., & Hayashi, T. (2020). How electronic word of mouth (e-WOM) triggers intention to visit through destination image, trust and satisfaction: the perception of a potential tourist in Japan and Indonesia. *Online Information Review*, 45(5), 861–878. <https://doi.org/10.1108/OIR-03-2019-0111>

Sinta Dewi, N. M. N., Suryaputra, R., & Amelia. (2022). Analysis of the effect of atmospherics, food quality, service quality and other customer on brand preference through brand image, customer satisfaction, and brand trust of Sushi Tei Restaurant consumers at Galaxy Mall Surabaya. *Journal of Economics, Finance And Management Studies*, 5(3), 673–686. <https://doi.org/10.47191/jefms/v5-i3-20>

Sio, K. P., Fraser, B., & Fredline, L. (2021). A Contemporary systematic literature review of gastronomy tourism and destination image. *Tourism Recreation Research*, 1–17. <https://doi.org/10.1080/02508281.2021.1997491>

Statista. (2023). *Most visited travel and tourism websites worldwide as of July 2023*. <https://www.statista.com/statistics/1215457/most-visited-travel-and-tourism-websites-worldwide/>

Tripadvisor. (2022). *Tripadvisor is the world's largest travel site*. <https://ir.tripadvisor.com/>

Tuhin, M. R., Ali, M. B., Nuruzzaman, M., Alim, M. A., Sakib, M. S., & Sarker, M. O. F. (2020). Can customer satisfaction be gained through brand image and perceived value? *Jahangirnagar University Journal of Marketing*, 8(June), 95–109.

Türk Dil Kurumu. (2023). *Gastronomi*. <https://sozluk.gov.tr/>

UNESCO Türkiye Millî Komisyonu. (2021). *UNESCO Yaratıcı Şehirler Ağı*. <https://www.unesco.org.tr/Pages/88/129/UNESCO-Yaratıcı-Şehirler-Ağı>

Yeşilyurt, H., Çalışkan, C., & Okat, Ç. (2020). Potansiyel turizm destinasyonlarında bulunan otellerle ilgili e-şikâyetlerin coğrafi bakışla değerlendirilmesi: Adıyaman örneği. *Türk Turizm Araştırmaları Dergisi*, 4(3), 2003–2017. <https://doi.org/10.26677/tr1010.2020.463>

Intelligent agents used in the digitization of pre-employment processes for people with disabilities

Diana Avram ¹

Abstract

Introduction: The present work presents a job crawler based on intelligent agents, a multi-agent system, an innovative way of using web technologies with their application in the digitization of pre-employment processes for people with disabilities. The research is carried out within the project "CAREJOBS - Resource platform for people with disabilities" SMIS 156142.

Within the project, we developed a web application based on intelligent agents that act on the basis of scientific workflow & rule engines, being configured and optimized to extract data of interest in the field of recruiting people with disabilities.

Aim: The goal is to present an effective way to solve a real problem on the job market, that of searching and finding a job for people with disabilities.

Method: The software application is a prototype of a multi-agent system developed to validate the feasibility of the CAREJOBS concept. Qualitative and quantitative methods were used for research and simulation, testing, and formal methods for the software development process. The neural network method is used to represent the results.

Findings: These methods highlighted some omissions and the team concluded that certain tools would have facilitated the analysis process and software development and improved the product based on the results obtained.

Originality and value: The obtained results validate the system in the simulated environment.

Key Words: Employment, Crawling, Intelligent agents, Digitization

Jel Codes: C88, M55

1. INTRODUCTION

The following work presents a job crawler based on intelligent agents, a multi-agent system, and an innovative way of using web technologies with applications in the digitization of pre-employment processes for people with disabilities.

The goal is to present an effective way to solve a real problem on the job market, that of looking for and finding a job for people with disabilities, participating in this way in the European movement towards a digital economy inclusive for people with disabilities. (ILO, 2021).

Within the CAREJOBS project, we developed a web application based on intelligent agents that act on the basis of scientific workflow & rule engines, being configured and optimized to extract data of interest in the field of recruiting people with disabilities. The application was developed in the JAVA language, the proposed multi-agent system was implemented using JADE, the Rules Engine is written using YAML, and the obtained data is represented as a neural network with Node.js.

The objective of this approach is to demonstrate the efficiency of using intelligent agents and a rule engine in the digitization of pre-employment processes for people with

¹ Ph.D. Researcher, Grafen Software, Romania

disabilities, by validating an integrated system of technological and support elements in a simulated environment.

2. LITERATURE REVIEW

In this section, there is a review of the specialized literature and previous studies in the field, as well as a brief presentation of intelligent agents and multi-agent systems.

2.1. Agent

The FIPA standard defines an agent as a computing process that implements the autonomy and communication functionality of an application. The agent has a name, can have its own attributes, has a location and an agent locator that contains the list of transport descriptions for the agent, and can send and receive messages.

According to (Ferber, 1999) and (Michel, Ferber and Drogoul, 2009) an Agent is considered to be a hardware or software entity (a process), located in a virtual or real environment, which has the following properties:

- It is able to act in the environment;
- It is led/directed by a set of tendencies (individual goals, goals, directions, satisfaction/survival);
- It has its own resources;
- May communicate directly or indirectly with other agents;
- May be capable of self-reproduction;

Autonomous behavior is the consequence of perceptions, representations and interactions with the world and with other agents. The agent can be thought of as a superset of artificial intelligence. What allows it to be considered a separate category of programs is the fact that the agent uses one or more properties that show a certain type of intelligence (or at least show properties that appear as intelligences).

According to (Protageros, 2008) and (Hong Lin, 2007), an agent is usually composed of a number of elements (Figure 1) which include: one or more sensors used to perceive the environment and which are part of the function of *Perception*; one or more effectors that manipulate the environment and that compose the *Action* function; a control system that provides a mapping from sensors to effectors and intelligent (or rational) behavior. Its control system is usually an application, which can be written in most available languages, that directs the behavior of the agent. The control system fulfills the *decision/deliberation* function of the agent, which includes both the decision-making processes and, possibly, deduction/inference, as well as the "knowledge baggage".

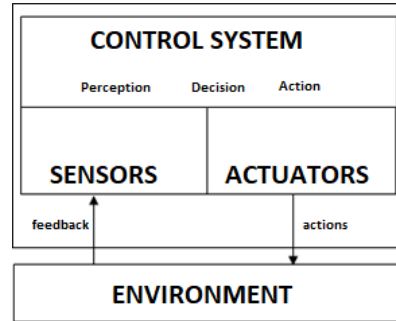


Figure 1: Basic Anatomy of an Agent

Intelligent agents are frequently used by AI applications to perform actions such as communicating, negotiating, moving, reasoning, searching, matching, learning, predicting, repairing, sensing, delivering, cloning, etc. (Avram, V.&Rizescu, D., 2015).

2.2. Multi-agent systems (MAS)

Multi-agent system (Ferber, 1999) is a system composed of several interacting intelligent agents. Multi-agent systems can be used to solve problems that are difficult or impossible to solve by a single agent or monolithic system. Multi-agent systems consist of agents and their environment. Typically, multi-agent systems research is concerned with software agents.

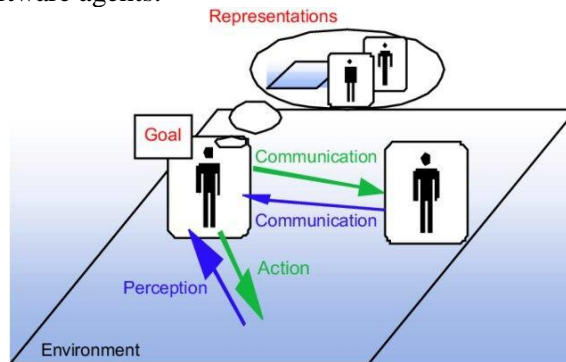


Figure 2: Multi-agent system (Ferber, 1999 as cited by Bousquet and Le Page, 2004)

3. RESEARCH

The objective of this approach is to demonstrate the efficiency of the use of intelligent agents and a rule engine in the digitization of pre-employment processes for people with disabilities, by validating an integrated system of technological and support elements in a simulated environment.

3.1. Methodology

The research involved the collection of relevant data from the sensitive field of employment of persons with disabilities and collaboration with persons with disabilities, with profile NGOs and protected enterprises (ILO, 2021). A simulated environment was used to validate the system. Analyze and interpret collected data found using analytical methods to extract meaningful data and demonstrate system viability. Graphical representation is achieved by using neural networks.

3.2. Experimental Work

The experimental work consists in a Crawling Framework (CF) CAREJOBS that we present here. CF is a suite of tools based on intelligent agents, dedicated for career search. It acts as a foundation for further adding modules and functionality in the career offering activity domain.

Conceptually the CF follows the general characteristics and approaches of a multi-agent system with Webcrawler Softbots working on the Internet, exploring web pages to collect info on job offering, following links and pattern matching. The approach design used is a goal-based agent which downloads and indexes content from all over the Internet and automates the process of finding job listings across numerous websites and job boards.

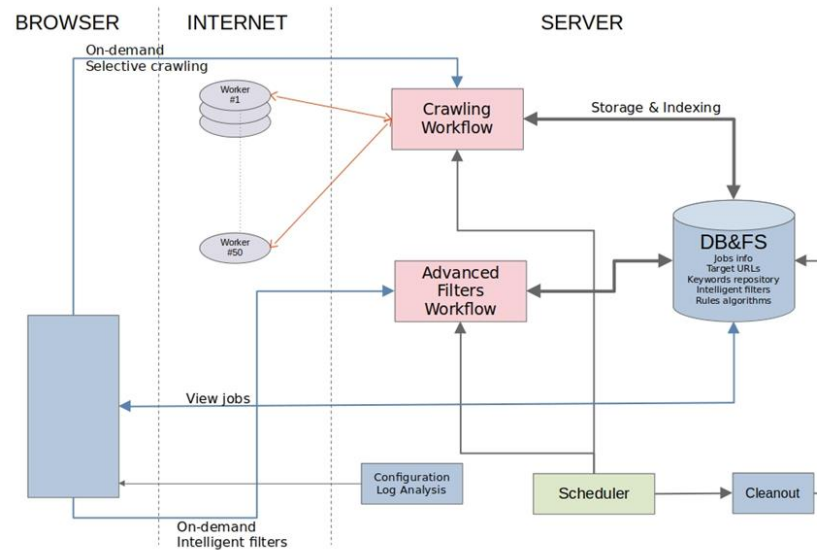


Figure 3: CF CAREJOBS architecture

The main steps for job searching are:

1. Defining the Job Criteria: The first step is to specify the job criteria, including the type of job, location, industry, skills required, and any other relevant details such as employment for people with disabilities, to perform effective searches.
2. Scanning Job Boards: The softbot can be programmed to visit popular industry-related job boards and company career pages to look for job postings. For the purpose of proving the concept our CF uses Accenture and Indeed.

3. Extracting Job Listings: The softbot extracts the relevant information from job listings, such as job title, company, location, job description, and application instructions. It also captures the URL for the full job posting.
4. Filtering and Sorting: The softbot can filter out job listings that do not match the defined criteria. It can sort and organize the results based on our preferences, such as by relevance, date, or location and for people with disabilities. The end result of the framework is to provide to the CV Expert user, intelligent filters (we call them advanced filters) based on complex criteria.



Figure 4: CF CAREJOBS - job searching

Our webcrawler softbots can exhibit intelligent agent-like behavior:

1. Task Automation: webcrawler softbots automate repetitive tasks, such as data collection, information retrieval, and monitoring. They can mimic human-like behavior in the sense that they follow pre-defined rules and instructions to complete tasks autonomously. Our agents are scheduled overnight with a precise agenda given to them through a Rules Engine.
2. Adaptive Behavior: Our intelligent agents adapt to their environment and tasks. They are programmed to adapt to changes in the structure of websites they crawl. They can adjust their scraping patterns and rules.

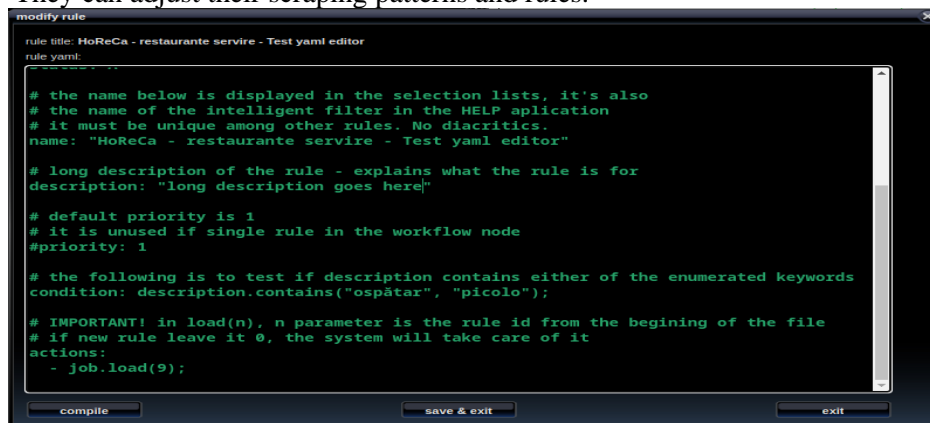


Figure 5: CF CAREJOBS - rules editor

3. Decision-Making: Our webcrawler softbots are designed to decide which links to follow or which data to extract based on specified criteria.
4. Information Processing: Our webcrawler softbots are capable of basic information processing, such as data aggregation and organization. They can extract data from various sources and structure it in a way that's useful to the user.

- Interaction with Users: Our intelligent agents perform a one-way interaction with users to understand their preferences and requirements through filtering keywords in the CV Expert module. Public API: the results of agents processing are exposed through a public REST API which gives access to job offering data through intelligent filtering.

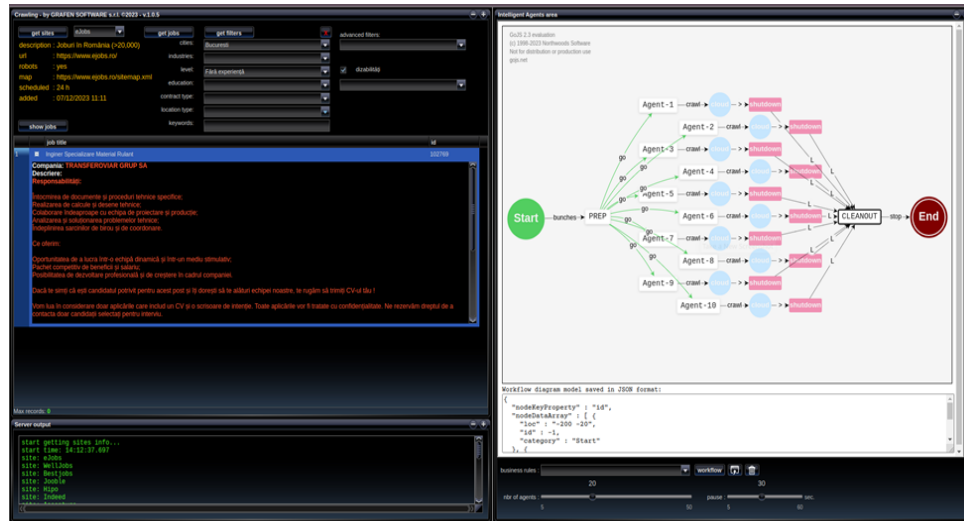


Figure 6 - CF CAREJOBS interface

4. CONCLUSION

This paper presents a job crawler based on intelligent agents, which consists of a Crawling Framework developed within the CAREJOBS research project. At the experimental level, the obtained results validate the system in the simulated environment and encourage us for further developments.

It is important to note that our agents, webcrawler softbots are usually rule-based and deterministic, meaning that their "intelligence" is limited to the rules and algorithms provided by the programmers. So there is no learning, they have limited adaptive behavior and limited decision-making due to the time and resource constraints of the project.

The experimental results and their analysis indicate that our design and development approach has good results, but it could be even better if we add important facilities in terms of precision and recall.

Therefore, the work we propose next is using the intelligent agent technology through reinforcement learning which will retrieve high quality information with higher precision and recall. Further, the research can be extended by applying genetic algorithms in the crawler architecture to perform larger searches and improve the accuracy of the retrieved information.

REFERENCES

ILO, (2021). A joint publication by Fundación ONCE and the ILO Global Business and Disability Network, developed within the framework of Disability Hub Europe, a project led by Fundación ONCE and co-funded by the European Social Fund, "An inclusive digital economy for people with disabilities".

https://www.ilo.org/global/topics/disability-and-work/WCMS_769852/lang--en/index.htm

Avram, V.&Rizescu, D. (2015). “Technologies for e-Business”, Editura Universitară, ISBN:978-606-28-0237-0, pp. 32.

Carvalho, C. Deusdado, S. Deusdado, S. (2013). “Crawling PubMed with web agents for literature search and alerting services”, *Advances in Distributed Computing and Artificial Intelligence Journal*, Special Issue #4, <http://adcaj.usal.es>, pp. 19-22.

Farmer, J.D.&Foley, D. (2009). “The Economy Needs Agent-Based Modelling”, *Nature*, Vol 460, 6 August 2009.

Ferber, J. (1999). “Multi-Agent Systems: an Introduction to Distributed Artificial Intelligence”, Addison Wesley, Boston.

FIPA. (2022). “Document Set Standard FIPA Specifications, IEEE Foundation for Intelligent Physical Agents (FIPA)”, IEEE Computer Society, <http://www.fipa.org/repository/standardspecs.html>.

Lin, H. (2007). “Architectural Design of Multi-Agent Systems: Technologies and Techniques”, IGI Global.

Mesbahi, M.&Egerstedt, M. (2010). “Graph Theoretic Methods in Multiagent Networks”, Princeton University Press, Princeton and Oxford, e-Book ISBN: 9781400835355.

Michel, F., Ferber, J.&Drogoul, A. (2009). “Multi-Agent Systems and Simulation: A Survey from the Agent Community’s Perspective”, in Adelinde Uhrmacher, Danny Weyns, eds. (2009). *Multi-Agent Systems - Simulation and Applications*, CRC Press, pp. 16-50.

Protageros, N. ed. (2008). “Agent and Web Services Technologies in Virtual Enterprises”, IGI Global.

Rizescu (Avram), D.&Avram, V. (2015). “MODELING THE RELATIONSHIPS NETWORKS INSIDE GROUPS AS GRAPHS”. *The 14th International Conference on Informatics in Economy, IE2015*, pp 601-606.

RUSSELL & NORVIG. (2010). “Artificial Intelligence: A Modern Approach”, 3rd ed., Pearson Education, Inc., pp. 34-61.

Saran Raj S, Aarif Ahamed S, R. Rajmohan and K.S.Guruprakash, (2021). “Design and Implementation of Distributed Web Crawler for Drug Website Search using Hefty based Enhanced Bandwidth Algorithms”. *Turkish Journal of Computer and Mathematics Education*, Vol.12 No.9 (2021), 75-81.

Zofia Wrona, Wojciech Buchwald, Maria Ganzha, Marcin Paprzycki, Florin Leon, Noman Noor, Constantin-Valentin Pal (2023), “Overview of Software Agent Platforms Available in 2023”, <https://www.mdpi.com/2078-2489/14/6/348>

Exploring the Factors Affecting the Purchasing Behaviour of Consumers in Bioplastic Products: A Sustainability Approach

Sabriye Akin¹, Ketı Ventura²

Abstract

Introduction: Concerns about the environment have grown steadily over the last 30 years. These concerns have started to be used as a competitive advantage both in the business and political world.

Aim: Within this context, the aim of this study is (i) to reveal the perception of green products and especially bioplastic products of consumers (ii) to determine the relationship between this perception and purchasing behavior and (iii) exploring the factors affecting the purchasing behavior of consumers of bioplastic products.

Method: Two focus group studies were conducted, based on the Turkish Household Social and Economic Status (SES) 2012 income groups created by the Turkish Research Association (TÜAD). The focus groups included people from different professions and income groups. The aim of the focus group studies was to obtain information about consumers' general perspective on green and bioplastic products. The collected data were analyzed by descriptive analysis method. As a result, since bioplastics are new in the market and have been used in a limited number of products, it creates limited customer experience.

Findings: Environmental awareness and green awareness positively affect consumers' purchase intentions or behaviors and price is slightly effective on purchase decisions.

Originality and Value: Although there have been many field studies on green or recyclable products in general, there are only a limited number of studies specifically focuses on consumers' knowledge and preferences about bio plastics and the products made of biodegradable wastes. It is thought that this study will make a difference in this respect and may help marketing studies with the increasing use of bioplastics in the future.

Key Words: Green Marketing, Sustainability, Green Product, Bioplastic Products.

Jel Codes: M31, Q20, P28

1. INTRODUCTION

The world has been struggling to cope with an uncontrollably growing population and increasing consumption in recent years. Companies are increasing their production every day to meet this huge demand and thus consuming all the resources. The fact that the resources are not unlimited in the nature leads to the depletion of resources and creates irreversible damage to the environment.

¹ Master Student, Ege University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Marketing and Brand Management, Turkey

² Professor, Ege University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Marketing, Turkey

Since the 1950s, the rate of consumption of natural resources and the problems caused by global warming have led to widespread concern on consumers about resource depletion. The whole world is now aware of these damages and is contributing to improving the situation with a number of practices to protect natural resources.

The world's leading companies have started to change and improve their production and marketing strategies in this direction. Following the 1970s, with the increase in the production of nature-friendly products, the concept of Green Marketing entered our lives. Practices such as sanctions by the European Union have started to be implemented.

Green Deal, the border taxes on carbon emissions and green production that governments and institutions have introduced in recent years, which will increase in the coming years, have forced companies to take action on environmental awareness. At this point, companies become a part of the sustainable cycle and strengthen their brand image by trying to fulfill the green goals while having the mission of educating the consumer on this issue through green marketing.

The aim of this study is to evaluate consumers' level of awareness of green products and especially bioplastic products and their purchasing tendencies accordingly. In the first part of the study, green marketing and green products were emphasized and in the second part, green product purchasing tendencies and the factors affecting them were discussed. The final part of the study includes findings, conclusions and recommendations regarding an exploratory study on the factors affecting consumer behavior in green products.

2. LITERATURE REVIEW

2.1. Green Marketing Concept and Its' Development

While the need of consumption has reached uncontrollable levels in recent years, the environmental sensitivity of consumers and companies is slowly increasing due to the limited natural resources and the increasing waste. As consumers' awareness of the environment and natural resources increases, manufacturers are striving to reduce the damage caused in each production process in order to meet these demands. The concept of green marketing was first introduced in 1975 in a study on 'ecological marketing' by the American Marketing Association (AMA) and was defined as "any marketing activity of a firm that aims to create a positive impact or reduce the negative impact of a product on the environment and consequently capitalize on consumers' concerns about environmental issues" (Majid, Amin and Kansana, 2016).

Green marketing aims to meet the needs of the consumer while meeting these needs sustainably and without giving any harm to the environment. In addition, it supports this with a number of environmentally friendly activities that can attract consumers' attention (Onurlubaş and Derya, 2016).

Green marketing is a form of marketing that aims to reduce the negative impact of existing production processes and products on nature and environment and strives to infuse this concept to the consumers (Utkutuğ, 2011). The development of Green Marketing has occurred in three separate phases (Utkutuğ, 2011): Ecological Marketing, Environmental Green Marketing and Sustainable Marketing.

The first of these stages, Ecological Marketing; covers the period between 1960 and 1970 and it is defined as marketing activities that will provide solutions to all environmental problems. In these years, when environmental concerns were just emerging, the focus was mostly on air pollution, fossil fuel waste or solutions to agricultural residues such as insecticides, herbicides and pesticides. Regulation and improvements covered limited sectors such as agriculture and automotive industry. (Korucuk, 2019).

The second stage is environmental marketing. Following the 1980s, with the discovery of the ozone hole and the Chernobyl disaster, people began to realize that the earth's resources are limited and these resources should be used effectively. In this period, the environmental approach gradually gained importance not only in production, but also in post-production and marketing activities. Service sectors such as tourism and banking have included in the environmental marketing approach already operating in the agricultural and automotive industry (Kocaşahin, 2009).

Sustainability, as the last and most important stage of green marketing, covers the period from the 2000s to the present day. The use and importance of natural, renewable, recyclable resources have emerged within the framework of sustainability. In these years, it is recognized that uncontrolled and unsustainable consumption is the main cause of current environmental problems (Peattie, 2001).

Sustainability is an important concept for the next generations to benefit efficiently from the environment and natural resources we live in. Environmental factors are not the only field of sustainability. Sustainability also encompasses economic and social dimensions. Within the framework of social sustainability, issues such as the protection of human rights, equality and justice are addressed, while in economic sustainability, all these environmental and social benefits are provided while at the same time economic growth is realized and productive sectors are supported. (Küçükyörük and Kurtuldu, 2022).

2.2. The Concept of Green Products

Green products do not pollute or harm the environment we live in. They are products; (Korucuk, 2019);

- that do not cause any harm to the health of humans and other living things.
- that they don't have any harmful thing to nature in all stages from production to the end consumer,
- that use limited resources such as water and energy efficiently,
- that Avoid unnecessary consumption in labeling, packaging and waste during the production phase and throughout the product life cycle after reaching the consumer.

Many different definitions are made by several authors of green products over the years. According to that; a green product is a product that is more competitive in terms of manufacturing, use, environmental performance and waste compared to normal products (Peattie, 2001). Sustainable products are that have already been improved or aim to be improved in terms of social and environmental quality (Seuring & Müller, 2008). In general, green products are ecological or environmentally friendly (Chen & Chai, 2010). Green products, also referred to as environmentally safe or sustainable products, are the products that provide customer satisfaction with their quality while reducing customer concerns about issues such as environmental responsibility (de Medeiros and Ribeiro, 2017)

Although they have been applied in limited sectors in the past years, today the usage of green products has been considerably expanded. While it was initially limited to the automotive and energy industry, it is now becoming increasingly widespread in cosmetics, textiles, health, technology and transportation.

Considering the life cycle of green products, recycling has a very important place. Reuse of raw materials is important for the conservation of limited resources and sustainable production (Vatan, 2022).

2.3. Bioplastic Products and Their Usage Areas Within the Scope of Green Products

Plastics are inherently non-biodegradable and insoluble in soil. In the past years, plastic raw materials have extensively been used due to their low cost and easy application to many different products.

According to the OECD; from 2000 to 2019, the rate of plastic waste in the world reached 353 million tons. 40% of this comes from the packaging industry, 12% from consumer goods and 11% from the textile industry. Only 9% of the world's total plastic waste is recycled. The rest is burned or sent to low-income countries (OECD, 2023). Considering the global environmental impact of plastic usage and plastic waste, the development of environmentally friendly raw materials will be a solution to this problem as an alternative material to plastics.

Biodegradable plastics are polymers obtained from renewable and biological resources. Since biodegradable polymers have a biodegradable structure, they dissolve in nature in a shorter time compared to normal plastics and do not harm the environment. They are easier to recycle and require less energy in the production process (Ernur, 2021). Biodegradable plastics can be derived from food waste such as citrus peels and agricultural raw materials such as rice husks, sunflower husks or straw.

Biodegradable plastics have the opportunity to be used in every finished product and where plastic is used, only by regulating the necessary strength and standards. Bioplastics, which are little known, are used in automotive, medical, packaging, white goods and small household appliances and horticulture sector (in products such as flower pots etc.) (Rajendran et al., 2012).

In our country, there are examples of products that mass-produced by using plantal waste which are degradable in the soil. Arçelik uses eggshells in the production of egg trays in refrigerators. It also develops innovative solutions to reduce the use of plastic by using coffee waste in the production of coffee machines and tea fibers in tea machines (<https://www.arcelikglobal.com/tr/>, 2023). Difaş Company produces eco-friendly combs and toothbrushes made of olive pits under the name "Bio" series. Ecoware, on the other hand, produces disposable forks, knives, spoons and straws that can be used in the food industry by using vegetable and biodegradable raw materials such as wheat, avocado extract and barley (www.ecoware.com.tr, 2023). Although examples are limited, it is thought that there will be an increase in the number of industries and companies who will use bio-based plastics in the following years.

3. PURCHASE INTENTIONS ON GREEN / BIOPLASTIC PRODUCTS

Green purchase intention can be explained as a buying or preferences tendency for products and services which are environmentally friendly or eco-friendly.

3.1. Green Consumer Profile

Over the last 30 years, concerns about the environment, such as increasing droughts and climatic changes, have increased. On the other hand, with the development of technology and the use of social media becoming an integral part of our daily lives, consumers' sensitivity to the environment is increasing and they prefer environmentally friendly products.

Consumers are no longer only interested in the consumption stage, but also in the production stages of the products they use or buy. For example, they are sensitive to the fact that any cosmetic product they buy is vegan and not tested on animals or the shopping bag they buy is made of recyclable materials rather than plastic, or that it can be used more than once.

Green consumers can be defined as people who have developed environmental sensitivities and therefore purchase environmentally friendly products rather than normal products and generally engage in activities that will benefit the environment. Green consumers think that they have a big role to play in protecting the environment we live in and they have attitudes in this direction (Keleş, 2007). Individuals who care about green consumption are consumers who make research and evaluate the products they will purchase beforehand and has a positive effect on the environment due to their contribution in line with these preferences. Green consumers are interested in and care about the ingredients, raw materials and production stages of the products they prefer to buy (Karaca, 2013).

Green consumption habits are often associated with green consciousness and environmental awareness. Consumers with a high knowledge and awareness about the environmental issues are more likely to be a committed green consumer (Sharma, 2021).

3.2. Factors Affecting Consumer Behavior in Green / Bioplastic Products

3.2.1 Socio- Demographic Factors

The age factor has been addressed by many researchers and as a common result, it has been observed that younger consumers are generally more sensitive and conscious about environmental issues. Because the generations that witnessed the periods when environmental problems were on the agenda intensively are naturally more sensitive to this issue. (Straughan and Roberts, 1999).

In a study titled "Examination of Consumers' Green (Product) Purchasing Behaviors in Terms of Socio-Demographic Variables", conducted on 600 people in Adana, it was concluded that young people buy more green products compared to older people. Moreover, according to the same study; people who are women, married, and have high income and education tend to buy more green products (Çabuk and Keleş, 2008).

In a different study which is conducted in 2014 on the use of environmentally sensitive products in Aydın province, it was concluded that participants with an education level below secondary education cared less about environmental awareness and green purchasing and the tendency towards environmentally sensitive purchasing increased as income level increases (Armağan & Karatürk, 2014). Income has a positive relationship with environmental sensitivity. Because individuals with high income have the budget to allocate to extraordinary categories such as green products, eco products and organic products (Straughan & Roberts, 1999).

3.2.2 Green Awareness and Environmental Consciousness

Environmental consciousness or environmental awareness is; being aware of the factors which cause the destruction of nature and the environment and being concerned about these problems and also taking actions in response to these problems (Küçükyörük & Kurtuldu, 2022). Environmentally conscious consumers believe that they are individually responsible for the improvement of the environment they live.

Many studies reveal that green consumers and their attitudes interact with each other (Zhao, Hui and others., 2014). Environmental concern does not always turn into a purchasing action, nor does every consumer, who thinks himself highly environmentally conscious, act in an environmentally conscious manner.

Environmental consciousness and green awareness have a very important role in the purchase of green products. As awareness increases, purchase behavior is positively influenced and, accordingly, the act of purchase also changes in a positive direction. The natural balance is gradually disturbed due to climate changes, pollution, the growth in the population, epidemics, wars and economic difficulties. Therefore, human beings

are concerned about the future and are in search of solutions to ensure that the next generations live in better conditions. This concern, which is also felt by young age groups today, causes them to be more sensitive about the environment issues (Yılmaz, 2019).

3.2.3 Socio-Cultural Factors

Culture is inherited from generation to generation and blended with individuals' own experiences (Aktan & Tutar, 2007).

The society we live in and the culture we belong to have a great influence on shaping our preferences and lifestyle. Culture varies between countries and regions. Culture has a determining role in almost every choice we make, from our consumption habits, tastes, food to clothing and to the choice of where we live. Culture also influences the consumption and purchase of green products (Özcan & Özgül, 2019). Religion, traditional holidays and celebrations, customs, and traditions influence individuals' purchasing habits and provide insight into the reasons and motivations behind their buying behavior (Lawan & Zanna, 2013). Social norms shaped by individual norms significantly determine purchasing behaviours (Sharma, 2021)

Subcultures are the groups which exist within the same society but are different in certain ways and have some common characteristics among each other. Clubs and fan groups using certain brands can be given as examples of subcultures. These groups, have an effect on purchasing and consumer decisions of each member of the group (Özsungur & Güven, 2016).

Individualism or collectivism, libertarianism, the notions of success, ethnic perspectives, boundaries are transmitted between individuals and across generations as a set of values formed by culture, subcultures and social classes. Thus, they have a determining influence on individuals' preferences (Ramya & Mohammed, 2016). Family also has a very important place in the social structure in terms of consumption. Consumption is directly and indirectly affected by the family's income level, education level and employment status. Even if involuntarily, family members are affected by the family's perspective of life and attitudes in most decisions they make. Purchasing habits are also shaped by the influence of the family (Boz, Duran & Başköy, 2020).

From the moment they are born, people have certain social statuses and roles as a member or part of their families, the schools they attend, the neighborhood they live in, or the courses and associations they attend. These status and roles are quite effective in purchasing preferences as well as in many decisions and choices made. For example, a person who is a manager in a private company is also a father in the family and has to behave and get in the shape required by these roles (Özalp, 2020). All these social concepts have a significant impact on green product preferences.

3.2.4 Eco Labeling

Eco-labels are labels describing the life cycle stories of environmentally friendly products, starting from their production processes until they become waste after use. It enables consumers to tend towards green products (Başaran Alagöz, 2007).

Eco-labeling provides information to consumers about the green categories of products, their lifespan and plays a triggering role in the conversion of green products into sales (Chekima, vd.,2015). Despite the fact that eco-labeling positively influences consumers to make their purchases, in some instances, consumers doubt the accuracy of the information provided on labels or certificates and abstain from purchasing products (Joshi ve Rahman, 2015). Thus, it is important that eco-labels and product contents are transparently reflected to the consumer in order to gain consumer trust.

There are various versions of ecolabels issued by different institutions, governments or companies. Figure 1 shows the symbols of the Turkish Environmental Label and the European Union ecolabels.



Figure 1. Turkish Environmental Label and European Ecolabel
(Ministry of Environment, Urbanisation and Climate Change, 2023) (European Commission, 2023)

Eco-labels can also be characterized as indicators that justify price differences in green products. Eco-labels are a guide for the consumer to find the product choice that causes the least damage to the environment and to see the difference between the products which can be competitors or substitutes (Chekima et al., 2015).

4. A RESEARCH ON THE FACTORS AFFECTING CONSUMER BEHAVIOR IN GREEN / BIOPLASTIC PRODUCTS

4.1. Purpose, Scope and Limitations of the Research

The aim of this research is to determine the awareness levels and purchasing tendencies of consumers about green and environmentally friendly products and bioplastics under these product groups. One of the most important limitations of the research is that bioplastic products are not widely available in the market yet. Therefore, participants were given detailed explanations about these products. On the other hand, because of the time limitations, 2 focus groups are conducted.

4.2. Research Model, Research Method and Data Collection

In this study, focus group technique, one of the qualitative research methods, was used. Focus group studies focus on certain topics with predetermined and organized groups. (Hennink, 2014). Focus group interviews can be conducted with four to twelve pre-selected participants, accompanied by a moderator. While many studies suggest that six to eight participants are sufficient, some studies suggest that there should be a minimum of four and a maximum of fifteen participants. And they also claim that a group with more than 12 members becomes difficult to manage and may split into two or even three sub-groups, each with its own independent discussion (O.Nyumba et al., 2017).

Prior to the focus group interviews, the objectives of the research and the questions to be answered by the participants were defined. Then the interviews were recorded and the data were analyzed through these recordings. As green products and bioplastics are a specific topic, 2 focus group discussions were made in June 2023 using an exploratory model in this research.

The participants were selected from different occupational and income groups as much as possible with the aim of obtaining information about the general public's perspective on the issue. The audio recordings were recorded with the permission of the participants.

4.3. Research Questions

The questions of the research are as follows:

- Are environmental issues important for the participants?
- Which factors are effective in the purchasing intention/behaviour of green products?
 - What is the consumer perception between a standard product and products made of bioplastic material?
 - What is the purchasing intention of products made from materials such as sunflower husks, rice husks, eggshells, coffee wastes?

4.4. Sampling

In order to examine the environmental awareness and sensitivity of individuals with different profiles and their thoughts about green and bioplastic products, the study included participants from different occupational, age and socio-economic groups. Hence, the maximum variation method, which is a part of purposive sampling, was utilized. The aim of maximum variation sampling is to create a small sampling and to reflect the diversity of the participants in this sample to a maximum extent and also to identify similarities and differences (Yıldırım and Şimşek, 2013). Focus group discussions were held with 5 different income groups that are categorized using the Türkiye Household Social and Economic Status (SES) 2012 table.

4.6. Demographic Profile of the Participants

A total of 10 people, 6 women and 4 men, participated in the focus group discussions. The age range of the participants was between 49-25 years. The answers given to each question in the research were evaluated in detail. All participants' opinions on each question were tried to be obtained.

Table 1: Demographic Details of the Participants

Demographic Details					
Grade	Gender	Age	Education	Marital Status	Profession
A	Female	32	Bachelor's Degree	Married	Housewife
B	Female	34	Bachelor's Degree	Single	Business Executive
B	Female	47	Associate degree	Single	Operations and Production Supervisor
B	Male	26	Bachelor's Degree	Single	Engineer
C1	Female	25	Bachelor's Degree	Single	Accountant
C2	Female	29	Associate Degree	Married	Pre-School Teacher

C2	Male	31	Secondary Education	Married	Machinery Installer
D	Female	49	High School Degree	Married	Cook
D	Male	36	Secondary Education	Married	Driver
D	Male	26	Primary School Graduate	Single	Production Worker

4.7. Analyzing Research Data and Findings

The data obtained through the audio recordings of the interviews were analyzed through "descriptive analysis" technique with the aim of understanding the participants' thoughts about their perceptions. The focus group interviews were designed under two main topics based on the literature review and in line with the literature review. These analyzed and organized data were supported by direct participant quotes.

Research findings consist of two main headings: green product and environmental awareness/environmental sensitivity and awareness of bioplastics.

4.7.1. Awareness of Green Products

In the two focus group studies, it was determined that the majority of the participants from different occupational, age and income groups had knowledge about green products and could define the green products. Most of the participants described green products as "nature-friendly or environmentally friendly products".

"...Environmentally friendly products that cause minimal harm to nature, products made with more sustainable resources..."(E.T, Female, Accountant, 25)

"...It sounds like an environmentally friendly product that can be recycled in nature..." (S.K., Male, Mechanical Fitter, 31)

"...I think a green product is any product that is made of biodegradable materials. So this could be a product that can be used instead of plastic. Or it could be a tampon made of 100% cotton, etc... Products that are produced in different categories in an environmentally sensitive way, and that can dissolve in the environment..."(A.M., Female, Business Owner, 34)

"...I think of it as recycled material..." (E.A., Female, Housewife, 32)

Education level is one of the most important demographic factors affecting purchasing attitudes. As the education level of the individuals' increases, their consumption habits differentiate and their needs increase as well (Alniaçık ve Yılmaz, 2008). It was observed that participants with low levels of education and income did not have clear knowledge about green products. They only consider green products as plants by associating the concept of green products with color due to its name.

"...It usually reminds me of fruits and vegetables..." (S.T., Male, Production Worker, 26)

"...Spinach, leek... it reminds me of all the vegetables we know, all the vegetables that are green. The greens in nature, the vegetables we cook, green apples, spinach, leeks, that kind of thing..." (S.D., Female, Cook, 49)

4.7.2. Green Awareness, Environmental Consciousness and Attitudes Towards Environmental Concern

The results of the research show that almost all of the participants have some concerns about environmental issues, are concerned about the environment and are sensible towards the environment. Statements related to this are stated as follows.

"...So of course you are anxious. Environmental pollution is already at an extreme level. When you go out in the evenings, I couldn't take that deep breath, that deep breath I used to take when I was a child..." (S.D., Female, Cook, 49)

"...My biggest fear is that one day there will be no water at all or that water resources will diminish..." (M.G., Female, Operations and Production Supervisor, 47)

"...Just recently in Konak, something like mucilage happened. It is already everywhere in Turkiye. Moreover, the floods caused by the melting of the glaciers, the things that happen in summer, the fires, these are all things that are actually caused by environmental pollution. And of course it should be a matter of concern for all of us. We are all very worried about our future..." (A.M., Female, Business Executive)

"...The world has a cycle within itself. The more we put a spoke in this wheel, the more it will be the other way around, so it is certain that future generations will have bigger problems in this subject..." (S.K., Male, Machinery Installer, 31)

However, as in the study of Zhao, Hui Hui et Al. (2014), it was concluded that these attitudes do not always turn into behaviors or are not returned as purchasing actions. Price and trust factors are effective at this point. Consumers usually prefer non-green products due to the high cost of green products. The comments below support these attitudes.

"...I mean, let me explain, I am as worried as everyone else, but in besides being worried, we need to look at what we are doing about it. I mean, in most European regions, garbage is sorted, why don't we have such a rule? So we throw everything in the same garbage bin. Then there is a sorting process. This is an extra cost. For example, my friend says that he works as an operator in a recycling company. In order to separate them, nature is polluted again, why is there a forklift working, a shovel working. So, even if these small calculations are made, it should be done, it needs to be done. But when we look at it, I mean, we are all worried, but what are we doing? Nothing. I mean, the plastic bag in the market is 25 cents, most of us go to the market and say "25 cents, let's buy it". How many of us take a cloth bag with us? None..." (B.Ç., Male, Engineer, 26)

"...There are some issues that we pay attention to, we try to pay attention to some issues as much as possible, I mean, I don't think I personally pay too much attention, I personally..." (S.T., Male, Production Worker, 26)

A certain number of participants commonly follow some basic practices to protect the environment. These are practices such as garbage sorting and waste oil management. However, except these practices, when green consumption is taken into consideration, it is clear that consumers' environmental sensitivity and consciousness are not reflected in their product preferences to the same extent.

Price and trust, which were not mentioned in the study but were frequently discussed during the interview, appear to be the most important factors in green product preferences. Consumers generally prefer non-green products due to the high costs of green products or due to the prejudice that they will cost high.

"...We do the price research. Unfortunately, price is the first thing we pay attention to due to economic conditions. I look at the price, a product is recyclable and leather, for example... If the price is the same, yes, I prefer the recyclable one. So I can make such a conscious decision..." (B.Ç., Male, Engineer, 26)

"...We do it like this, for example, you will buy a make-up product. Yes, there are brands that use more environmentally friendly recyclable products. You prefer one of them. If there is not a huge price difference. But for example, sometimes even if you do some search, after seeing the result, unfortunately, you can't afford it, so you can't buy it. Yes, we pay attention, but sometimes we cannot do it due to cost..." (E.T., Female, Accountant, 25)

"...In our country, you know, our living conditions are a bit more difficult than in other countries. We are a poor country. To speak the truth. People's first priority is a product that is good in terms of price and durable in terms of strength. That's why environmentally friendly comes last..." (K.T., Male, Driver, 36)

"...Of course, the first thing we look at is the price, then we consider about whether it is harmful to nature..." (S.D., Female, Cook, 49)

"...The level of welfare needs to increase and the education system needs to change because the biggest concern and concern of people is to be able to make a living, to be able to survive, to live in comfort. After obtaining these things, people can think more environmentalist, more democratic, more socialist. Because I think a society, a nation, a person who is worried about hunger cannot pursue these kind of values. Because the priority is to achieve the conditions such as shelter, safety, etc. for oneself, one's family..." (S.K., Male, Machinery Installer, 31)

When there is no price difference between green and non-green products, all of the participants stated that they would prefer to buy green products in order not to harm the nature with the following statements.

"...I prefer whichever is more beneficial to nature, which means the recyclable one..." (S.T., Male, Production Worker, 26)

"...Of course, if both are equal, if you don't get the recyclable one, you need psychological treatment..." (S.K., Male, Machinery Installer, 31)

"...I think everyone who knows about it would prefer the recyclable one if there is already the same price..." (E.A., Female, Housewife, 32)

It is concluded that the participants are not paying attention to reading the labels and contents of eco-labels which are the identity of green products. The price and reliability factors are again effective in this respect. Although it is not clearly known by which institutions and organizations eco-labels are given, there is a problem of trust towards these institutions and organizations. Joshi and Rahman (2015) argues in his study that eco-labels are very important in the process of gaining the trust of consumers and that eco-labeling should be done in a transparent and honest way and provides an example for the following comments.

"...I don't look at the back of the packaging. I mean, sometimes they advertise the product and I can prefer everything we see as recyclable, but I don't look at the labelling of the product..." (E.A., Female, Housewife, 32)

"...I don't pay any attention to the labels. As I said, I don't have any trust in such things. Besides, there is the example of a bag that Mr. Berkan gave, okay, it is recyclable, but the threads of the bag are recyclable, but what does the man do? He will abuse that part, but he tries to sell it to the consumer as if the whole bag is recyclable. This is a marketing tactic, actually..." (S.K., Male, Machinery Installer, 31)

"...I think our country is quite a step behind in many innovations and researches on this subject, and it is very open to abuse. So, for example, I always have the same perception about natural products, organic products. I wonder if they are indeed natural..." (M.G., Female, Operations and Production Supervisor, 47)

4.7.3. **Consumers' Perception and Purchase Intentions of Bioplastics in the Green Product Category**

Although not detailed, most of the participants have some basic knowledge about the concept of bioplastics and their structure. They mostly describe bioplastics as recyclable and biodegradable. Some of the responses to questions about what bioplastics evoke are as follows.

"...I mean, I actually have a very limited knowledge. I mean, I know that it can dissolve in nature in a much shorter time than plastic. Because I know that plastics take at least a thousand years. I know that it comes from more organic products, like potatoes, starch. I don't have more detailed information..."(E.T., Female, Accountant, 25)

"...Bioplastic has a degradable raw material. In other words, I know that organic-based products that we can call more environmentally friendly than existing plastics and products and they can take a shorter time to dissolve and degrade in nature..." (S.K., Male, Machinery Installer, 31)

"...As far as I know, bioplastics mean that the components in it are organic-based. What is the raw material of the plastic found in nature on an organic basis? It is petroleum. So it's not something chemical like petroleum, but more like a grass, I don't know, a plant. You know, which dissolves more easily in nature..."(B.Ç., Male, Engineer, 26)

"...The first thing that comes to my mind is that it is biodegradable plastic" (K.T., Male, Driver, 36)

"...When I think of bioplastics, I think of plastic-like substances produced not from petroleum but from different products such as sunflower lecithin. For example, like leather and leather made from cactus. You know, not plastic but a plastic-like product..." (A.M., Female, Business Owner, 34)

At the point of comparison of bio plastics with ordinary plastics in terms of durability and performance, no clear positive or negative opinions could be obtained due to the lack of sufficient usage experience of the participants regarding bio plastics, and only perceptual answers were received.

"...Plastic has been in our lives since we were born, it has been in our lives for years. You know, we have an experience there. Not bioplastics. That's why I can't make a comparison, but if you say it's prejudiced, I think plastic will be more durable. But I can't make a logical comment unless I buy it and have an experiment about it. But I don't think it will be much different, after all, since they also go through certain production standards, quality and alloys, I don't think there will be much difference..." (S.K., Male, Machinery Installer, 31)

Bio composites contain biodegradable fillers or reinforcements. The fillers that used are natural biodegradable materials such as grinded agricultural wastes, plant fibers, etc. These materials can be used in powder, chopped or continuous fiber form in the bio composite materials. They reflect their natural appearance on the surface appearance of the manufactured part. As they can give their natural colors to polymers, they can also be visible on the surface as particulate or continuous fibers. This allows them to have a natural appearance in aesthetic parts. This is a positive and encouraging feature for only a few of the participants at the purchase stage, which tells them that the product is environmentally friendly.

"...I've only seen a product made of coffee capsules, I've seen it on the internet, so I haven't had the chance to see in real life, of course, but the design looks very cute and different to me in the images..." (M.G., Female, Operations and Production Supervisor, 47)

For most participants, it was concluded that for any textile product, footwear and especially hygiene-related products (such as toilet paper, napkins), appearance is important, design and visual features such as smoothness and whiteness are a priority.

"...Big brands have also started to make shoes from recycled materials. When I look at it visually, it looks a little bit more like an old shoe. Actually, it is not, but because it does not have the brightness of regular shoes, people have the perception of this is bad, I will pay this much money and it will look like this..." (E.T., Female, Accountant, 25)

"... It looks bad both toilet paper and napkins. I mean, it also looks bad on the napkin. But I keep buying them, I keep buying them continuously. I mean, yes, I know it bothers me, but there when you think about it in the future, we have a child, when you think about your child, you say that I should make a contribution and you continue, but it does bother me, don't like the appearance..." (G.K., Female, Teacher, 29)

When evaluated in terms of durability and performance, due to the participants' lack of experience in the use of bioplastic products, there are concerns that these products will be weak and cannot be replaced by conventional products. The following statements support that they would be willing to take a chance and buy the product only if its performance is the same as the products they are already using or are already used to purchasing.

"...Sturdiness is also important. Of course, I try to prefer the bioplastic one, I will definitely buy it once and try it, but if it breaks in my hand, I may continue that insensitivity... If it performs the same way and price is similar, I can definitely prefer it. But if it reduces my usage performance slightly, I will continue to use it, but if it reduces it significantly, I may tend to go back to what I know. I mean, I may force myself, but I also may not force myself." (A.M., Female, Business Operator, 34)

"...I don't remember the brand, but the napkin was blue. A baby blue color. So it's black like this, recycled. But it doesn't look like normal processed napkins, for example. And that's important. You need to use 2-3 more pieces to be able to clean..." (G.K., Female, Teacher, 29)

"...The organic or recycled toilet papers are not as soft as the normal toilet papers. I don't know how this can be done, but companies should be able to manage it..." (A.M., Female, Business Owner, 34)

"...One is regular plastic and one is recyclable. I bought it and then the recyclable one broke two days later or three months later. I have to buy it again. Then it will cost me so much..." (S.D., Female, Cook, 49)

There is a common opinion that regular plastics will be more robust, especially in durable consumer goods which require long-term use. It was observed that the use of bio-based plastic raw materials in products such as washing machines and refrigerators caused hesitation in consumers due to the thought that these products will be used for many years. It was concluded that materials such as disposable cutlery or plates used once and thrown into the garbage can be easily preferred.

"... I definitely think that the 100% regular plastic is more durable. If I am going to use it for a long time, I would personally buy the 100% plastic one, not the biodegradable one. But if its durability does not have much effect and if the price is not very expensive or if it is not something that is used for a long time, I would prefer the environmentally friendly one." (B.Ç., Male, Engineer, 26)

When it comes to health, although the participants think that glass is the healthiest material, all of them, without exception, think that bioplastic products can be healthier and more natural than normal plastics.

"...Plastic is unhealthy. the organic one is healthy..." (S.K., Male, Machinery Installer, 31)

"...Glass always seems the healthiest to me. By the way, I never use plastic straws. I have glass straws at home, I use them all the time. My children use them every day because..." (E.A., Female, Housewife, 32)

5. CONCLUSION

In recent years, as globalization and over consumption have increased and resources have become increasingly scarce, consumers' concerns about environmental issues have increased at the same level. As many studies on green products, purchasing behavior of green consumers and the role of environmental awareness in green consumption have shown, people cannot ignore environmental problems.

The whole world is in search of less environmentally damaging practices and less damaging versions of products. Companies not only have to fulfill the requirements of the era, but also have to adapt to the changing needs of consumers.

In this study, green marketing, which will reinforce its importance in the world and Türkiye in the upcoming years, consumers' environmental awareness and green awareness and related purchasing intentions, and the perception of bioplastics on consumers within the scope of sustainability were revealed and analyzed using a focus group study, which is a qualitative research method.

Many studies have been conducted on bioplastics for technical purposes so far. However, there are not many studies on the perception of bioplastics on consumers in the field of marketing. Considering that bio-based plastics obtained from agricultural and natural wastes will be seen in every field as the green products of the future, it is thought that this research will shed light on the preference of bioplastics and consumer purchasing intentions.

According to the results of the research, the fact that a product is environmentally friendly or green, or bio-based does not by itself determine the purchase intention. However, people's environmental awareness, individual sensitivities such as health and environmental concerns are effective in product preferences.

Consumers' perception that there are not enough sanctions to protect the environment pushes environmentally conscious approaches and consequently green consumption to second priority. Therefore, governments, associations and organizations should take concrete steps in this respect.

In order to increase green awareness in protecting the environment and nature, the trust problem of consumers regarding green products and eco-labels should be solved through social marketing activities to be implemented by government agencies and private organizations. In this way, society's prejudices can be reduced and consumer awareness about the environment and green products can be improved. These social marketing activities can be supported by certain trainings. Eco-labels educate consumers and raise awareness.

Although price is a barrier to purchasing green products, companies should improve this impression through various innovative marketing activities and price policies. Economic drivers need to be eliminated in order for people to prefer environmentally friendly products, to convert these preferences into purchases, and to ensure that this becomes a mass practice and is fully adapted by society.

REFERENCES

Aktan, C., & Tutar, H. (2007). Bir Sosyal Sabit Sermaye Olarak Kültür. *Pazarlama ve İletişim Kültürü Dergisi*, 6(20), 1-11.

- Alınışık, Ü., & Yılmaz, C. (2008). Değer Yargıları ve Tüketimde Çevreci Eğilimler. *13.Ulusal Pazarlama Kongresi*.
- Armağan, E., & Karatürk, H. (2014). *Organizasyon ve Yönetim Bilimleri Dergisi*, 6(1), 1309 -8039 (Online).
- Avrupa Birliği Komisyonu*. (2023). [commission.europa.eu: https://commission.europa.eu/index_en](https://commission.europa.eu/index_en) adresinden alındı
- Ay, C., & Ecevit, Z. (2005). Çevre Bilinçli Tüketiciler. *Akdeniz U.B.F. Dergisi* (10), 238-263.
- Başaran Alagöz, S. (2007, Ocak). Yeşil Pazarlama ve Eko Etiketleme. *Uluslararası Hakemli Sosyal Bilimler E-Dergisi*(11), 1694-528X.
- Boz, D., Duran, C., & Başköy, S. (2020). Yeşil Pazarlama Faaliyetlerinin Tüketiciler Üzerindeki Etkileri. *Uluslararası Toplum Araştırmaları Dergisi*, 15(22), 1347-1372.
- Cemalcılar, İ. (2008). Pazarlama Nedir? *Eskişehir İktisadi ve Ticari İlimler Akademisi Dergisi*(1(2)), 63-72.
- Chekima, B., Wafa, S., Igau, O., Chekima, S., & Sondoh Jr., S. (2015). Examining Green Consumerism Motivational Drivers: Does Premium Price and Demographics Matter To Green Purchasing. *Journal of Cleaner Production*, 3436-3450.
- Chen, T., & Chai, L. (2010). Attitude Towards The Environment And Green Products: Consumer's Perspective. *Management Science and Engineering*, 2, 27.
- Çabuk, S., & Keleş, C. (2008). Tüketicilerin Yeşil (Ürün Satın Alma Davranışlarının Sosyo-Demografik Değişkenler Açısından İncelenmesi. *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi*, 17(1), 85-102.
- De Medeiros, J., & Ribeiro, J. (2017). Environmentally Sustainable Innovation: Expected Attributes in the Purchase of Green Products. *Journal Of Cleaner Production*.
- Ernur, M. (2021). Biyobozunur Malzemelerin Üç Boyutlu Yazıcılarda Kullanılması. Edirne.
- Gedik, Y. (2020, Haziran). Yeşil Pazarlama Stratejileri ve İşletmelerin Amaçlarına Etkisi. *International Anatolia Academic Online Journal / Sosyal Bilimler Dergisi*(6), 46-65.
- Hennink, M. (2014). *Focus Group Discussions*. New York: Oxford University Press. <https://www.arcelikglobal.com/tr/>. (Accessed: May, 2023).
- Joshi , Y., & Rahman, Z. (2015, Nisan 27). Factors Affecting Green Purchase Behaviour and Future Research Directions. *International Management Review*(3), 128-143.
- Karaca, Ş. (2013, Ocak). Tüketicilerin Yeşil Ürünlere İlişkin Tutumlarının İncelenmesine Yönelik Bir Araştırma. *Ege Akademik Bakış (Ege Academic Review)*, 13(1), 99-111.
- Kâtip, A., Karaer, F., & Özengin, N. (2014). Otomotiv Sektörünün Çevresel Açidan Değerlendirilmesi. *Uludağ Üniversitesi Mühendislik Fakültesi Dergisi*, 19(2).
- Kavoğlu, S. (2012, Aralık). İtibar Yönetimi Açısından Yeşil Pazarlama:Örnek Olay İncelemesi*. *Tarih Kültür ve Sanat Araştırmaları Dergisi* (ISSN: 2147-0626), 1(4), 13-31.

- Keleş, C. (2007). Yeşil Pazarlama Tüketicilerin Yeşil Ürün Tüketme Davranışları ve Yeşil Ürünlerin Tüketiminde Kültürün Etkisi İle İlgili Bir Uygulama. Adana.
- Kocaşahin, S. B. (2009, Ağustos). Yeşil Pazarlama Stratejileri: Dünyadaki ve Türkiye'deki Örnek Uygulamaların Karşılaştırılması. Konya.
- Koçarlan, H. (2015, Aralık). İşletmelerin Sosyal Sorumluluk Bilincinde Çevre Duyarlılığının Yeşil Pazarlama Üzrine Etkileri. Kilis.
- Korucuk, N. (2019). Yeşil Pazarlama Bağlamında Yeşil Ürünlere İlişkin Tüketici Satın Alma Davranışı. Kars.
- Kotler, P. (2004). *Günümüzde Pazarlamanın Temelleri*. (S. Talay, Dü.) Optimist Yayınları.
- Küçükyörük, G., & Kurtuldu, G. (2022, Aralık). Sürdürülebilir Pazarlamanın Sürdürülebilir Tüketim Üzerindeki Etkisinde Çevre Bilincinin Aracılık Rolü. *Trakya Üniversitesi İktisadi ve İdari Bilimler Fakültesi*, 11(2), 141-162.
- Lawan, A., & Zanna, R. (2013, January). Evaluation of Socio-Cultural Factors Influencing Consumer Buying Behaviour of Clothes in Borno State, Nigeria. *International Journal Of Basics And Applied Sciences*, 01(03), 519-529.
- Majid, J., Amin, S., & Kansana, K. (2016). Green Marketing: Sustainable Economy, Environment & Society- Concept & Challenges. *GSD- Green and Sustainable Development*, 1.
- Nguyen, L. T. (2023). A Rising Trend In Eco-Friendly Products: A health-Conscious Approach To Green Buying. Ho Chi Minh City.
- O.Nyumba, T., Wilson, K., Derrick, C., & Mukherjee, N. (2017). The Use Of Focus Group Discussion Methodology: Insights From Two Decades Of Application In Conversation.
- <https://www.oecd.org/> (Accessed: June, 2023)
- Onurlubaş, E., & Derya, D. (2016). *Yeşil Pazarlama* (1 b.). İstanbul: Beta Basım A.Ş.
- Özalp, Ç. (2020, Ocak). Yeşil Ürünlerin Tüketici Satın Alma Davranışı Üzerine Etkisi: Ankara İlinde Bir Uygulama . *Yüksek Lisans Tezi* . Ankara.
- Özcan, H., & Özgül, B. (2019). Yeşil Pazarlama ve Tüketicilerin Yeşil Ürün Tercihlerini Etkileyen Faktörler. *Türkiye Mesleki ve Sosyal Bilimler Dergisi*, 1-18.
- Özsungur, F., & Güven, S. (2016). Tüketici Davranışlarını Etkileyen Sosyal Faktörler ve Aile. *International Journal Of Eurasian Education And Culture*(3), 127-142.
- Peattie, K. (2001). Towards Sustainability : The Third Age of Green Marketing. *The Marketing Review*(2), 129-146.
- Ramya, N., & Mohammed, A. (2016). Factors Affecting Buying Behaviour.
- Rajendran, N., Sharanya, P., Sneha, R., & Angeeleena, R. (2012, Mart). Seaweeds Can Be A New Source For Bioplastics. *Journal Of Pharmacy Research*(5), 1476-1479.
- Sdrolia, E., & Zarotiadis, G. (2019). A Comprehensive Review of Green Product Term: From Definition to Evaluation. *Journal Of Economic Surveys*(33), 150-178.
- Seuring , S., & Müller, M. (2008). From A Literature Review To A Conceptual Framework For Sustainable Supply Chain Management. *Journal Of Cleaner Production*.

- Sharma, A. (2021, June). Consumers' Purchase Behaviour and Green Marketing: A Synthesis, Review and Agenda. India.
- Straughan, R., & Roberts, J. (1999). Journal Of Consumer Marketing. 6(16), 558-575.
- Toker, B. (2007). İşletmelerde Sosyal Pazarlama Faaliyetlerinin Performansa ve Marka Bilinirliğine Etkileri Üzerine Bir Araştırma. *Yüksek Lisans Tezi*, 37. Konya.
- Toklu, A. (2019). Çevresel Bilinç Yeşil Davranışı Etkiler mi? Türkiye'nin Doğu Karadeniz Bölgesinde Bir Araştırma. *İşletme Araştırmaları Dergisi*(11(4)), 2799-2811.
- Türkiye Cumhuriyeti Çevre, Şehircilik ve İklim Değişikliği Bakanlığı*. (2023, Haziran). [www.csb.gov.tr: https://cevreetiketi.csb.gov.tr/](https://cevreetiketi.csb.gov.tr/) adresinden alındı
- Utku, Ç. P. (2011). Yeşil Pazarlamanın Gelişimi ve Yeşil Tutundurma Stratejileri: İnşaat Sektöründe Uygulanabilirliği. *Ulusal Tesisat Mühendisliği Kongresi*, (s. 1637-1648). İZMİR.
- Vatan, C. (2022, Mayıs). Plastik Malzemelerin Geri Dönüşümü: Otomotiv Endüstrisinden Örnekler. İstanbul.
- <https://ecoware.com.tr/biz-kimiz> (Accessed: 04.06.2013).
- Yaşar, L. D. (2019). Yeşil Pazarlama Ve Tüketicilerin Yeşil Ürün Satın Alma Davranışlarının İncelenmesi (Van İli Örneği). *Yüksek Lisans Tezi*. Van.
- Yıldırım, A., & Şimşek, H. (2013). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Ankara.
- Yılmaz, M. (2019). Gelecek Kaygısı ve Sürdürülebilirliğin Marka Tutumu ve Satın Alma Niyeti Üzerine Etkisi: Beyaz Eşya Sektöründe Bir Araştırma. *Yüksek Lisans Tezi*. İstanbul.
- Zhao, H.-H., & vd. (2014). What Affects Green Consumer Behavior In China? A Case Study From Quingdo. *Journal of Cleaner Production*(63), 143-151.

Cyber Conflict: Indicators and Assessments

Serghei Ohrimenco¹ Valeriu Cernei²

Abstract

Introduction: The history of interactions between states, nations, and alliances of countries dates back thousands of years. These relationships typically progress through several stages, including cooperation, integration, competition, and confrontation. It's important to recognize that these stages encompass a wide array of aspects, including politics, military affairs, finances, technology, society, and ideology. Interaction and confrontation occur at various levels, ranging from global and strategic to tactical and individual. This paper primarily focuses on the stage of confrontation within the relatively new and not yet fully explored realm of cyberspace.

Aim: The aim of this research is to study the cyber domain category and determine the possibilities and peculiarities of information interaction (cyber conflicts, cyber blockades, and cyber sanctions). It also involves analyzing existing models and basic assessment indicators characterizing the level of information technology development in individual countries.

Method: A systematic approach was employed, consisting of several stages, including the formation of the conceptual foundations of the cyber domain, gathering statistical information from scientific and monographic literature, research reports, and data processing and analysis using game theory, econometric analysis, and economic-mathematical modeling.

Findings: A comprehensive study of the nature of cyber conflicts can significantly enhance the process of multilateral cooperation. Future research on conflict dynamics and existing conflict management mechanisms requires further investigation of information security threats and risk management.

Originality and value: Statistics have been collected characterizing the National Cyber Security Index and Global Cybersecurity Index 2020: Country profiles of several countries, including Turkiye, Bulgaria, Romania, Moldova, Ukraine, and Russia. An attempt has been made to correlate the level of Cyber-Dependent Crimes with the level of cyber domain protection.

Key Words: CyberSpace Domain, Cyber Attacks, Cyber Conflict, Cyber Blockade, Cyber Sanctions

Jel Codes: D74 D81 E26 F51 K24

1. INTRODUCTION

The significance of this topic lies in each state's imperative to safeguard its national interests in the realm of cybersecurity. It's important to underscore the distinctions between the cyber domain and other domains, as emphasized in Brantly's work from 2016 (Brantly, 2016). First and foremost, cyberspace is a human-made domain. Secondly, the management of military and civilian capabilities in other domains relies on and operates through the cyber domain. Third, the military and civilian facets of cyber operations are intricately interwoven, making it challenging, and at times impossible, to differentiate between them. Fourth, establishing the attribution of operations in cyberspace is a very difficult and complex task.

¹ DSC, Professor, Laboratory of Information Security, Academy of Economic Studies of Moldova

² PhD Student, Partner, IT Audit & Advisory BSD Management SRL, Moldova

Absence of such indicators (or measurement units) as mass, gravity, friction or distance is yet another feature of cyberspace. In addition, the following statements have become widespread: cyberspace is an abstract space; cyberspace has no natural boundaries; cyberspace can obtain any number of subspaces (e.g. Internet, telephone system, radio communication system); cyberspace is not limited in its dimensions (for example, the Internet has an IP address, MAC address, port number, etc.); each dimension of cyberspace has no limits; each cyber object has its own coordinates; one cyber object can belong to more than one subspace; objects in cyberspace can interact with objects in physical space (Sheymov, 2021).

Within the framework of the existing cyberspace, many authors agree that the possibility of an active presence in this domain depends on many political, economic and social factors. The division into certain representative groups determines the ability of an individual state to develop mechanisms for responding to cyber threats, encourage investment in research and development of digital transformation processes, and the adoption of laws on data protection, establishing national computer security incident response teams (CSIRTs), cyber capacity-building (CCB), counteract the cyber attacks and etc.

2. LITERATURE REVIEW

A highly relevant literature source in the cybersecurity field is (Sheymov, 2021). This source offers an extensive analysis of cyberspace and introduces the Variable Cyber Coordinates (VCC) Method of Communications. It delves into the structures, contents, and environments of cyberspace, as well as the laws and regulations governing it, along with insights into the interactions between different subspaces. Another key work, (Perkovich & Levite, 2017)) provides detailed research of the cyberspace components.

The cyber environment has given rise to a new form of statecraft, enabling the influence of regions in other countries through a combination of military and non-military tactics to achieve objectives via political and military pressures, as articulated by Martti Lehto in 2018 (Martti Lehto, 2018). Lehto's work comprehensively addresses several critical topics, including Deterrence Theory and Practice, Modern Strategies in Cyber Warfare, and the Detection of Domain Generation Algorithms Using Machine Learning Methods and other.

The author (Maurer, 2018)) raises important questions about the control, authority and use of offensive cyber capabilities. In (Power & Sutton, 2018), issues related to the Main Cybersecurity Issues, Vulnerabilities and Threats, Information on Cybersecurity Controls are studied. The authors of book (Betz, 2011) consider various aspects of the problems of power and cyberspace, cyberspace and sovereignty. A number of books of undoubted interest for the study of cyberspace area should be noted (Friis & Ringsmose, 2016), (Brantly, 2016), (Libicki, 2016), (Laurent, 2022). We should also mention a number of publications describing the problems of identifying cyber threats and their impact (Mishra, 2020), (Lee, 2023), (Yassine Maleh, 2023), (Hari Vasudevan, 2022).

3. RESEARCH METHODOLOGY

The methodology of this research is based on a systemic approach that encompasses several stages, including the formulation of the conceptual foundations of cyber domain security, the structure and components as vital functions of each state, setting the research objectives, collecting statistical information from available sources (scientific and monographic literature, research reports of organizations engaged in cyber domain activities);, processing and analyzing the gathered information using game theory,

econometric analysis, and economic-mathematical modeling. This methodical approach serves as the robust foundation for our study.

One of the most important tasks undertaken by the authors was the analysis of categories such as cyberspace, cybersecurity, and the identification of the interconnections among their components - Cyber Attacks, Cyber Conflict, Cyber Blockade, and Cyber Sanctions. In recent years, actions aimed at organizing Cyber Blockades and Cyber Sanctions have become increasingly prevalent, running parallel to political and economic sanctions imposed on specific countries and communities. A new political instrument and a new means of influence have emerged - cyber sanctions. Cyber sanctions are defined as economic, financial, and technological measures aimed at changing the behavior of targets through malicious actions in cyberspace and/or intrusions. An analysis of the theory and practice of interaction between various entities in the cyber sphere indicates that the concept of cyber sanctions and cyber blockade is a relatively new research direction in global politics, demanding in-depth theoretical research and practical development.

The analysis of available sources showed that a significant number of experts highlight the absence of a unified international regulatory body for evaluating state actions in cyberspace and existing mistrust in cyber sanction mechanisms. One important aspect to note is that the applied sanctions are based solely on assumptions and the lack of a factual basis, leading to the unresolved issue of attribution, i.e., identifying the source of a cyberattack. Moreover, contemporary IT allows malicious actors to mask their actions and conceal their true location (e.g., illegal marketplaces, specialized software offering criminal services, the DarkNet environment, etc.). Attribution issues currently have primarily political and declarative characteristics and often remain contentious. The key problems with attribution include:

- The continual advancement of Advanced Persistent Threats (APTs).
- Determining the sources (locations of launch and initialization) of a cyberattack.
- Identifying the party responsible for the cyberattack (the primary actor).
- Handling a large volume of unsorted (raw) data.
- The decentralization and complexity of existing public-private attribution systems.
- The use of methods to simulate cyberattacks with the aim of creating false accusations against a specific violator, cybergroup, and/or state.

Media constantly reports an increase in cyberattacks. Resistance occurs on multiple levels: state versus state, commercial entities versus commercial entities, and individual users versus higher-level entities. Unexplored aspects remain concerning public-private partnerships in the organization of cyberattacks as private companies manage a significant part of communications.

As a result, the challenges require substantial changes to existing legislation, making this the prospective research direction.

The research identifies the primary models (Oxford Cybersecurity Capacity Maturity Model (CMM) and International Telecommunication Union Global Cybersecurity Index (ITU GCI), as well as a basic set of indicators. Statistical data on the basic set were complemented by cyber-dependent crimes.

4. BASIC INDICATORS

Experts utilize two primary models as widely adopted mechanisms for assessing the cyber capabilities of countries: the Oxford Cybersecurity Capacity Maturity Model (CMM) and the International Telecommunication Union Global Cybersecurity Index

(ITU GCI). These models play a crucial role in ranking and evaluating countries based on various indicators, enabling the identification of existing gaps, strengths, and weaknesses.

The Oxford Cybersecurity Capacity Maturity Model is a methodological framework designed to assess a country's cybersecurity capabilities. This model has been continuously refined through the contributions of focus groups, thematic coding, and expert consultations. It has been implemented in over 87 countries. Various methods are employed for selecting and calculating indicators in this model:

1. One of the most significant indicator of the assessment is cyberpower. This indicator, its calculation methodology, is presented in National Cyber Power Index 2022 (NCPI), as an example of a holistic national approach (Julia Voo, 2022). The following indicators were used to calculate this indicator: Cyber Risk Literacy and Education Index; Cyber Military Staffing; Data Privacy Laws; Freedom on the Net; Global Soft Power Index; Mobile/Computer Infection Rate; National Standards Body; Population on the Internet; Social Media Usage; Surveillance.

The 2022 the calculation methodology used 29 indicators. The final aggregated NCPI calculation data for 2022 is shown in the following table.

Table 1. NCPI 2022: Top 10 Most Comprehensive Cyber Power

Ran k	2022
1	US
2	China
3	Russia
4	UK
5	Australia
6	Netherlands
7	ROK
8	Vietnam
9	France
10	Iran

Source: Julia Voo, Irfan Hemani, Daniel Cassidy (2022). National Cyber Power Index 2022. Report September 2022. p.8. www.belfercenter.org/project/cyber-project.

Ratings for various categories were considered for individual states, including Financial, Surveillance, Intelligence, Commerce, Defense, Information Control, Destructive, and Norms.

It is essential to note that elements from the theory of expected utility, widely utilized in the analysis of cyber conflicts, can also be effectively applied to elucidate a broad spectrum of political scenarios and their corresponding solutions. The concept of utility, as expounded by Bueno De Mesquita and other notable scholars (such as Scott Ashworth in 2021 and Ethan Bueno De Mesquita in 2021), may be assessed within a range spanning from +1 to -1, with the pivotal point at 0.

2. Another indexed variable related to the series Cyber Power is Indexing Equation for Cyber Power (Brantly, 2016).

3. In his paper (Kello, 2017), Lucas Kello proposes a deterrence formula for assessing prospective conflicts. This formula posits that the net benefit or cost can be

determined by calculating the ratio of the cumulative benefits and harms suffered by the victim to the cumulative costs and harms anticipated from the victim.

$$AA = \frac{Ba + Hv}{Ca + Hv} \quad (1)$$

where:

AA - net benefit or cost;

Ba - the benefits the attacker receives;

Ca - the harm the attacker inflicts on the victim (i.e., the relative benefit to the attacker);

Hv - the harm the attacker expects the victim to suffer in retaliation.

In turn, the formula used to measure perceived cyberpower is as follows:

$$\text{Perceived Cyberpower} = (C + E + M + I) * (S + W) + \text{Interrelations (C, E, M, I)} \quad (2)$$

where:

C is the critical mass, which includes the size and age of the population and the level of cyber awareness of the population;

E - economic component, which includes cyberinfrastructure, technology and the development of and access to critical information infrastructure;

M - military component, includes the use of cybernetics in the armed forces;

I - information component, includes communication and information flows between systems and technologies;

S - strategic component, includes implementation of national cyber strategy;

W - influence of people on responsible use of cyber security rules (awareness) and prevention of cybercrime.

4. One of the important evaluation indicators can be the Composite Index of National Capacity (CINC) (Anon., n.d.). CINC is a statistical measure of national power created by J. David Singer for the Correlates of War. Each component is a dimensionless percentage of the world's total.

5. Perceived Cyber Power. This is another additional specific indicator proposed in (Jansen van Vuuren, 2018) (Anon., n.d.).

Let's examine the achievements of individual countries across a set of indicators as presented in the following tables.

Table 2: National Cyber Security Index

Country Name	Overall Score	Regional Rank	Criteria
Turkiye	61,04	55	Cybersecurity Policy Development - 100% Cyber Threat Analysis and Intelligence - 20% Education and Professional Development - 78% Contribution to Global Cybersecurity - 50% Digital Service Protection - 20% Critical Service Protection - 17% Electronic Identification and Trust Services - 78% Personal Data Protection - 100% Cyber Incident Response - 50% Cyber Crisis Management - 60% Combatting Cybercrime - 100% Military Cyber Operations - 17%

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Romania	89.61	6	<p>Cybersecurity Policy Development - 100%</p> <p>Cyber Threat Analysis and Intelligence - 80%</p> <p>Education and Professional Development - 78%</p> <p>Contribution to Global Cybersecurity - 83%</p> <p>Digital Service Protection - 80%</p> <p>Critical Service Protection - 100%</p> <p>Electronic Identification and Trust Services - 89%</p> <p>Personal Data Protection - 100%</p> <p>Cyber Incident Response - 100%</p> <p>Cyber Crisis Management - 60%</p> <p>Combating Cybercrime - 100%</p> <p>Military Cyber Operations - 100%</p>
Ukraine	75.32	24	<p>Cybersecurity Policy Development - 100%</p> <p>Cyber Threat Analysis and Intelligence - 80%</p> <p>Education and Professional Development - 89%</p> <p>Contribution to Global Cybersecurity - 33%</p> <p>Digital Service Protection - 20%</p> <p>Critical Service Protection - 100%</p> <p>Electronic Identification and Trust Services - 100%</p> <p>Personal Data Protection - 100%</p> <p>Cyber Incident Response - 67%</p> <p>Cyber Crisis Management - 60%</p> <p>Combating Cybercrime - 100%</p> <p>Military Cyber Operations - 17%</p>
Bulgaria	74.03	28	<p>Cybersecurity Policy Development - 71%</p> <p>Cyber Threat Analysis and Intelligence - 80%</p> <p>Education and Professional Development - 100%</p> <p>Contribution to Global Cybersecurity - 33%</p> <p>Digital Service Protection - 40%</p> <p>Critical Service Protection - 50%</p> <p>Electronic Identification and Trust Services - 89%</p> <p>Personal Data Protection - 100%</p> <p>Cyber Incident Response - 100%</p> <p>Cyber Crisis Management - 20%</p> <p>Combating Cybercrime - 100%</p> <p>Military Cyber Operations - 67%</p>
Russian Federation	71.43	30	<p>Cybersecurity Policy Development - 86%</p> <p>Cyber Threat Analysis and Intelligence - 60%</p> <p>Education and Professional Development - 89%</p> <p>Contribution to Global Cybersecurity - 17%</p> <p>Digital Service Protection - 40%</p> <p>Critical Service Protection - 83%</p>

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

			Electronic Identification and Trust Services - 100% Personal Data Protection - 100% Cyber Incident Response - 50% Cyber Crisis Management - 20% Combating Cybercrime - 78% Military Cyber Operations - 100%
Moldova	57.14	62	Cybersecurity Policy Development - 100% Cyber Threat Analysis and Intelligence - 20% Education and Professional Development - 79% Contribution to Global Cybersecurity - 33% Digital Service Protection - 20% Critical Service Protection - 0 Electronic Identification and Trust Services - 100% Personal Data Protection - 100% Cyber Incident Response - 50% Cyber Crisis Management - 0 Combating Cybercrime - 100% Military Cyber Operations - 17%

Source: e-Governance Academy Foundation. <https://ncsi.ega.ee/> (accessed on October 12, 2023)

The next index will be the Global Cybersecurity Index 2020, developed by the International Telecommunication Union (ITU). The main achievements are presented in the following table.

Table 3. Global Cybersecurity Index 2020: Country profiles

Country Name	Overall Score	Regional Rank	Criteria
Russian Federation	98.06	5	Legal Measures - 20.00 Technical Measures- 19.08 Organizational Measures - 18.98 Capacity Development - 20.00 Cooperative Measures - 20.00
Turkiye	97,50	11	Legal Measures - 20.00 Technical Measures - 19.54 Organizational Measures - 17.96 Capacity Development Measures - 20.00 Cooperative Measures - 20.00
Romania	76.29	62	Legal Measures - 18.60 Technical Measures - 18.40 Organizational Measures - 6.42 Capacity Development Measures - 12.88 Cooperative Measures - 20.00
Moldova	75.78	63	Legal Measures - 16.73 Technical Measures - 16.86 Organizational Measures - 13.21 Capacity Development Measures - 13.09

			Cooperative Measures - 15.89
Bulgaria	67.38	77	Legal Measures - 17.34 Technical Measures - 7.84 Organizational Measures - 13.72 Capacity Development Measures - 14.92 Cooperative Measures - 13.57
Ukraine	65.93	78	Legal Measures - 17.46 Technical Measures - 11.60 Organizational Measures - 13.06 Capacity Development Measures - 10.94 Cooperative Measures - 12.87

Source: Global Cybersecurity Index 2020: Country profiles.
<https://www.itu.int/epublications/publication/D-STR-GCI.01-2021-HTML-E> (accessed 12.10.23)

5. CYBER-DEPENDENT CRIMES

We will link the probability of cyber conflicts with cyber-dependent crimes, defined as organized crimes that are dependent on the use of a computer, computer network or other forms of information communications technology (ICT). These include the spread of viruses or other malware, hacking, distributed denial of service (DDoS) attacks, ransomware and cryptocurrency fraud. These activities are considered to be conducted for the purpose of obtaining a monetary or material benefit (as opposed to a political or ideological objective).

Overall, the CDC index for Europe is 5.58. Let's examine the achieved results for individual countries, as presented in the following table.

Table 4. CDC Indexes by Individual Countries

		Turkiye	Bulgaria	Romania	Moldova	Ukraine	Russia
1	Criminality Scores	7,03 (+0,14)	5,65 (+0,23)	4,58 (-0,01)	5,60 (+1,15)	6,48 (+0,31)	6,87 (+0,63)
2	Criminal Market Scores	6,77 (+0,37)	5,40 (+0,30)	5,27 (+0,22)	5,20 (+1,30)	6,27 (+0,67)	6,83 (+0,73)
3	Criminal Actors Scores	7,30 (-0,08)	5,90 (+0,15)	3,90 (-0,23)	6,00 (+1,00)	6,70 (-0,05)	6,90 (+0,53)
4	Resilience Scores	3,38 (-0,17)	5,33 (+0,04)	6,00 (+0,42)	3,92 (+0,21)	4,54 (+0,54)	3,79 (-0,25)
5	Cyber-Dependent Crimes	5,00	6,00	6,00	7,50	8,50	9,00

Source: Global Organized Crime Index 2023. <https://ocindex.net/report/2023.html> (accessed 12.10.23)

The analysis of the data presented in the table above allows for the following preliminary conclusions. Firstly, the crime rate is increasing in all countries, except for

Romania. Secondly, there is a growth in the criminal market in all countries, with the highest increase in Moldova - 5.20 (+1.30). Thirdly, there is an increase in criminal actors in all countries, except for Turkiye, Romania, and Ukraine. Fourthly, the indicators of resilience show significant variation. Fifthly, the level of cyber-dependent crimes differs significantly: the lowest is observed in Turkiye (5.00), while the highest is in Russia (9.00).

6. CONCLUSION

Cyberspace has become a highly contested virtual territory, with countries, corporations, and individuals using it for both tactical and strategic purposes. This reflects the growing importance of the digital realm in modern society. Today's problems of political, technical and economic issues confront us with cyber espionage, data manipulation and digital disinformation. Addressing these important issues within cyberspace necessitates not only thorough scientific analysis but also effective solutions.

The authors of this study proceeded with the premise that a comprehensive examination of cyber conflict's nature could significantly enhance the multilateral collaborative process. It is important to emphasize that the level of cooperation varies in response to the conflict's dynamics and the local conflict management mechanisms.

A focus should be directed towards recognizing potential cooperative opportunities among conflicting parties, assessing their informational capacities, and considering the impact of external actors.

REFERENCES

- Anon., n.d. *Composite Index of National Capability*. [Online] Available at: [https://www.wikiwand.com/en/Composite Index of National Capability#introduction](https://www.wikiwand.com/en/Composite_Index_of_National_Capability#introduction) [Accessed 20 10 2023].
- Betz, D. S. T., 2011. *Cyberspace and the state: toward a strategy for cyber-power*. s.l.:The International Institute for Strategic Studies.
- Brantly, A. F., 2016. *The decision to attack : military and intelligence cyber decision-making*. s.l.:Athens, GA : University of Georgia Press,.
- Friis, K. & Ringsmose, J., 2016. *Conflict in Cyber Space: Theoretical, Strategic and Legal Perspectives*. s.l.:Routledge Studies in Conflict, Security and Technology.
- Hari Vasudevan (editor), S. S. D. (. A. M. (. M. M. (. N. M. S. T. P. N. R. S. M., 2022. *Cyber Security Threats and Challenges Facing Human Life*. s.l.:Chapman and Hall/CRC.

Hari Vasudevan), S. S. D. A. M. M. M. N. M. S. T. P. N. R. S. M., 2022. *Cyber Security Threats and Challenges Facing Human Life*. s.l.:Chapman and Hall/CRC.

Jansen van Vuuren, J., 2018. *Council for Scientific and Industrial Research*. [Online]

Available at: <https://researchspace.csir.co.za/dspace/handle/10204/10361> [Accessed 20 10 2023].

Julia Voo, I. H. D. C. 2. N. C. P. I. 2. R. S. 2., 2022. *National Cyber Power Index 2022*. [Online]

Available at: <https://www.belfercenter.org/publication/national-cyber-power-index-2022> [Accessed 20 10 2023].

Kello, L., 2017. *The Virtual Weapon and International Order*. s.l.:Yale University Press.

Laurent, S.-Y., 2022. *Conflicts, Crimes and Regulations in Cyberspace, Volume 2*. s.l.:John Wiley & Sons.

Lee, M., 2023. *Cyber Threat Intelligence*. s.l.:John Wiley & Sons Inc.

Libicki, M., 2016. *Cyberspace in Peace and War*. s.l.:Naval Institute Press.

Martti Lehto, P. N., 2018. *Cyber Security: Power and Technology*. s.l.:Springer International Publishing.

Maurer, T., 2018. *Cyber Mercenaries: The State, Hackers, and Power*. s.l.:Cambridge University Press.

Mishra, B. K. P. J. R. C., 2020. *Understanding Cyber Threats and Attacks*. s.l.:Nova Science Publishers Inc..

Perkovich, G. & Levite, A. E., 2017. *Understanding Cyber Conflict: 14 Analogies*. s.l.:Georgetown University Press.

Power, D. J. & Sutton, D., 2018. *Business continuity in a cyber world: surviving cyberattacks*. s.l.:Business Expert Press.

Sheymov, V., 2021. *CYBERSPACE and SECURITY: A Fundamentally New Approach*. s.l.:Cyberbooks Publishing.

Yassine Maleh, M. A. L. T. I. R., 2023. *Big Data Analytics and Intelligent Systems for Cyber Threat Intelligence*. s.l.:River Publishers.

Artificial Intelligence – Some Ethical Issues in the Context of State Government

Rumyana Popova¹, Vladimir Karadzhov²

Abstract

Introduction: The application of artificial intelligence (AI) has been steadily increasing in diverse spheres of life, such as technologies, economics, education, art and culture, even in politics and others. What is more, the everyday life has been deeply impacted by the development of the AI. As AI is possibly to become integrated into the operations of state governments worldwide, ethical concerns emerge, regarding the extent of AI's autonomy in decision-making and action execution. This research article, therefore, delves into the ethical dimensions of AI deployment within the context of state government and public relations, focusing on two distinct usage scenarios. In the first scenario, AI serves as a tool for information analysis and recommendation without executing decisions or actions autonomously. The second scenario involves AI systems with the authority to independently execute decisions and actions that require the imperative human oversight. Human involvement is essential to ensure that decisions made by AI align with societal values, uphold legal and ethical standards, and safeguard against unforeseen consequences. This dual-tier approach, combining AI's capabilities with human confirmation, strikes a balance between technological advancement and ethical responsibility.

Aim: This study aims to provide certain guidelines for policymakers and technologists in navigating the ethical complexities of AI implementation in the public sector.

Method: The study employs a comparative analysis approach to assess the ethical considerations surrounding AI's autonomy in state government and public relations. It examines the differing needs of AI systems in two distinct scenarios, offering insights into the balance between AI autonomy and human oversight.

Findings: The research findings emphasize the importance of a dual-tier approach in state government AI deployment.

Originality and value: This research contributes to the emerging field of AI ethics by specifically addressing the ethical challenges posed by AI in state government and public relations. The value of the research is set to outline the framework of future solutions and it puts forth the question of the influence of the AI regarding state governments and policymakers, thus focusing on the ethical implications of AI integration.

Key Words: Artificial Intelligence, SWOT Analysis, Ethical Issues, State Government, AI Autonomy, Decision-Making, Human Oversight, Ethical Guidelines.

Jel Codes: D63, O38

¹ Assistant Professor, PhD, South-West University “Neofit Rilski”, Faculty of Philosophy, Department of Philosophical and Political Sciences, Bulgaria

² Chief-Assistant Professor, PhD, South-West University “Neofit Rilski”, Faculty of Mathematics and Natural Sciences, Department of Geography Ecology and Environmental Protection, Bulgaria

1. INTRODUCTION

Artificial intelligence (AI) is a milestone in human history. Development is a value people has always been striving for. AI is a phenomenon that is making history and is going to shape the new image of modern-day societies and coming civilization. The application of artificial intelligence (AI) has been steadily increasing in diverse spheres of life, from E-health and online public services to economics, education, art and culture, even in politics and others. What is more, the everyday life has been deeply impacted by the development of AI technologies. As AI is possibly to become integrated into the operations of state governments worldwide, ethical concerns emerge, regarding the extent of AI's autonomy in decision-making and action execution.

This research delves into the ethical dimensions of AI deployment within the context of state government and public relations, focusing on two distinct usage scenarios that are going to be further presented. The study **aims** to turn policymakers and technologists' attention to the ethical complexities of AI implementation in the public sector. The study **employs** a comparative analysis approach to assess the ethical considerations surrounding AI's autonomy in state government and public relations. It examines the differing needs of AI systems in two distinct scenarios, offering insights into the balance between AI autonomy and human oversight. In order to comprehensively examine the intricacies and implications of artificial intelligence, this article also employs a SWOT analysis framework. The research **findings** emphasize the importance of a dual-tier approach in state government AI deployment. This research **contributes** to the emerging field of AI ethics by specifically addressing the ethical challenges posed by AI in state government and public relations. The value of the research is set to outline the framework of future solutions and it puts forth the question of the influence of the AI regarding state governments and policymakers, thus focusing on the ethical implications of AI integration.

2. LITERATURE REVIEW

1.1 What is Artificial Intelligence?

The linguistic roots of the term *intelligence* are from Old French meaning “*the highest faculty of the mind, capacity for comprehending general truths*”³ and are also related to the notions “*understanding, knowledge, power of discerning; art, skill, taste*”⁴ (Latin). The semantic evolution enriches the meaning with “*superior understanding, sagacity, quality of being intelligent*”. The examination of the contextual nuances of the word's meaning is committed today with the understanding of what is *artificial intelligence*.

There is no universal concept that defines what *Artificial intelligence* (AI) is. Diverse terminology is used, depending on the core interests or target field of the various actors and groups. AI definitions typically refer to: “(1) the types of outputs produced (e.g., predictions), (2) the techniques employed (e.g., machine learning) and (3) the level of autonomy exercised” (Gray et al., 2023).

Stanford Professor John McCarthy who coined the term *artificial intelligence* in 1955, defines it as the “science and engineering of making intelligent machines,

³ *Intelligence*. In Online Etymology Dictionary. Retrieved November 10, 2023, from <https://www.etymonline.com/search?q=intelligence>

⁴ Ibid.

especially intelligent computer programs”⁵. His use of the term helped formalize the field and pave the way for decades of research and development.

What characterizes AI is its ability to perform human-like activities, such as *reasoning, learning, planning* and *creativity*. AI equips technology with the ability to sense its surroundings, analyze information, formulate solutions, and execute tasks to attain desired outcomes. AI systems can also dynamically adjust their behavior to some extent by learning from the consequences of their past actions and operating independently⁶.

The European Commission defines *artificial intelligence* as referring “to systems that display intelligent behavior by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications).”⁷

The European Commission expands the definition of artificial intelligence and explains certain features of AI as “a scientific discipline and as a technology”, for the purpose of promoting a shared knowledge of AI basic principles, addressing both AI professionals and nonexperts, and integrating the ethical guidelines for this evolving algorithm and its policy recommendations.

The Proposed Rules on Artificial Intelligence (EU Artificial Intelligence Act) regards the AI system as a “software that ... for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with”⁸.

When examining AI systems, it is needed to highlight the AI key subfields that enable computers learn and execute all their actions – machine learning and deep learning. ***Machine learning*** is a technique that teaches machines to learn

⁵ *What is Artificial Intelligence?* John McCarthy’s Official Website. Retrieved November 10, 2023, from <http://jmc.stanford.edu/artificial-intelligence/what-is-ai/index.html>

⁶ *What is artificial intelligence and how is it used?* (2023) European Parliament’s Official Website. Retrieved November 9 2023, from https://www.europarl.europa.eu/news/en/headlines/society/20200827STO85804/what-is-artificial-intelligence-and-how-is-it-used?at_campaign=20234-Digital&at_medium=Google_Ads&at_platform=Search&at_creation=DSA&at_goal=TR_G&at_audience=&at_topic=Artificial_Intelligence&gclid=Cj0KCQjwuNemBhCBARIsADp74QSmBnOu_21JavHryTd668pcEqfK_hSE4FS81EZyfrwVJT5aGuhnnMgaAmkYEALw_wcB

⁷ High-Level Expert Group on Artificial Intelligence (2019) *A Definition of Artificial Intelligence: Main Capabilities and Scientific Disciplines*. European Commission. Retrieved November 10, 2023 from: <https://digital-strategy.ec.europa.eu/en/library/definition-Practically, AI aids humans, boosts their capabilities, improve the efficiency in many aspects of life, referring to the complexed interconnections modern world functions today. These complexed interconnections are characterized by many processes, some basic however are the globalization and the digitalization of public services and public relations. Information is everywhere and everything is information. Consequently, AI is everywhere, since it is a data collection, processing and transformation phenomenon.artificial-intelligence-main-capabilities-and-scientific-disciplines>

⁸ Article 3: Definitions. European Union Artificial Intelligence Act. (2021) Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts Retrieved November 10 2023, from: <https://artificialintelligenceact.eu/the-act/>, p. 39.

from data, identify patterns and make decisions without being explicitly programmed. It is used in a variety of applications, such as spam filtering, image recognition, and fraud detection. **Deep learning** is a subset of machine learning that uses artificial neural networks to learn from data. Neural networks are inspired by the human brain and are able to learn complex patterns from data. Deep learning is used in a variety of applications, such as natural language processing, computer vision, and speech recognition⁹. Machine learning and deep learning are fundamental approaches to achieving artificial intelligence, enabling machines to learn from data, recognize patterns, and make decisions without explicit programming. They are important because of their qualities of driving significant advancements in AI capabilities.

1.2 The Positive Impacts of Artificial Intelligence

Practically, AI facilitates humans, provides assistance, improves efficiency and safety in many aspects of life, referring to the complexed interconnections modern world functions today. These complexed interconnections are characterized by many processes, some basic however are the globalization and the digitalization of public services and public relations. Information is everywhere and everything is information. Consequently, AI is everywhere, since it is a data collection, processing and transformation phenomenon.

Artificial intelligence is revolutionizing various aspects of our lives, from healthcare to transportation, by enhancing efficiency, improving decision-making, driving innovations etc. AI's potential to solve complex problems and automate tasks promises to make our lives easier, safer, and more productive. The following core levels of AI's application may be outlined:

1. Assisting and facilitating the everyday life of the population

The everyday use of consumer electronics and digital devices, search engines help, online shopping, ensuring cybersecurity for people's everyday routines, autonomous vehicles, and many more, people do not realize the full extent of what really the presence of AI in our everyday life is.

2. Competitive advantages for businesses - Facilitating and improving businesses

The technology of AI can be applied to many different sectors and industries, improving the business performance. Any product and service development sector are impacted by the adoption of AI technologies. Manufacturing, technology sector, financial industry, corporate finances, marketing and sales are only some of them.

3. Assisting and facilitating state government to improve the public services and state administration

Applications for AI are also being used to make trading easier and all relating processes, such as supply, demand, and pricing. Bank and financial relations are highly impacted by AI technologies since the essence and performance of these branches are related to the procession of a large data bases and producing analyses. AI technologies are substantial in terms of national security reasons

⁹ What is Machine Learning? Retrieved November 19, 2023, from <https://www.ibm.com/topics/machine-learning>

and AI technology innovations maintain and strengthen states' competitiveness. Defense, intelligence, and law enforcement agencies are commonly deploying AI. AI technologies are adopted in many public sectors as public administration, transportation, education etcetera.

Several factors, including automation of labor processes, technological advancements, and the emergence of new competitors, influence the growth of productivity driven by AI. The report by the McKinsey Global Institute explores the impact of AI on supply chains, revealing that 61% of executives have witnessed reduced costs and 53% have experienced revenue growth as direct consequences of incorporating AI into their supply chain operations (EU Intellectual Property Office, 2022).

Some of the positive impacts that we consider of the adoption of AI, are further expressed in the following lines below. It is to be noted that this is a non-exhaustive list of the benefits of AI that is going to be presented:

- Provides free access and availability.
- Ensures promptness of performance and results.
- Increases productivity.
- Ensures high accuracy and efficiency of results.
- Provides reduction of human errors.
- Gathering and processing large quantities of data. Drawing inferences.
- Facilitates processes in investigation, detection and prevention of crimes and terrorism.
- Early warnings of natural disasters and preparation and mitigation of consequences.
- Prevention of disinformation.
- Improvement of workforce safety.

AI can improve the employees' safety and efficiency as it can collaborate or replace people for specific or dangerous work tasks. For instance, 50% of construction companies that used drones to inspect roofs and other risky tasks achieved improvements in safety. AI can also ensure smart solutions for the safety of employees¹⁰. A McKinsey Global Institute report predicts that approximately 30% of global work hours could be automated by 2030. AI can facilitate this automation by taking over repetitive or hazardous tasks, allowing employees to concentrate on higher-order strategic and analytical work (European Union Intellectual Property Office, 2022).

- Healthcare benefits.

AI has developed its potential in healthcare in terms of improving diagnoses and identifying treatments of patients, for example by the detection of 95% of skin cancers by learning from large sets of medical images (Goyal, 2020); training of medical specialists, as well as supporting the work of medical workers. As Gabriela Belova argues, the introduction of information and communication technologies in the distribution and access to health care and

¹⁰ ProCon.org. (2023). *Artificial Intelligence (AI) — Top 3 Pros and Cons*. ProCon.org. <https://www.procon.org/headlines/artificial-intelligence-ai-top-3-pros-and-cons>

services, as well as the sharing of health-related information, inevitably raises some ethical and legal issues (Belova, 2019).

1.2 The Ethics of Artificial Intelligence: Striking a Balance between Progress and Potential Harm

1.2.1. The ethical dimension

The significance of the AI is now being open to debate with various opinions and points of view clashing in the process. The adoption of AI offers a multitude of advantages that extend far beyond what is mentioned in the present research. While AI offers a multitude of benefits, it is crucial to acknowledge and address the ethical concerns that accompany its development and implementation.

Nation states are the main political organizations and main subjects of the international relations and international law. States and state power perform specific functions and have responsibilities towards their individuals and societies in the context of globalization and regionalization, bearing the characteristics of digitalized social relations (Popov, 2019). Such responsibilities are protection and promotion of human rights, provision on fruitful economic, social and cultural environment, creation of employment opportunities, ensuring security etc. The implementation of some of these responsibilities is characterized by perplexed challenges in the context of globalization and digitalization of relations in every sphere of life.

The debate over artificial intelligence and its influence on societies is controversial with two main standpoints - AI is not able to substitute for human mind and AI is on its way to outstrip human potential to even emphasizing of claims that AI replaces humans with a high accuracy of the outputs. Subsequently, this process being real not only is imposing risks, but is raising critical ethical concerns that demand special consideration.

What is *ethics* and *ethical norms* and why are they important?

The origin of the term ethics dates back to the late 14c., when *ethic* is regarded as a “study of morals”, from Old French *etique* “ethics, moral philosophy” (13c.). The meaning “moral principles of a person or group” is attested from 1650s. As of 1600, the term is associated with the meaning of “pertaining to morality”¹¹.

Etymologically, the notion *moral* (1mid-14c.) is “associated with or characterized by right behavior,” also “associated with or concerning conduct or moral principles” (good or bad). From late 14c. as “of or pertaining to rules of right conduct” and “morally good, in accordance with rules of right conduct” From 1680s, the term is associated with reference to rights, duties, etc., “founded on morality”¹².

¹¹ *Ethics*. In Online Etymology Dictionary. Retrieved November 10, 2023, from <https://www.etymonline.com/search?q=ethics>

¹² *Ethics*. In Online Etymology Dictionary. Retrieved November 10, 2023, from <https://www.etymonline.com/search?q=ethics>

Ethical norms, or moral principles, have a key role nowadays. They “govern people’s behavior and the way they conduct life’s activities”¹³. They are based on the concepts of human dignity and require consciousness, commitments and responsibilities.

As Stuart Russel and Peter Norving have stated, history reveals that technological advancements have often led to unforeseen and undesirable consequences, such as the Chernobyl catastrophe and the looming threat of global nuclear war illustrate the precarious balance between progress and imminent danger. Similarly, the internal combustion engine, while revolutionizing transportation, has also unleashed environmental woes. The air pollution and global warming are among the most serious issues of our time and in a sense, automobiles are robots that have taken over the world by making themselves indispensable (Russel, Norving, 2010).

Some of the reasons why the use and development of AI create potential risks are the following:

1. AI possesses the ability to continuously enhance its capabilities through self-learning algorithms.
2. AI can execute tasks that exhibit intelligence without the need for explicit instructions.
3. AI demonstrates the capacity for rational thought and action.
4. AI is designed to observe and emulate human behavior in order to perform tasks effectively¹⁴.

To further delve into the potential ethical concerns associated with AI, below are presented some of them.

- Unregulated provision of rights to perform independent actions and decision making.

Unregulated provision of rights to perform independent actions and decision-making of AI could lead to autonomous systems that act without human oversight or control, potentially posing significant risks to human safety, security, and well-being (Bostrom, 2014).

- Misuse of sensitive information.

The misuse of sensitive information with reference to AI could refer to the unauthorized access, use, or disclosure of personal data by AI systems, often with harmful consequences for individuals or society. Some cases we may consider of misuse of sensitive information with reference to AI may include *data breaches*: AI systems can be used to hack into databases and steal sensitive personal information, such as Social Security numbers, medical records, and financial data; *discrimination*: AI systems can be used to discriminate against individuals based on their gender, race, religion or other characteristics; *surveillance*: AI systems can be used to surveil individuals without their knowledge or consent, thus potentially violating their privacy rights.

¹³Ethics and Empathy (2023) Council of Europe’s Official Website. Retrieved November 10, 2023, from <https://www.coe.int/en/web/digital-citizenship-education/ethics-and-empathy>

¹⁴ What is Artificial Intelligence in 2024? Types, Trends, and Future of it? (2023) Great Learning Team. Retrieved November 10, 2023, from <https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/#how-do-we-measure-if-artificial-intelligence-is-acting-like-a-human>

- Privacy and Security risks and Data protection/ Data theft

The advancements in AI have introduced a new dimension of security risks that challenge nation states, citizens and organizations. Malicious use of AI could threaten digital security (for instance by cybercriminals employing AI-powered hacking tools or employing AI-generated social engineering tactics to manipulate victims with superhuman efficiency), physical security and political security (e.g., by deploying privacy-invasive surveillance systems, discriminatory profiling algorithms, and automated disinformation campaigns) (Brundage, 2018).

- *Data theft*, also known as information theft, represents the illegal transfer or storage of personal, confidential, or financial information. This is the unauthorized access to digital information stored on computers, servers, or electronic devices with the intent to obtain confidential information or infringe upon privacy. The stolen data can encompass a wide range of sensitive information, including online passwords, bank account details, passport numbers, driver's license numbers, social security numbers, medical records, online subscriptions, software code or algorithms, proprietary processes or technologies, and more. Once an unauthorized individual gains access to personal or financial information, they can manipulate, alter, or even block access to it without the owner's consent¹⁵.

Referring to *personal data protection*, data exchange and collection have increased dramatically to a global scale, with people disclosing their personal information and making it publicly available. The economic and social integration, cohesion and networking, along with the enhanced advancement in technology, have resulted in posing new risks to the preservation of personal information and data flows¹⁶.

Privacy risks: Along with the numerous benefits of AI related to healthcare, there are security and privacy risks that must be considered, such as data breaches made by cybercriminals. Users of any kind of digital services may become victims of violation of privacy. Private or work email addresses, social media accounts or any other accounts with personal information may be subjected to AI-enabled malware by hackers to identify potential vulnerabilities. Any health care providers that operate with sensitive information of patients, is a potential target of data breach.

Facial recognition technology in private and public sectors is increasingly common nowadays, yet it poses privacy risks, apart from the benefits it provides. It is being applied for a wide range of purposes including identification, verification, object or person detection, access control, group demographic analysis, and sentiment or affect analysis. Facial recognition is adopted by law enforcement agencies to support investigations and for mass or targeted

¹⁵ What is Data Theft and How to Prevent It? Retrieved November 10, 2023, from <https://www.kaspersky.com/resource-center/threats/data-theft>

¹⁶ Data Protection in EU. European Council and Council of the European Union's Official Website. Retrieved November 10, 2023, from <https://www.consilium.europa.eu/en/policies/data-protection/>

surveillance; in *education* it is used for access control and identification of potential security risks. In Europe, the Swedish Data Protection Authority (DPA) fined a school for implementing a pilot of facial-recognition technology to track students' attendance due to violated several articles of the EU's General Data Protection Regulation. Facial recognition is widely used in *transportation* systems for various ends, such as scanning passengers' faces instead of physical tickets (China), deferring fare evasion (New York), even governmental surveillance purposes (Argentina) and others. Facial recognition and other biometric technologies are used in the spheres of migration and immigration, for border security and checkpoints monitoring, etc. (Richardson, 2021).

The digitalization of personal and business data increases the concerns related to data security and protection, and the level of vulnerability of users. The users of digitalization are considered both ordinary citizens as well as government authorities and administration. This in turn brings up the question of the reliability of AI systems used in public administration and private lives, especially in the context of a globalized world with connections and networks surpassing nation states' boundaries.

The wide-ranging use of AI in surveillance, persuasion and deception poses significant threats to political security of nation states. AI-powered surveillance systems could enable unprecedented levels of invasion of privacy, while AI-generated propaganda and manipulated videos could increase social manipulation, and also undermine public trust. Additionally, AI's ability to analyze human behaviors and beliefs could lead to different forms of manipulation and control. These risks are particularly concerning for authoritarian regimes but also threaten the integrity of democratic systems (Brundage, 2018).

- Hacker attacks/ Viruses/ Increase in Cybercrime

The enhanced technological trends of incorporation of electronic services and the highly increased use of mobile devices over the last decades, has produced another threat for users and has increased the challenges faced by the law enforcement authorities of states. The advancement of AI provides cybercriminals with powerful tools for automating attacks, bypassing security measures and evading detection.

- Increased Xenophobia and Chauvinization / Radicalization/ Extremism of groups in the society on political, social or religious issues.

While AI is often portrayed as a countermeasure against violent extremism, its algorithms and applications can also serve as a tool for radicalization and polarization of public opinions, as well as to disseminate racist attitudes and incite political instability. Researchers in cybersecurity are recognizing to a great level the links between cybersecurity practices and societal issues like racial injustice and violence. Extremist groups, such as Al-Qaeda and ISIS for example, have effectively exploited online platforms to spread their radical messages; recruit new members; as well exploit existing polarization within societies. Similarly, far-right groups have utilized online space to spread the narratives and belief that white people are inherently superior to other races, to criticize opposing viewpoints, and encourage violence against marginalized

communities. Emerging technologies, including AI-powered algorithms and gaming platforms, are being harnessed by extremist actors to expand their reach, enhance their propaganda and accelerate their recruitment efforts (Burton, 2023).

As it has been alluded to before, facial recognition is racially biased. Beyond facial recognition, online AI algorithms frequently fail to recognize and censor racial slurs, AI algorithms have also been found to show a “persistent anti-Muslim bias” by associating violence with the word “Muslim” at a higher rate than with words describing other religions including Christians, Jews, Sikhs, or Buddhists¹⁷.

- Biases

When referring to ethical concerns related to AI, biases are often discussed. Data can contain inherent biases that can lead to discriminatory outcomes when used in machine learning algorithms. Machine learning systems are able to create prerequisites for gender biases or discrimination on the basis of certain characteristics, for example in recruitment. These circumstances indeed surpass the boundaries of ethical issues, but could also be recognized as human rights violations (Stahl, 2021). Automated recruitment system at Amazon was found to discriminate against women, likely due to historical biases in the company's hiring practices. Similarly, the COMPAS¹⁸ risk assessment algorithm, used to predict recidivism, was found to be biased against black defendants. These examples highlight the dangers of using biased data in machine learning and the need for careful scrutiny of such systems (Müller, 2020).

Since the potential of machine learning to violate the right to equality and non-discrimination (basic human rights), we argue that human involvement is essential to ensure that decisions made by AI align with societal values, uphold legal and ethical standards and provide protection against unforeseen consequences.

- Workforce reduction

There are many concerns related to the pace of artificial-intelligence development and the automation of certain jobs, and how it may affect human employment. Workforce reduction is another disputed issue and among the biggest challenges world governments are already facing. There are professions and work places that are being threatened by the adoption and development of AI. Such clashes already exist in factories that use new technologies and robots in manufacturing and food production; between shop assistants and online shopping and advertising; human translators and machine translations; personal assistants vs. digital personal assistants etc.

In a special survey of Eurobarometer from 2017, 88% of the respondents reveal the widespread concerns of Europeans that the use of robots and artificial intelligence leads to job losses as they consider that these technologies need careful management (Eurobarometer, 2017).

¹⁷ ProCon.org. (2023). *Artificial Intelligence (AI) — Top 3 Pros and Cons*. ProCon.org. <https://www.procon.org/headlines/artificial-intelligence-ai-top-3-pros-and-cons>

¹⁸ Correctional Offender Management Profiling for Alternative Sanctions

Following the contemplations on the future of Yuval Harari, new jobs created by technological advancements will require high levels of expertise, leaving unemployed unskilled workers without job prospects. Retraining unskilled workers for these new jobs may be more difficult than the creation of the jobs themselves. Unlike previous waves of automation, where workers could be able to make transition between low-skill jobs, the skills required for new jobs in the future will be much more specialized. This could lead to the rise of a „useless class“ as Harari calls it, of unemployed individuals who lack the necessary skills for the new jobs. There exists the possibility to turn out to be in a situation where there is both high unemployment and a shortage of skilled labor. This could trigger social and economic problems (Harari, 2019).

- **Educational issues**

The widespread adoption and easy access to AI tools offer to users in education convenience and efficiency, however, they provide concurrently a growing concern of developing plagiarism, undermined academic integrity and diminished creativity and motivation for learning.

Yuval Hahari explains that the ongoing AI revolution is not only driven by advancements in computing power and hardware capabilities. Rather, it is a multidisciplinary endeavor based on the profound insights of life and social sciences. As our understanding, Harari maintains, of the complicated biochemical mechanisms in the basis of human emotions, desires, and decision-making processes deepens, we allow or authorize AI systems to more accurately analyze and interpret human behavior. This awareness of human cognition holds the potential for AI to surpass human capabilities in various areas or domains, including predicting future actions, making autonomous decisions, and even replacing human professionals in fields such as transportation, finance, and legal services (Harari, 2019). Alan Turing’s work “Computing Machinery and Intelligence” proposed the “Turing test” as a way to assess a machine's ability to exhibit intelligent behavior, equivalent to, or indistinguishable from, that of a human (Turing, 1950).

The adoption and use of artificial intelligence and its software in the provision of a number of services concerning the professional and everyday aspects of modern society indisputably raises a number of questions concerning legal, social and, with the particular emphasis on the present study, ethical norms. Policymakers need to formulate adequate and effective responses to the challenges AI presents for contemporary societies.

There are no generally accepted ethics standards for AI, because of its complexities, but safety and efficiency are to be set, especially for the mass users that tend to be more vulnerable to abuse. As Rosalind Picard maintains, “the greater the freedom of a machine, the more it will need moral standards” (Picard, 1997). To fully take advantage of the opportunities of a globalized network and foster a prosperous digital economy, it is crucial to strike a balance between securing personal data with the highest level of protection and enabling the seamless flow of such data.

3. RESEARCH METHODOLOGY

In the pursuit of understanding the intricacies and implications of Artificial Intelligence (AI), the chosen research methodology employs the widely recognized

SWOT analysis. This strategic tool, which stands for Strengths, Weaknesses, Opportunities, and Threats, is traditionally utilized in business settings to assess and strategize around internal and external factors. However, its adaptability makes it valuable in the context of AI research, providing a comprehensive framework for evaluating the technology's current state and

Why using SWOT analysis?

The utilization of SWOT analysis in this research on Artificial Intelligence (AI) serves several key purposes, making it a suitable and valuable method for this type of exploration:

- Comprehensive Examination:

SWOT analysis allows for a holistic evaluation of AI by systematically examining its internal factors (Strengths and Weaknesses) and external factors (Opportunities and Threats).

Suitability: AI is a multifaceted and rapidly evolving field with diverse aspects, ranging from technical capabilities to ethical considerations. SWOT analysis ensures that the research covers a broad spectrum of factors, providing a comprehensive view.

- Strategic Insights:

SWOT is a strategic planning tool designed to identify and leverage internal strengths, address weaknesses, capitalize on opportunities, and mitigate threats.

Suitability: AI development and deployment require strategic foresight. By using SWOT analysis, you can derive actionable insights that inform decision-making, guide development efforts, and contribute to the formulation of effective strategies for advancing AI responsibly.

- Adaptability to Emerging Trends:

SWOT analysis is flexible and adaptable, making it well-suited for research in dynamic and rapidly evolving fields like AI.

Suitability: The AI landscape is continually changing with technological advancements, emerging ethical considerations, and evolving societal needs. SWOT analysis accommodates this dynamism, allowing this research to stay relevant and responsive to emerging trends and challenges.

- Identifying Ethical Considerations:

SWOT analysis includes a focus on weaknesses and threats, enabling the identification of ethical concerns and potential risks associated with AI.

Suitability: Ethical considerations are paramount in AI research due to the potential societal impact and implications of AI technologies. SWOT analysis ensures a systematic exploration of ethical challenges, fostering responsible AI development.

- Strategic Planning for Future Development:

SWOT analysis not only assesses the current state of AI but also helps in planning for its future development.

Suitability: As AI continues to advance, understanding its trajectory and anticipating future challenges and opportunities is crucial. SWOT analysis provides a forward-looking perspective, aiding in the development of strategies that align with the evolving landscape of AI.

In summary, the use of SWOT analysis in this AI research is justified because it provides a structured and strategic framework for comprehensively examining AI, addressing its complexities, and offering valuable insights to guide both current and future developments in this rapidly evolving field.

4. RESULTS AND DISCUSSION

Comprehensive Insights through SWOT Analysis.

In employing the SWOT analysis as a research methodology, this study seeks to provide a holistic understanding of AI - acknowledging its strengths, addressing its weaknesses, exploring potential opportunities, and mitigating potential threats. This strategic approach not only offers a nuanced perspective on the current state of AI but also provides valuable insights for guiding its future trajectory in an ethically responsible manner.

Qualitative (Traditional) SWOT analysis

The use of SWOT analysis in this AI research is justified because it provides a structured and strategic framework for comprehensively examining AI, addressing its complexities, and offering valuable insights to guide both current and future developments in this rapidly evolving field (Table 1).

Table 1. Traditional SWOT analysis on Artificial Intelligence (AI) utilization.

Strengths	Weaknesses
<p>Unveiling AI Prowess</p> <p>The initial phase of the SWOT analysis involves identifying the strengths of AI. This encompasses the technological advantages, innovations, and capabilities that set AI apart. By scrutinizing the current landscape, we aim to uncover AI's inherent strengths, such as its ability to process vast amounts of data rapidly, self-learn from experiences, and execute complex tasks with precision.</p>	<p>Addressing AI Limitations</p> <p>No technology is without its flaws, and AI is no exception. This phase involves a critical examination of the weaknesses inherent in AI systems. Potential pitfalls, ethical concerns, limitations in decision-making processes, and issues related to transparency and bias are among the aspects to be explored. Recognizing these weaknesses is crucial for developing strategies to mitigate and address them in the evolution of AI.</p>
Opportunities	Threats
<p>Navigating the AI Horizon</p> <p>In the realm of AI, opportunities abound. This segment of the analysis involves identifying external factors that could positively impact the growth and advancement of AI. This may include emerging technologies, evolving user needs, and new applications of AI in various industries. Understanding these opportunities is paramount for harnessing the full potential of AI and guiding its development in directions that align with societal and technological advancements.</p>	<p>Safeguarding Against Risks</p> <p>Equally important is the identification of threats that could impede the progress of AI. This includes ethical dilemmas, regulatory challenges, potential misuse of AI capabilities, and public skepticism. By acknowledging these threats, researchers can contribute to the establishment of ethical guidelines, regulations, and frameworks that ensure responsible AI development and deployment.</p>

The adoption and use of artificial intelligence and its software in the provision of a number of services concerning the professional and everyday aspects of modern society indisputably raises a number of questions concerning legal, social and, with the particular emphasis on the present study, ethical norms.

Policymakers need to formulate adequate and effective responses to the challenges AI presents for today's societies.

This research article delves into the ethical dimensions of AI deployment within the context of state government and public relations, focusing on two distinct usage scenarios.

- **In the first scenario**, AI serves as a tool for information analysis and recommendation without executing decisions or actions autonomously. In this case, we propose that AI should be granted significant latitude, allowing it to operate with a high degree of freedom. Such autonomy can optimize efficiency and accuracy, provided it adheres to predefined ethical guidelines and principles.

- **The second scenario** involves AI systems with the authority to independently execute decisions and actions that require the imperative human oversight. In this context, we argue that human oversight is imperative. Human involvement is essential to ensure that decisions made by AI align with societal values, uphold legal and ethical standards, and safeguard against unforeseen consequences. This dual-tier approach, combining AI's capabilities with human confirmation, strikes a balance between technological advancement and ethical responsibility.

Quantitative SWOT analysis

Quantitative SWOT data is not typical in a traditional SWOT analysis, since this method primarily involves qualitative assessments. However, this research intends to introduce some quantitative elements to the analysis, plus a scoring system. It is important to notice, that assigning numerical values to qualitative aspects may introduce subjectivity, but it can be a helpful exercise for prioritization and comparison (Table 2).

Here's a simplified example of quantitative scores on a scale from 1 to 10 for each aspect of the SWOT analysis:

Table 2. Quantitative SWOT analysis on Artificial Intelligence (AI) utilization.

Strengths	Weaknesses
Rapid data processing capabilities: 9 Self-learning abilities: 8 Precision in complex tasks: 7	Ethical concerns: 6 Lack of transparency: 5 Decision-making limitations: 7
Opportunities	Threats
Emerging technologies: 8 Increasing user needs: 7 New industry applications: 9	Ethical dilemmas: 6 Regulatory challenges: 7 Public skepticism: 4

There is no generally accepted ethics standards for AI, because of its complexities, but safety and efficiency is to be set, especially for the mass user that tend to be more vulnerable to abuse.

Including a graphic representation of the quantitative SWOT analysis in this article (Fig. 2) offers several advantages that can enhance the clarity, visual appeal, and communicative impact of the research:

- Visual Summarization:
- Comparative Analysis:
- Facilitating Decision-Making:
- Enhancing Readability:
- Communicating Complexity:

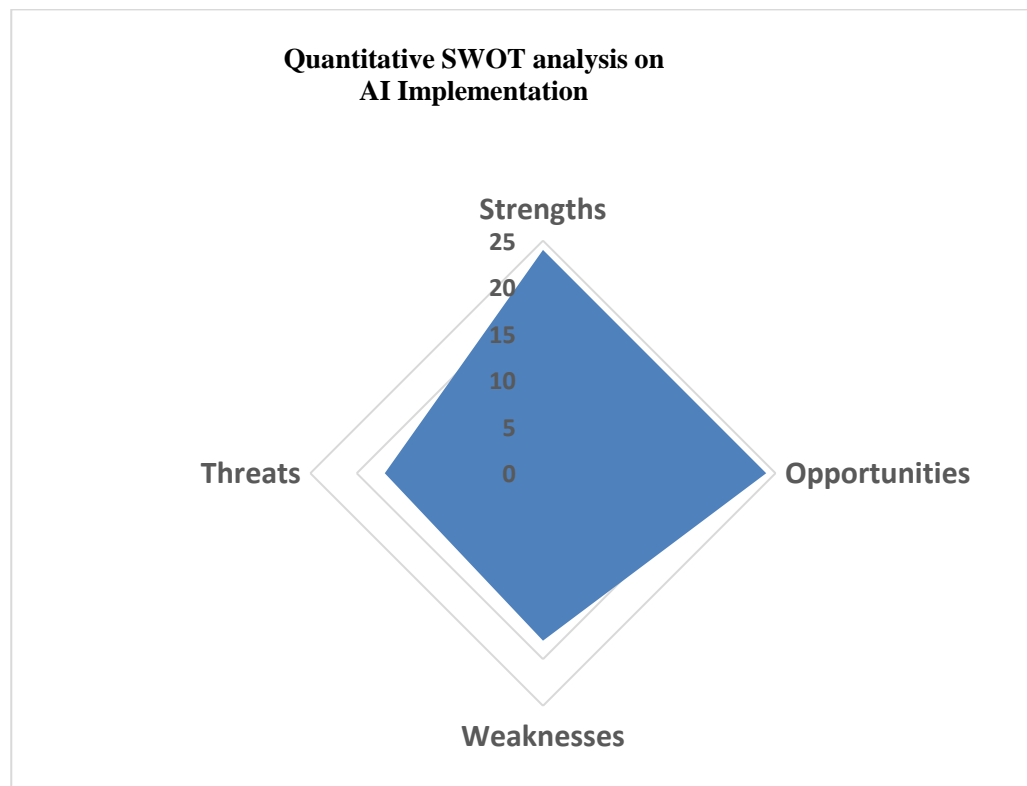


Fig. 1. Graphical representation on the “Quantitative SWOT analysis on AI implementation” results

The quantitative values derived from the SWOT analysis shed an optimistic light on the future of AI implementation. As we meticulously assessed the strengths, weaknesses, opportunities, and threats within the realm of Artificial

Intelligence, the numerical scores revealed a compelling narrative of promise and potential.

Embracing a Bright Future - Quantitative Affirmations in AI Implementation

The strengths of AI, with high scores in rapid data processing, self-learning capabilities, and precision in complex tasks, underscore its robust technological foundation. These inherent capabilities position AI as a formidable tool with the potential to revolutionize various aspects of our lives.

Addressing weaknesses proactively, the moderate scores in ethical concerns, lack of transparency, and decision-making limitations indicate a growing awareness and commitment to mitigating these challenges. This recognition signifies a collective effort to ensure responsible AI development, laying the groundwork for ethical and transparent practices.

Opportunities, with elevated scores in emerging technologies, increasing user needs, and new industry applications, point towards a landscape ripe for innovation. The quantitative values affirm that AI stands at the precipice of new horizons, ready to seize emerging opportunities and contribute to diverse fields.

Even in acknowledging threats, the modest scores in ethical dilemmas, regulatory challenges, and public skepticism indicate a conscious effort to anticipate and address potential risks. This proactive stance positions stakeholders to navigate challenges effectively, fostering a climate of trust and acceptance.

In sum, the quantitative values gleaned from the SWOT analysis paint a picture of a bright future for AI implementation. The technology's strengths, coupled with a commitment to addressing weaknesses and leveraging opportunities, position AI as a transformative force. As ethical considerations take center stage and regulatory frameworks evolve, the path forward appears characterized by innovation, responsibility, and a collective dedication to harnessing AI's potential for the greater societal good. The future of AI implementation, as illuminated by these quantitative affirmations, holds the promise of a technologically advanced and ethically sound era.

To fully embrace the opportunities of a globalized network and foster a thriving digital economy, it is imperative to strike a balance between safeguarding personal data with the highest level of protection and enabling the seamless flow of such data. This resonates with the second scenario, presented in the article.

As part of its digital strategy, the EU wants to regulate artificial intelligence (AI) to ensure better conditions for the development and use of this innovative technology - EU AI Act . Currently a draft regulation that was proposed by the European Commission on 21 April 2021. This regulation consists of a comprehensive set of rules for providers and deployers of AI systems, which details what obligations each entity has when using or deploying artificial intelligence in the European Union and is expected to pass by the end of 2023.

5. CONCLUSION

Added to the benefits and facilitation that artificial intelligence brings to the daily lives of citizens, businesses and government administration, the debate about the numerous challenges modern societies are confronted with by the use of artificial intelligence, is deepening.

Ethical concerns arise when basic human rights are threatened, such as physical and mental integrity, personal data, freedom, security etc. The violation of ethical norms may result into violation of legal norms. The significance of ethics has been increasing with the spread of AI. Discussing ethical norms with the adoption and application of AI, the question of responsibility arises. The adoption of AI within the public sector requires specific considerations regarding the interaction of public authorities and citizens. The use of AI in the provision of public services and the AI taking important decisions about people, can cause them serious harm and requires application of mechanisms for accountability.

Artificial intelligence has been increasing its potential to be massive and effective means that enable significant advancements and incorporates AI solutions in a wide range of fields, in both public and private sectors. These benefits of AI are unquestionable. In the context of AI, the ethical issues, relating to the AI refer to the moral obligations and duties that need to be undertaken - by AI, its creators and the state government that regulates public relations.

The ethical issues in the context of state government refer to the group of administrative and legal measures, decisions and practices states use to address ethical concerns, regarding the adoption, development and use of AI systems and to still be adequate and efficient in their main function – to preserve the well-being of their citizens. It is humans' responsibility to set rules for system oversight done by people and to safeguard ethical norms when applying AI to prevent negative outcomes.

In the rapidly evolving landscape of artificial intelligence, this research article has examined the ethical dimensions surrounding its deployment within state government and public relations, presenting two distinct usage scenarios. As we navigate the path towards integrating AI into our societal framework, the question of autonomy and regulation emerges as a critical consideration.

In the first scenario, where AI operates as a tool for information analysis and recommendation without executing decisions autonomously, our proposal suggests affording significant latitude to AI. Allowing a high degree of freedom can potentially optimize efficiency and accuracy, provided it operates within clearly defined ethical guidelines and principles. This approach advocates for leveraging AI capabilities to enhance decision support systems while maintaining a vigilant eye on ethical considerations.

Contrastingly, the second scenario introduces AI systems vested with the authority to independently execute decisions and actions, requiring imperative human oversight. Here, our argument emphasizes the indispensability of human involvement. Human oversight becomes a crucial component to ensure that AI decisions align with societal values, adhere to legal and ethical standards, and safeguard against unforeseen consequences. This dual-tier approach,

harmonizing AI's capabilities with human confirmation, embodies a careful balance between technological advancement and ethical responsibility.

As we contemplate the future of AI deployment, these scenarios emphasize the importance of formulating nuanced regulatory frameworks. The dual approach allows us to take advantage of the transformative potential of AI while mitigating ethical risks and ensuring accountability. Striking this balance will be contributory in building public trust, fostering responsible AI development, and steering our collective journey into an era where technology and ethics are associated for the greater societal good. The ethical considerations explored in this research contribute to the ongoing discourse on AI governance, guiding us towards a future where innovation and ethical responsibility walk hand in hand.

REFERENCES

Belova, G. (2019) Proceedings Book „Studies of Legal Issues in the Digital Environment“ [Sbornik “Izsledvaniya na pravnite problem v digitalnata sreda”] University Publishing House “Neofit Rilski”. ISBN 978-954-00-0196-8, p. 4.

Bostrom, N. (2014). Superintelligence: Paths, dangers, strategies. Oxford: Oxford University Press.

Brundage, M. et. al (2018). The malicious use of artificial intelligence: Forecasting, prevention, and mitigation, pp. 6, 10.

Burton, J. (2023) Algorithmic extremism? The securitization of artificial intelligence (AI) and its impact on radicalism, polarization and political violence, *Technology in Society*. Volume 75. ISSN 0160-791X; <https://doi.org/10.1016/j.techsoc.2023.102262>.

European Commission. (2017). Special Eurobarometer 460. Report on Attitudes towards the impact of digitalisation and automation on daily life. Series: Digitalisation in Our Daily Lives. ISBN 978-92-79-68471-5. European Union. <https://digital-strategy.ec.europa.eu/en/news/attitudes-towards-impact-digitisation-and-automation-daily-life>

European Union Artificial Intelligence Act. (2021) Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts Retrieved November 10 2023, from: <https://artificialintelligenceact.eu/the-act/>, p. 39.

European Union Intellectual Property Office (2022) Study on the Impact of Artificial Intelligence on the Infringement and Enforcement of Copyright and Designs. ISBN 978-92-9156-312-8; DOI: 10.2814/062663, pp.160-161.

Goyal, M. et al. (2020) Artificial Intelligence-Based Image Classification Methods for Diagnosis of Skin Cancer: Challenges and Opportunities, *Computers in Biology and Medicine*. Volume 127, ISSN 0010-4825,

Gray, C. et al. (2023) Knowledge across boundaries: Promoting global cooperation on AI regulation. ART-AI submission to the Global Digital Compact Theme 6: Promoting regulation of artificial intelligence. Supplementary Report.

Harari, Y. N. (2018). 21 Lessons for the 21st Century. Vintage, pp. 35-36. <https://doi.org/10.1016/j.combiomed.2020.104065>.

Müller, Vincent C. (2020) Ethics of artificial intelligence and robotics, in Edward N. Zalta (ed.), Stanford Encyclopedia of Philosophy (Summer 2020; Palo Alto: CSLI, Stanford University) <https://plato.stanford.edu/entries/ethics-ai/>, p. 8

Picard, R. (1997) *Affective Computing* MIT Press, Cambridge, MA.

Popov, N. (2019) Proceedings Book „Studies of Legal Issues in the Digital Environment“ [Sbornik “Izsledvaniya na pravnite problem v digitalnata sreda”] University Publishing House “Neofit Rilski”. ISBN 978-954-00-0196-8, p. 20.

Proposal for a Regulation of The European Parliament and of The Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts (2021) Retrieved November 11 2023, from <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0206>.

Richardson, R. (2021). Facial Recognition in the Public Sector: The Policy Landscape. German Marshall Fund of the United States. <http://www.jstor.org/stable/resrep28529>.

Russel, S. J., Norving, P. (2010) Artificial Intelligence. A Modern Approach. Third Edition. Pearson. ISBN-13: 978-0-13-604259-4; ISBN-10: 0-13-604259-7, p. 1034.

Stahl, B. (2021). Ethical Issues of AI. 10.1007/978-3-030-69978-9_4.

Turing, A. M. (1950) Computing Machinery and Intelligence, *Mind*, Volume LIX, Issue 236: <https://doi.org/10.1093/mind/lix.236.433>.

Харари, Ю. (2019) 21 урока за 21 век. Изток – Запад. 978-619-01-0416-2, с.29

The Relationship Between Youth Perception of Social Support in Physical Activities and Leisure Time Management Attitude

Rafet Resul Doğan¹, Gamze Aksoy², Sevda Almacı², Şeyma Demir², Mustafa Ertan Tabuk³

Abstract

Introduction: Participation in social and physical activities contributes to the social, physical and psychological development of youth. With the increasing importance of participation in physical activity in the fight against obesity, social support to direct youth to physical and social activities and the existence of programmes covering such activities gain importance. Social support for youth to participate in physical activities is related to their leisure time management planning.

Aim: The main aim of the research is to identify the relationships between youth perceptions of social support for participation in physical activity and their leisure use and attitudes towards it.

Method: The study used a relational screening model. The questionnaire form designed to measure the perception of social support in physical activities and leisure time management attitude was applied face-to-face to high school graduated youth (n=1012).

Findings: In the demographic data of the research, the findings that 92.2% of the participants are overweight, 71.1% (n=720) do not exercise regularly, 70.6% do not have membership to clubs, etc. that organize music, art or sports activities, and although they know that various activities are held in the living space (n=542, 53.6%), they are not aware of the activities (n=591, 58.4%) come to the fore.

Originality and value: According to the results of the study, it was found that there was a positive relationship between peers and parents in the perception of social support. It was also found that perceptions of social support from parents and peers positively predicted leisure time management attitudes at a weak level. It is suggested that practices and activities to support the physical activity of youth should be increased and institutional solutions should be produced within the Ministry of Youth and Sports.

Key Words: Leisure Time, Leisure Time Management, Physical Activity, Social Support, Youth.

Jel Codes: I31, J11, J13

1. INTRODUCTION

Social activities such as hobbies, arts, sports or music have an important place in people's social life. People acquire some skills by participating in social activities with the guidance of their family, teacher or social environment, especially from childhood.

¹ Master Student, Hitit University, Institute of Postgraduate Education, Physical Education and Sport Department, Turkiye

² Bachelor Student, Hitit University, Sport Science Faculty, Sport Management Department, Turkiye

³ Assoc. Prof. Dr., Hitit University, Sport Science Faculty, Sport Management Department, Turkiye

These skills can be an important factor in the identity of the individual with reinforcement. The display of these skills acquired during childhood and adolescence can also affect social, physical and psychological development (Karatekin & Ahluwalia, 2020). The sustainability of social-sportive activities is possible with the existence of structures operating in this field. In our country, social activities for young people are carried out by Youth Centers, Youth Sports Provincial Directorates and municipalities (Republic of Türkiye Prime Ministry, 1986) and private culture, arts and sports centers (Döş & Kır, 2013) with the duties defined by law (Art. 2) (Biol, et al., 2018). While some structures have an institutionalized culture, others are more local and even limited to a small audience.

The participation of post-secondary youth in the mentioned social-cultural and sportive activities is possible with the existence of organizations offered to them. These organizations should diversify their activities in order to achieve their objectives and should carry out their publicity activities meticulously. Informing young people about the activities is one of the important factors that will affect their participation. For this reason, relevant institutions, organizations and private structures should use management organization techniques effectively in accordance with their vision and mission. In this way, it will be possible for young people to spend their free time in a qualified way. In this respect, systematic management activities of organizational structures are considered important for their success.

2. LITERATURE REVIEW

2.1. Social Support

Socialization is the process of learning to adapt to group rules and structure (Topaçoğlu & Kılavuz, 2022) and continues throughout life (Baltacı & Uysal, 2012). Socialization positively affects the life of the individual and relieves him/her mentally (Yang, et al., 2023). In this sense, socialization supports the concept of social support. We can say that social support is the gains obtained from the social life of the person (Alyüz, 2020). While explaining the concept of social support, some concepts should be considered (Cohen, et al., 2000); these can be expressed as interaction, coping, respect, belonging, competence and change. These concepts can be explained as mutual dialogue, coping with one's problems, respect in bilateral relationships, feeling that one belongs to a place, having the ability to provide social support, and the state of returning a social support. These factors should be present in the explanation of social support (Halis & Demirel, 2016). It has been stated that social support affects people in two different ways. One of them is direct effect. It can be defined as a state of well-being that directly affects another person. It is related to our more basic emotions. The other dimension is the so-called buffer effect. It is the support the individual receives from the environment against situations that occur outside the individual's sphere of control (Alyüz, 2020; Diewald & Sattler, 2010).

2.2. Physical Activity and Participation

Physical activity is body movements that result in the consumption of energy in the body (Caspersen, et al., 1985; Carbone, et al., 2019). People's physical activity is related to their living standards (Koruç & Bayar, 2004). For this reason, daily physical activities affect the level of physical activity in the region where people live, such as climate and geographical conditions, modes of transport, occupational positions, leisure time utilization methods (Zimmermann-Sloutskis, et al., 2010). The importance of physical activity for physical, mental and psychological health has not been sufficiently

explained to people (Kong, et al., 2013). Therefore, the fact that individuals do not care about physical activity and lead a sedentary life is getting worse with the developing technology and the negativities brought by this increase the incidence of diseases such as diabetes, blood pressure, heart diseases, vascular diseases, etc. (Yıldırım & Bayrak, 2019). Today, the developing internet and social media life restricts the movement of our young people, so inactivity occurs with weight gain (Ayhan, et al., 2012). Psychological disorders seen in individuals between the ages of 15-17, negativities in their development, unbalanced nutrition cause them to gain unnecessary weight and experience health problems (Alper, et al., 2017). In this direction, increasing the interest of young people in physical activity will facilitate their lives in terms of health (Akca & Selen, 2015).

2.3. Concept of Leisure Time

Leisure time is the free time that individuals choose for themselves, the period of time when they do not work, do not think about life troubles and realize their own wishes and desires (Okumuş, 2005; Kılbaş, 2010). Leisure time is an extremely important element for individuals today to maintain motivation in their lives, to socialize, (Demir & Alpulu, 2020), to raise healthy generations, to become happy and successful in their future lives by evaluating their time efficiently (Aydoğan & Gündoğdu, 2006), and it is also possible for people who have the ability to create leisure time to use this time in the most efficient way. Therefore, the use of time can be expressed as an important skill that distinguishes individuals from others. The aim of the research determined in line with the conceptual relationships expressed in the literature is to reveal the relationship between high school graduates' perception of social support and attitude towards leisure time management.

3. RESEARCH METHODOLOGY

The research was designed with the relational survey model. The relational survey model is defined as "a research model that aims to determine the degree of change or the presence of co-variation between two or more variables" (Kaner, et al., 2013; Fraenkel & Wallen, 2006; Karasar, 2016). The measurement tool prepared for the collection of data within the scope of the research was applied face-to-face to the participants using the questionnaire technique.

3.1. Explanation of Scales

Social Support in Physical Activities Scale

The scale developed by Farias Junior, et al. (2014) and adapted by Küçükbiş and Eskiler (2019) was used in the study. The internal consistency coefficient of the scale, which consists of 10 items in two sub-dimensions including the encouragement of parents and peer groups to physical activity, joint participation, transport support and motivation, was determined as 0.70. As a result of the analysis of the research data, Cronbach Alpha internal consistency coefficient was determined as 0,793.

Leisure Time Management Scale

In the study, the "Leisure Time Management Scale" developed by Wei-Ching Wang, et al. (2011) and adapted into Turkish by Akgül and Karaküçük (2015) was used. The scale structurally has a total of 15 items with 4 factors that have achieved reliability values ($\alpha = ,83$). The scale has a 5-point Likert-type rating. As a result of the analysis of the research data, Cronbach Alpha internal consistency coefficient is 0,807.

3.2. Data Analysis

In this part of the study, the findings regarding the demographic characteristics of the participants, the data obtained as a result of the reliability and frequency analyses of the scales are presented.

3.2.1. Demographics

When Table 1 is analyzed, it is seen that 570 of the participants are women (56.3%) and 442 of them are men (43.7%). When the total family income of the participants was analyzed, it was determined that those with a minimum wage (39.3%) and two minimum wages (37.4%) were higher than those with three minimum wages (23.3%). When the regular exercise status and body mass indexes of the participants were analyzed, it was found that 71.1% (n=720) did not exercise regularly, and when classified according to body mass indexes, the majority (77.0%) were in the overweight category (n=779). While 70.6% (n=714) of the participants were not members of social organizations such as music, art, sports, etc., 18.5% (n=187) stated that they had no alternatives to evaluate their leisure time. When the daily leisure time durations of the participants were analyzed, it was determined that the majority (59.3%) of the participants had leisure time between 3-6 hours. While 46.4% of the participants (n=470) stated that there are clubs, associations, foundations, etc. offering alternative activities in the region where the research was conducted, 53.6% (n=542) stated that there are no such organizations. The majority of the participants (58.4%) stated that they were not aware of social activities. When the leisure time preferences of the participants are analyzed; 32,2% (n=326) answered social media, 28,1% (n=284) answered sports/music/art, 16,6% (n=171) answered TV/film, 22,9% (n=231) answered PS game, other, travelling and studying.

Table 1. Distribution of the participants in terms of demographic characteristics

Variables		f	%
Gender	Female	570	56,3
	Male	442	43,7
Total income level of the family	Minimum wage	398	39,3
	Minimum wage*2	378	37,4
	Minimum wage*3	236	23,3
I exercise regularly	Yes	292	28,9
	No	720	71,1
	Normal	79	7,8
Body mass index	Fat	779	77,0
	Obese	154	15,2
	Yes	298	29,4
A music art sports etc. club membership	No	714	70,6
	Yes	825	81,5
Availability of leisure time alternatives	No	187	18,5
	0-3 hours	307	30,3
	3-6 hours	600	59,3
Having daily free time	more than 6 hours	105	10,4
	Yes	470	46,4
	No	542	53,6

Being informed about social events	Yes	421	41,6
	No	591	58,4
	To study	16	1,6
	Others	120	11,9
	Ps game	54	5,3
Leisure use preference	Trip	41	4,1
	Social media	326	32,2
	Sports/music/art	284	28,1
	TV/movie	171	16,9
Total		1012	100

3.2.2. Normality and Validity of Scales

When the skewness and kurtosis values of the scale items used in the research in Table 2 were examined, it was determined that the skewness and kurtosis values of all items were between +2 and -2 (Tabachnick, et al., 2013). When the mean values of the answers given to the scale items were analyzed, it was found that although parents frequently encouraged young people to engage in physical activity ($\bar{X}=1,99$; $1,26 \leq \bar{x} \leq 2,72$), participation in physical activity with young people ($\bar{X}=1,51$; $0,69 \leq \bar{x} \leq 2,33$), monitoring their physical activities ($\bar{x}=0,81$; $0,07 \leq \bar{x} \leq 1,55$), providing access to physical activity ($\bar{x}=1,31$; $0,49 \leq \bar{x} \leq 2,13$) and stating that they do physical activity well ($\bar{x}=1,24$; $0,43 \leq \bar{x} \leq 2,05$). In addition, it is seen that young people perceive parental support ($\bar{x}=1,37$; $0,84 \leq \bar{x} \leq 1,90$) more than peer support ($\bar{x}=1,19$; $0,62 \leq \bar{x} \leq 1,76$) in physical activity participation. When the averages of the leisure time management scale were examined, it was determined that although the young people stated that leisure time was pleasing ($\bar{x}=4,00$; $3,22 \leq \bar{x} \leq 4,78$) and its use was important ($\bar{x}=4,2$; $3,48 \leq \bar{x} \leq 4,92$), they were undecided about organizing their leisure time daily and weekly ($\bar{x}=3,1$; $2,14 \leq \bar{x} \leq 4,06$). In addition, it was determined that young people had high mean scores in leisure time management ($\bar{x}=3,58$; $3,15 \leq \bar{x} \leq 4,01$).

Table 2. Quantitative data of the scales.

	Mean	SD.	Kurtosis	Skewness
Body mass index	2,07	0,15	,223	1,284
How many hours of free time do you have per day?	1,80	0,19	,127	-,474
Your parents support (Mean=1,37, SD=0,53)	Mean	SD.	Kurtosis	Skewness
Your parents encourage you to engage in physical activity?	1,99	0,738	-0,405	-0,03
Your parents do physical activities with you?	1,51	0,829	0,012	-0,55
Your parents drop you off at your physical activity location or get you there?	1,31	0,826	0,231	-0,451
Your parents watch you do physical activity?	0,81	0,743	0,73	0,376
Your parents say that you are doing your physical activities well?	1,24	0,817	0,2	-0,492
Peer support (Mean=1,19, SD=0,57)	Mean	SD.	Kurtosis	Skewness
Your peers encourage you to engage in physical activity?	1,17	0,801	0,303	-0,348
Your peers do physical activities with you?	1,09	0,756	0,407	-0,021
Your peers drop you off at your physical activity location or get you there?	1,12	0,777	0,401	-0,114
Your peers watch you do physical activity?	1,3	0,776	0,238	-0,276
Your peers say that you are doing your physical activities well?	1,28	0,807	0,297	-0,324
Leisure Time Management (Mean =3,58, SD=0,43)	Mean	SD.	Kurtosis	Skewness
Setting goals for my free time.	3,73	0,805	-0,613	0,953
I'm making a list of things I can do in my free time.	3,17	0,916	-0,167	-0,094
I set priorities for my free time.	3,61	0,82	-0,591	0,657
I organize my free time on a daily or weekly basis.	3,1	0,96	-0,087	-0,305
I collect information about leisure activities.	3,31	0,92	-0,378	0,052
I organize activities that I can do in my free time.	3,45	0,837	-0,513	0,419
I use my waiting times.	3,6	0,765	-0,265	-0,118
I evaluate my use of free time.	3,79	0,691	-0,465	0,492
I reserve some of my time for leisure activities.	3,69	0,775	-0,217	-0,226
Free time is meaningful.	3,86	0,781	-0,369	-0,172
Leisure time is happy.	4	0,789	-0,528	-0,043
Use of free time is important.	4,2	0,726	-0,819	1,117
I think making programs for free time is a waste of time.	3,29	0,957	0,212	-0,685
I believe free time is unpredictable.	3,57	0,833	-0,122	-0,34
I don't know what to do with my free time.	3,46	0,938	0,013	-0,762

According to the correlation analysis given in Table 3, it is seen that there is a positive, weak and moderately significant relationship between the sub-dimensions of the social support scale and leisure time management. It is seen that there is a positive, medium level ($r=,412$; $p<,000$) significant relationship between parental support and peer support scores; a positive, medium level ($r=,826$; $p<,000$) significant relationship between parental support and social support dimension scores; and a positive, weak level ($r=,139$; $p<,000$) significant relationship between parental support and leisure time management attitude dimension scores.

Table 3. Correlation between social support and its sub-dimensions and leisure time management

	Parental Support	Peer Support	Social Support	Leisure Management Attitude
Parental Support	1	,412**	,826**	,139**
Peer Support		1	,853**	,180**
Social support			1	,191**
Leisure Management Attitude				1

3.2.3. Regression Analysis Results

According to the regression analysis results for the prediction of the relationship between peer support and leisure time management attitude stated in Table 4, it is seen that peer support has a weakly significant positive effect on leisure time management attitude. In the model ($R=0,180$; $R^2 = 0,032$; $p<0,05$), it is seen that 3,2% of the variance of leisure time management attitude is explained by the independent variable of peer support. Beta coefficient of the independent variable included in the model is $=0,180$. Since the dimension of peer support is $p<0.05$, it has a statistically significant effect on leisure time management attitude.

Table 4. Regression analysis on the prediction of peers support on leisure time management attitude

	B	Std. Err.	Beta	t	P	R	R ²	F	p
Peer Support	,340	,148	,180	5,809	,000	,180	,032	33,741	,000

According to the regression analysis results for the prediction of the relationship between parental support and leisure time management attitude stated in Table 5, it is seen that parental support has a weak positive effect on leisure time management attitude. According to the model ($R=0,139$; $R^2=0,019$; $p<0,05$), 1,9% of the variance of leisure time management attitude was explained by parental support. Beta coefficient of parental support, which is the independent variable in the model, is $=0,139$. As a result, parental support ($p<0.05$) dimension has a statistically significant effect on leisure time management attitude.

Table 5. Regression analysis for the prediction of parental support on leisure time management attitude

		B	Std. Err.	Beta	t	P	R	R²	F	p
Parental Support	Leisure Management Attitude	,170	,038	,139	4,462	,000	,139	,019	19,912	,000

According to the results of the regression analysis conducted for the prediction of the relationship between social support and leisure time management attitude stated in Table 6, it is seen that social support has a weakly significant positive effect on leisure time management. In the model ($R=0,191$; $R^2= 0,036$; $p<0,05$), 3,6% of the variance of leisure time management attitude was explained by social support. Since the Beta coefficient of the independent variable social support= 0,191 ($p<0,05$), it has a statistically significant effect on leisure time management.

Table 6. Regression analysis for the prediction of social support on leisure time management attitude

		B	Std. Err.	Beta	t	P	R	R²	F	p
Social support	Leisure Management Attitude	,204	,033	,191	6,172	,000	,191	,036	38,090	,000

4. DISCUSSION AND CONCLUSION

In this study, the relationship between the perception of social support in physical activities and leisure time management attitude of young people was tried to be determined. It is seen that only 7.8% ($n=79$) of the young people participating in the study were of normal weight, 92.2% were overweight ($n=779$, 77%) and obese ($n=154$, 15.2%, Table 1). It is seen that 71.1% of such a mass (overweight and obese $n=933$), which is far from physical activity, do not exercise regularly ($n=720$, Table 1). In addition to these two findings, the low number of those who participate in activities such as sports/art/music in their free time ($n=284$, 28,1%) supports that the research group is far from physical activity. When the literature on the physical activity levels and body mass indexes of young people is examined, Yıldız, et al. (2015) found that the physical activity levels of young people were low in their study and stated that young people should be encouraged more to physical activity in order to prevent health problems that may occur due to inactivity. Özakar Akça and Selen (2015) concluded in a study that one out of every three participants was obese and the majority of the participants did not have the habit of doing sports. These results coincide with the results of our study.

It is seen that approximately 70% of the young people ($n=705$, Table 1) have more than three hours of free time. However, it can be stated that 70.6% of young people do not have a membership to a club, etc. that performs music, art or sports activities, and this may have an effect on leisure time management attitude. In a study conducted by Arat and Çalimli (2017), it was stated that the highest mean score in the answers of the

participants to the reasons for not participating in leisure time activities was in the statement "there are not enough facilities, tools and materials for such activities in my environment". Similarly, Akyol and Akkaşoğlu (2020) found in a study that the highest mean score in the reasons why young people do not participate in leisure time activities is in the expression "insufficient facility equipment". Özşaker (2012), in a study on the reasons why young people do not participate in leisure time activities, concluded that facilities and organizations are inadequate in universities where young people study.

Although 53,6% of the young people (n=542, Table 1) stated that they know that there are social activity organizations in their environment, it is seen that they are not aware of such activities (n=421, 41,6%). It is possible that the main reason for this finding may be due to the influence of the organizations that organize the activities on the practices of visual or written media activities. On the other hand, it was determined that young people's interest, perception and attitudes towards news sources prefer computer games (n=54), social media (n=326) and watching TV/film (n=171) more than physical activities (total n=551, 54,4%). Çömlekçi and Başol (2019) found a positive relationship between young people's use of social media for leisure time and social media addiction in a study they conducted. In a study conducted by Alemdağ (2022), it was determined that individuals who actively use social media participate in physical activities less than individuals who use social media passively. Schrag and Strattman (2009) stated that young people in urban and rural areas have high rates of participating in sports groups and listening to music, while young people living in the city center spend more time shopping and playing computer games (Özşaker, 2012).

According to the research findings, in the participants' perception of social support for physical activities, it was determined that parents ($\bar{X}=1,99$) encouraged participants to engage in physical activities more than peers ($\bar{X}=1,17$), parents (1,51) did more physical activities with participants than peers (peers, $\bar{X}=1,09$), and peers of the participants ($\bar{X}=1,3$) watched the participants while doing physical activities compared to parents (0,81). It was determined that both groups gave feedback to motivate the participants (parent $\bar{X}=1,24$; peer $\bar{X}=1,28$).

According to the results of the regression analysis conducted within the scope of the research, it was determined that the perception of social support (parents, peers) of young people predicted leisure time management attitudes in a positive and weakly significant way. No similar study has been found in the literature. Tomás, et al. (2019), in his research on the social support levels of family and peership relations of young people, concluded that the perception of social support of young people was high in general. This situation supports the results of our study.

According to the results of the study, a positive relationship was found between social support perceived from peers and social support perceived from family. Drogomyretska, et al. (2020) found a significant relationship between social support perceived from family and social support perceived from peers. Kahriman and Yeşilçiçek (2007) reported that there was a positive relationship between social support perceived from family and social support perceived from peers and that social support perceived from family was higher. Similarly, Traş and Arslan (2013) found that social support perceived from family was higher than social support perceived from peers.

REFERENCES

Abay-Alyüz, S. B. (2020). The importance of social support in individual life and social service. *Talim*, 4 (1), 115-134. <https://doi.org/10.37344/talim.2020.4>

- Akgül, B. M., & Karaküçük, S. (2015) Leisure time management scale: Validity-reliability study. *International Journal of Human Sciences*, 12(2), 1867-1880. <https://doi.org/10.14687/ijhs.v12i2.3445>
- Akyol, C., & Akkaşoğlu, S. (2020). A study on barriers to youth participation in recreational activities in their spare time. *Journal of Tourism & Gastronomy Studies*, 8(3), 2072-2089. <https://doi.org/10.21325/jotags.2020.649>
- Alemdağ, S. (2022). *Current Research in Sports*. In M. İlkın (Ed.), *The relationship between university students' participation in physical activity and social media* (134-144). Night Library.
- Alper, Y., Pündük, Z., Akçakoyun, F., & Göktaş, Z. (2017). Examination of nutrition and physical activity habits of Balıkesir science high school students. *Sportive View: Journal of Sports and Educational Sciences*, 4(2), 101-110.
- Arat, T. & Çalimli, Y. (2017). University students' preferences for spending their free time: The example of Selçuk University faculty of tourism. *Çatalhöyük International Journal of Tourism and Social Research*, (2), 109-128.
- Aydoğan, İ., & Gündoğdu, F.B. (2006). Activities for female faculty members to spend their free time. *Journal of the Institute of Social Sciences*, 2, 217-232.
- Ayhan, D. E., Günaydın, E., Gönlüaçık, E., Arslan, U., Çetinkaya, F., Asımı, H., & Uncu, Y. (2012). Nutritional habits of Uludağ University faculty of medicine students and factors affecting them. *Uludağ University Faculty of Medicine Journal*, 38 (2), 97-104.
- Baltacı, Y., & Uysal, A. T. (2012). Course material as a political socialization tool in Türkiye: A study on primary school social studies course. *Süleyman Demirel University Faculty of Economics and Administrative Sciences Journal*, 17 (3), 177-194.
- Birol, S.S., Aydın, E., & Karaaçık, S. (2018). Opinions and suggestions of youth services and sports provincial directorate employees regarding the determination of sports recreation facilities and services offered to the public in city centers. *Gazi Journal of Physical Education and Sports Sciences*, 23 (4), 251-267.
- Carbone, S., Del Buono, M. G., Ozemek, C., & Lavie, C. J. (2019). Obesity, risk of diabetes and role of physical activity, exercise training and cardiorespiratory fitness. *Progress in Cardiovascular Diseases*, 62(4), 327-333. <https://doi.org/10.1016/j.pcad.2019.08.004>
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126–131.
- Cohen, S., Underwood, L. G., & Gottlieb, B. H. (Eds.). (2000). *Social support measurement and intervention: A guide for health and social scientists*. Oxford University Press. <https://doi.org/10.1093/med:psych/9780195126709.001.0001>
- Çömlekçi, M. F., & Başol, O. (2019). Examining the relationship between young people's social media usage areas and social media. *Manisa Celal Bayar University Journal of Social Sciences*, 17(4), 173-188.
- Demir, G., & Alpullu, A. (2020). Evaluation of university students' leisure time management. *Eurasian Research in Sport Science*, 5(1), 94-102. <https://doi.org/10.35333/eriss.2020.172>

- Diewald M., & Sattler S. (2010). Social support networks Stegbauer C. and Haeussling R. (eds.) *In: Handbook Network Research* 689-699. 12(3). https://doi.org/10.1007/978-3-531-92575-2_61
- Döş, İ., & Kır, E. (2013). Social activity at the primary and secondary schools and its management. *Gaziantep University Journal of Social Sciences*, 12 (3), 527-544.
- Drogomyretska, K., Fox, R., & Colbert, D. (2020). Brief report: stress and perceived social support in parents of children with ASD. *Journal of autism and developmental disorders*, 50, 4176-4182. <https://doi.org/10.1007/s10803-020-04455-x>
- Farias Júnior, J. C. D., Mendonça, G., Florindo, A. A., & Barros, M. V. G. D. (2014). Reliability and validity of a physical activity social support assessment scale in adolescents *ASAFA scale*. *Revista Brasileira de Epidemiologia*, 17, 355-370. <https://doi.org/10.1590/1809-4503201400020006ENG>
- Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education (6th ed.)*. McGraw-Hill Publishing.
- Halis, M., & Demirel, Y. (2016). The effect of social support on organizational isolation. *Kastamonu University Faculty of Economics and Administrative Sciences Journal*, 11 (1), 318-335.
- Kahriman, İ., & Yeşilçiçek, K. (2007). Examining the social support levels perceived by Karadeniz Technical University Trabzon health school students from their family and friends in terms of some variables. *Anatolian Journal of Nursing and Health Sciences*, 10(1), 10-21.
- Kaner, S., Büyüköztürk, Ş., & İşeri, E. (2013). Conners teacher rating scale-revised brief: Türkiye adaptation study. *Education and Science* 38(167). <https://doi.org/10.4274/npa.y6219>
- Karasar, N. (2016). *Scientific research method*. Nobel Academic Publishing.
- Karatekin, C., & Ahluwalia, R. (2020). Effects of adverse childhood experiences, stress, and social support on the health of college students. *Journal of interpersonal violence*, 35(1-2), 150-172. <https://doi.org/10.1177/0886260516681880>
- Kılbaş, Ş. (2010). *Recreation and free time evaluation (4th ed.)*. Gazi Bookstore.
- Kong, F., Zhao J., & You X. (2013). Self-esteem as mediator and moderator of the relationship between social support and subjective well-being among Chinese University students. *Social Indicators Research*, 112(1), 151-61.
- Koruç, Z., & Bayar, P. (2004). The place and effects of exercise in the treatment of depression. *Journal of Sports Sciences*, 15 (1), 49-64.
- Küçükibiş, H. F., & Eskiler, E. (2019). Social support scale in physical activities: Adaptation to Turkish, validity and reliability study. *Cumhuriyet University Journal of Economics and Administrative Sciences*, 20(2), 117-127.
- Okumuş, E. (2005). Leisure and Islam. *Journal of Social Sciences Research*, 5, 23-43.
- Özakar Akça, S., Selen, F. (2015). The effect of university components' speed skips and daily physical activities on body mass index (BMI). *TAF Preventive Medicine Bulletin*, 14(5), 394-400.

- Özşaker, M. (2012). An investigation on the reasons why young people cannot participate in free time activities. *Selçuk University Journal of Physical Education and Sports Science*, 14(1), 126-131.
- Schrag, K., & Strattman, K. (2009). Free-time literacy activities. In *Proceedings of the 5th Annual GRASP Symposium, Communication Sciences and Disorders*. College of Health Professions, Wichita State University, 156-157.
- Tabachnick, B.G., Fidell, L.S., & Ullman, J.B. (2013). *Using multivariate statistics* (Vol. 6), 497-516. MA: Pearson.
- Tomás, J. M., Pinazo-Hernandis, S., Oliver, A., Donio-Bellegarde, M., & Tomás-Aguirre, F. (2019). Loneliness and social support: Differential predictive power on depression and satisfaction in senior citizens. *Journal of Community Psychology*, 47(5), 1225-1234. <https://doi.org/10.1002/jcop.22184>
- Topaçoğlu, O., & Kılavuz, M. E. S. (2022). Metaverse review in terms of recreation and socialization. *Journal of Recreation and Tourism Research*, 9(3), 18-37. <https://doi.org/10.5281/zenodo.7129830>
- Tıraş, Z., & Arslan, E. (2013). Examining social competence in adolescents in terms of perceived social support. *Primary Education Online Journal*, 12(4), 1133-1140.
- Wang, W.C., Kao C.H., Huan, T. C., & Wu, C.C. (2011). Free time management contributes to better quality of life: A study of undergraduate students in Taiwan. *Journal of Happiness Studies*, 12(4):561-573. <https://doi.org/10.1007/s10902-010-9217-7>
- Yang, L., Tsai, Y. L., Yang, P. L., Lu, C. C., Liaw, J. J., & Lan, H. Y. (2023). Path analysis of the effects of life stress and social support on rural adolescents' quality of life in Taiwan: Family hardiness as a mediator. *Journal of Medical Sciences*, 43(2), 67. https://doi.org/10.4103/jmedsci.jmedsci_7_22
- Yıldırım, M., & Bayrak, C. (2019). The effect of university students' participation in sports-based physical activities and their quality of life on academic success and socialization (Eskişehir Osmangazi Hacettepe University example), *Hacettepe University Faculty of Education Journal*, 34(1). 123–144. <https://doi.org/10.16986/HUJE.2017032928>
- Yıldız, A., Tarakcı, D., & Mutluay, F. K. (2015). The relationship between physical activity level and body composition in young adults: Pilot study. *Journal of Health Sciences and Professions*, 2(3), 297-305. <https://doi.org/10.17681/hsp.15450>
- Zimmermann-Sloutskis, D., Wanner, M., Zimmermann, E., & Martin, B. W. (2010). Physical activity levels and determinants of change in young adults: A longitudinal panel study. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 1-13. <https://doi.org/10.1186/1479-5868-7-2>

Strategic Tools and Future Perspective of Financial Risk Management in the Age of Digital Transformation

Özden Şentürk¹

Abstract

Introduction: The Financial sector is one of the professional sectors most deeply affected by digitalisation. The financial sector which is keeping pace with this technological change, faces various risk on the one hand, and on the other hand it is on the verge of great opportunities.

Aim: This study aims to examine financial risk and strategic financial risk management tools in the digital world, as part of the transformation and vision for the future that has led to fundamental changes in the financial sector as a result of technological advances and digitalisation.

Methodology: The study analysed the scientific studies carried out in the relevant field and then evaluated the findings of these studies. The aim of this method is to comprehensively review the existing literature of evaluate the result of the relevant studies from a broad perspective.

Finding: The study found that digital transformation has a significant impact on financial risk management, bringing with it complex challenges such as cybersecurity risks and technology investment risks.

Originality and value: The analysis evaluates the relationship between digitalization and financial risk management, leading to a transformative impact based on efficiency.

Keywords: Digitalisation, Digital Transformation, Financial Sector, Financial Risk, Financial Risk Management.

Jel Codes: G3, M10, M42,O30

1-INTRODUCTION

Finance is one of the professions most deeply affected by digitalization. As it both witnesses and adapts to this technological evolution, the finance sector faces various risks and stands on the brink of great opportunities. Financial risk is the possibility that an organisation's financial profits and enterprise value may be adversely affected. These risks typically arise from factors such as changes in interest rates, foreign exchange rates, credit risks, liquidity risks and market risks. Financial risk management is defined as a set of strategies and tools used to identify, assess, prevent or minimise these risks. An understanding of risk management processes is essential for successful risk management. Technological developments and digitalisation have led to fundamental changes in the financial sector and have reshaped the industry. Technologies such as mobile banking, online trading platforms, digital payment systems and cryptocurrencies have expanded access to and use of financial services. These technologies have provided users with faster, more transparent and user-friendly services, while increasing competition in the sector.

In addition to the challenges that may arise from cybersecurity threats, technology failures and digital asset management, digitisation has led to significant changes in consumer behaviour, expectations and demands. For these reasons, it is crucial for

¹ Phd Student, İstanbul University, Institute of Social Sciences, Economics, Türkiye

organisations to define effective management processes for the risks they may face when adopting digital transformation.

This study covers the details and future vision of the transformation that has led to fundamental changes in the financial sector as a result of technological developments and digitalisation, and aims to help develop solutions for financial risk management strategies in the digital world.

2-RESEARCH METHODOLOGY

The research method was implemented by compiling the studies and articles prepared in the relevant field. After collecting the relevant materials, the results of these studies were evaluated in detail. This evaluation process is crucial for addressing the research topic and developing recommendations. In summary, this method aims to provide a comprehensive review of the existing literature and to evaluate the results of the relevant studies from a broad perspective.

3- FINANCIAL RISKS IN THE DIGITAL WORLD

3.1 Cybersecurity Risks

Cyber security is the sum of procedures established to protect computers, software and data within the framework of information technology (KPMG, 2017). With digitalisation, the risk of cyber threats to financial institutions and individuals has increased. Banks, financial service providers and individuals may be exposed to ransomware, phishing attacks and other cyber attacks. These attacks can cause financial losses, reputational damage, and loss of customer confidence.

3.2. Technological Investment Risks

In particular, cryptocurrencies, which have been very popular in recent years, carry a significant element of risk due to their volatility and structure. In addition, the anonymous nature of cryptocurrencies can become a tool for illegal activities. This poses both financial risks for investors and complicates regulatory oversight

3.3. Risks of Digitized Financial Products

One of the digital products that have become very popular in recent years, especially crypto coins, carry a significant risk element due to their volatility and structure. Also, the anonymous nature of cryptocurrencies can become a vehicle for illegal activities. This creates financial risks for investors and complicates the oversight of regulatory authorities.

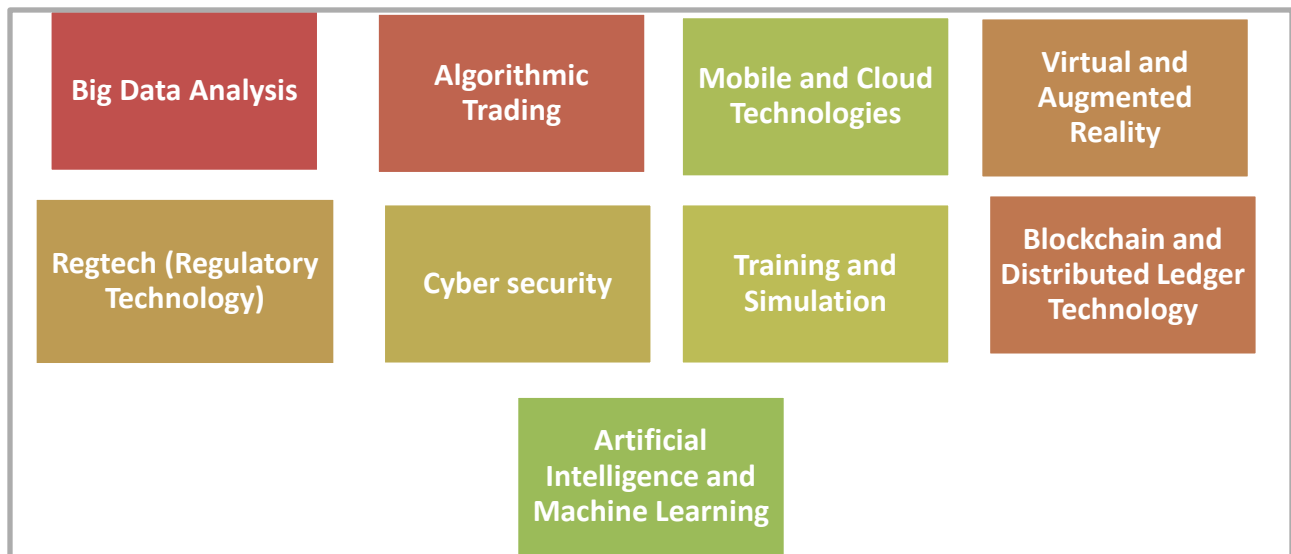
3.4. Risks Posed by Artificial Intelligence and Automation

Financial institutions use artificial intelligence and automation to speed up transactions and reduce costs. However, it is possible for these systems to make incorrect decisions based on misleading data or act in unexpected ways. This can lead to operational and financial risks (World Economic Forum, 2018).

4.FINANCIAL RISK MANAGEMENT STRATEGIES IN THE DIGITAL WORLD

Financial risk management in the digital world is becoming increasingly complex, with opportunities and threats arising from technological advances and the globalised economy. Digitalisation has brought both new risks and new strategies for managing and mitigating risk.

Table 1: Strategic Tools of Financial Risk Management



Source: Prepared by author

- **Big Data Analysis:** As a result of recent technological innovations, the amount of data we need to access is increasing day by day (Pwc, 2015:3).By using big data analysis, financial institutions can analyse complex data sets to better understand market trends, consumer behaviour and potential risks.
- **Algorithmic Trading:** Financial institutions can react quickly to market movements and minimise potential risks through the use of automated algorithms.
- **Blockchain and Distributed Ledger Technology:** These technologies make transactions more transparent, more reliable and less susceptible to manipulation. Again, with these technologies, it is expected that the use of relevant technology in terms of solving problems with more technical details will save time and costs. (Li, 2022).
- **Virtual and Augmented Reality:** Investors and analysts can employ VR and AR technologies to delve deeper into financial scenarios and models.
- **Cybersecurity:** In the digital space, cyber threats pose a significant risk to financial institutions. Advanced cybersecurity protocols and infrastructure are vital to managing these risks. (Andress, J. 2014).

- **Training and Simulation:** Financial institutions can use simulations and training programs to better understand digital risks and develop strategies accordingly.
- **Mobile and Cloud Technologies:** Cloud-based platforms allow financial organisations to access data from anywhere. Recently, cloud-based technologies have been increasingly recognised in finance and accounting (Puhan et al., 2020). At the same time, mobile financial applications allow users to conduct financial transactions anywhere, but this requires strict implementation of security protocols.
- **Artificial Intelligence and Machine Learning:** These technologies offer significant potential in financial risk analysis and forecasting (Goodfellow, Bengio, & Courville, 2016).
- **Regtech (Regulatory Technology):** Technologies offering digital solutions for regulatory compliance help financial institutions adapt to rapidly changing regulations (Arner, Barberis, & Buckley, 2017).

In the digital world, financial risk management strategies have become more effective, flexible and scalable by harnessing the power of technology. However, successful implementation of these strategies requires continuous training, innovative thinking and investment in technology infrastructure. Organisations that are able to engage in digital transformation will be able to increase their efficiency while maintaining their sustainability, while those that are unable to adapt will lose efficiency by lagging behind current developments in business processes, R&D projects, applications and other activities (O'neil & Schutt, 2014, pp. 3-5).

4.1. Featured Strategic Recommendations and Implementation Steps

The digital financial ecosystem has made significant progress in recent years. While this progress has changed consumer habits, business models and the overall functioning of financial markets, it has also introduced new risks. As a result of discussions and assessments on the evolution of financial risk management in the digital world, some strategic recommendations and implementation steps for these recommendations are listed below.

Table 2: Main Strategy Guidelines and Implementation Protocols

Strengthening the Cyber Security Infrastructure	Integration of Digital Risk Assessment Tools	Regulatory Compliance Tracking and Enforcement	Collaborations for Systemic Risk Management
Regularly updating the infrastructure using the latest security protocols and tools	Integrating AI and machine learning-based analytics tools into in-house systems.	Automating the regulatory compliance process using RegTech solutions	Sharing information and developing common strategies in cooperation with other financial institutions

Raising awareness of personnel through regular cyber security trainings and exercises.	Creation of risk analysis reports with data visualization tools.	Automating the regulatory compliance process using RegTech solutions.	Organizing periodic meetings with sector-related regulatory bodies and experts.
--	--	---	---

Source: Prepared by author

- **Strengthening Cybersecurity Infrastructure:** The digital world is creating new and more complex threat vectors for cyber-attacks. Integrating the latest security protocols and tools is critical to increasing resistance to these threats. Not only new protocols, but also updated versions of existing protocols should be integrated into the infrastructure. In addition to technological measures, raising awareness and training staff is also essential. It is believed that regular cyber security training of employees and refreshing their knowledge through exercises will minimise the risks caused by human error.

- **Integration of Digital Risk Assessment Tools:** Artificial intelligence and machine learning facilitate the rapid analysis of large data sets. This enables rapid decision-making and implementation processes to identify potential threats, anomalies and risks and take proactive action. Visualised reports using data visualisation tools to understand the cyber security status of an organisation enable decision makers to quickly become aware of threats and risks. In a digitalised world, developing technologies will change the way evidence is gathered and data is analysed and will shape the audit process (Rozario & Thomas, 2019 :21-30).

- **Monitoring and Implementation of Regulatory Compliance:** Regulatory requirements for organisations are constantly changing. Monitoring these changes ensures that an organisation not only remains compliant, but also adopts best practice in cyber security. In this way, it is a strategic method for organisations to manage compliance with financial, technological and corporate regulations in a simple, automated and effective way. As a result, organisations will be able to minimise errors by reducing manual processes in the financial area.

- **Collaborations for Systemic Risk Management:** Factors that can pose a financial threat are often capable of posing risks to many organisations. Therefore, systematic risk management collaboration can create a more effective defence, provided that risk information is shared and common strategies are developed. Regular meetings with regulators and industry experts ensure that organisations keep up to date with market standards and best practice. This increases awareness of potential threats and risks in the industry.

The proposed strategic steps aim to make financial risk management more effective, efficient and sustainable in the digital world. Senior management support, resource allocation and the establishment of ongoing evaluation and feedback mechanisms are essential for the successful implementation of these recommendations.

5. A LOOK INTO THE FUTURE: THE EVOLUTION OF FINANCIAL RISK MANAGEMENT IN THE DIGITAL WORLD

Financial risk management in the digital world is becoming increasingly complex with the opportunities and threats presented by technological advances and the

globalised economy. Digitalisation has brought both new risks and strategies to manage and minimise risks (Bauder, 2017). Digital transformation enables instantly generated data to be rapidly transformed into information and integrated more effectively into decision-making processes. This development will create transformational benefits for all sectors by contributing to many areas such as increasing the service quality of public and private sector organisations, improving effective decision-making mechanisms, efficient risk management and strategy formulation (Marr, 2019).

The financial world of the future will be much more complex and dynamic than today. As technological advances lead to radical changes in financial risk management, institutions will have to adopt more effective tools and strategies to survive and compete in this new digital age.

The rise of crypto assets in recent years is a perfect example of how financial risk management is changing. The volatility of these digital assets poses new risks for both investors and financial institutions, and innovative solutions that do not work in traditional ways are needed to manage these new risks (Eyal, & Sirer, 2018). Blockchain technology is a system that can provide convenience in a fast and reliable way in many areas beyond the economic and financial sectors, such as the public and private sectors where big data is intensively produced (Mustaçoğlu, 2018). In addition, modern technologies such as artificial intelligence and machine learning increase the ability to predict and manage financial risks. Given all these technological developments, the digitised financial world has become an attractive environment for cybercriminals. Financial institutions need to continuously strengthen their security measures to protect themselves from data breaches and other cyber threats. Digital transformation is expected to make financial risk management more efficient with its ability to automate manual processes.

The evolution of financial risk management in the digital world is inevitable in this era of rapid technological advancement and globalisation. Organisations need to be able to make adaptive decisions to understand, anticipate and respond to these new risks with appropriate strategies. Only in this way can they thrive in the financial climate of the future.

CONCLUSION

From the past to the present, the digitalisation process has led to profound changes in the financial sector, as in many other sectors, at all stages. As a result of the proliferation of digital technologies, radical changes in financial risk management practices are inevitable. Digitalisation has had a profound impact on the financial sector, creating both new opportunities and risks. In this situation, traditional risk management approaches are no longer sufficient and innovative strategies are needed to understand and respond to the challenges posed by the digital world. In this process, the rapid evolution of technology and the expansion of the financial ecosystem have necessitated the adoption of more dynamic, proactive and integrated approaches to risk assessment and management.

Financial risk management in the digital world will continue to evolve with technological advances and global trends. Financial institutions must keep pace with this evolution and adopt innovative approaches and strategies to minimise risks and maximise opportunities. This will be achieved not only through investment in technology infrastructure, but also through changes in culture, training and strategic planning.

While technological innovation provides financial institutions with more effective risk management tools, it can also introduce new and unexpected threats. However, the effectiveness of digital transformation in financial risk management requires not only technology transfer, but also a significant cultural change. As a result, financial risk management in the digital world will continue to be an ever-changing field. Therefore, based on the strategic recommendations and implementation steps, institutions should continuously review their risk management strategies, invest in training programmes and emphasise the effective use of the technological infrastructure necessary to survive in the digital world.

REFERENCES

- Andress, J. (2014). "The basics of information security: understanding the fundamentals of InfoSec in theory and practice". Syngress.
- Arner, D. W., Barberis, J., & Buckley, R. P. (2017). "RegTech: Building a better financial system". Journal of Financial Transformation.
- Bauder, M. (2017). "Risk management in the digital age". Journal of Risk Management in Financial Institutions.
- Eyal, I., & Sirer, E. G. (2018). "Majority is not enough: Bitcoin mining is vulnerable". Communications of the ACM.
- Goodfellow, I., Bengio, Y., & Courville, A. (2016). "Deep Learning". MIT Press.
- Güryeli, M. (2017), "İşletmelerin Yatırım Geçmişini Etkileyen Faktörler İçin Risk Analizi ve Öneriler: Teknoyatırım Firmaları Üzerine Bir Uygulama" Yayınlanmamış Uzmanlık Tezi, T.C. Sanayi ve Teknoloji Bakanlığı.
- KPMG (2017).Clarityon dynamic audit. Retrieved from: <https://assets.kpmg/content/dam/kpmg/ch/pdf/clarity-on-dynamic-audit-en.pdf>
- Lİ, Y. (2022). System of Government Audit Information Integration Platform Based on Block Chain Technology. In: Macintyre, J., Zhao, J., Ma, X. (eds) The 2021 International Conference on Machine Learning 171 and Big Data Analytics for IoT Security and Privacy. SPIoT 2021.
- Lecture Notes on Data Engineering and Communications Technologies, vol 97. Springer, Cham
- Marr, B. (2019). Büyük Veri İşbaşında "45 Yıldız Şirket Büyük Veriyi Nasıl Kullandı?". (B. Gündüz, Çev.)
- Mustaçoğlu, A. F. (2018) Blockchain-Based Data Sharing and Managing Sensitive Data, Avrupa Bilim ve Teknoloji Dergisi (14), s. 235-240.
- O'neil, C., & Schutt, R. (2014) Doing Data Science "Straight Talk From The Frontline, O'Reilly Media Inc.
- Puhan S., Panda D. And Mishra B. K., (2020) Energy efficiency for cloud computing applications: A survey on the recent trends and future scopes, 2020 International Conference on Computer Science, Engineering and Applications (ICCSEA), 1-6.
- PWC Türkiye. (2015). Dijitalleşen iç denetim. Erişim adresi: <https://www.pwc.com.tr/tr/risk-surec-teknoloji-hizmetleri/assets/ic-denetim-ve-kontrol-hizmetleri/dijitallesen-ic-denetim.pdf>

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Rozario, A. M., Thomas, C. (2019), Reengineering the Audit with Blockchain and Smart Contracts, *Journal of Emerging Technologies in Accounting*, 16(1), 21-30

The Financial Action Task Force (FATF). (2020). "Virtual Assets and Virtual Asset Service Providers".

World Economic Forum. (2018). "The New Physics of Financial Services: How artificial intelligence is transforming the financial ecosystem"

Estimating the economic value of agricultural land on the financial sustainability of agricultural holdings in the North-East Region of Romania

Gabriela Ignat¹, Ioan Prigoreanu², Nicu Șargu³, Lilia Șargu⁴

Abstract

Introduction: The paper analysed methods of economic evaluation of agricultural land, focusing on indicators of crop yield capacity, depreciation of expenses and differential income in the North-East Region of Romania, helping to determine the sustainability of crop cultivation under current production conditions in a given geographical area.

Aim: By applying mathematical modelling using differential income indicators, the aim was to obtain a maximum gross income under the mixed game strategy, including on more fertile and less fertile soils within the North-East Region of Romania.

Method: The study was based on a series of indicators and methods relating to crop yield capacity, the determination of indicators for the payback period and differential income, the partial economic valuation score, the equation for calculating the valuation score, which integrated the various components of economic valuation, allowing an overall assessment of land value and economic valuation indicators.

Findings: The results provide clear indications on the optimal direction for managing these lands by optimising crop rotation which revealed that a crop rotation including winter wheat, oilseed rape, maize and sunflower is the most rational choice in this Region. The study also indicated that the average size of optimal agricultural land for this region is about 11.50 hectares.

Originality and value: The research proposed an optimisation of agricultural land use management using a metric model based on economic land valuation indicators. This model was used to determine the optimal share of agricultural crops in the crop rotation, and can be adapted and applied to any other agricultural region.

Key Words: valuation, efficiency, modelling, depreciation, differentiated returns, crop yields, agricultural land

Jel Codes: C13, C21, C41, C51

1. INTRODUCTION

Agricultural land use patterns provide insight into the relationship between various factors influencing the transformation of agricultural land use and are increasingly used to predict potential future land uses.

Economic land valuation is a method that allows us to predict the microeconomic value resulting from the implementation of a particular agricultural land use system on

¹ PhD, Prof., University of Life Sciences “Ion Ionescu de la Brad”, Faculty of Agriculture, Iasi, Romania

² PhD, student, University of Life Sciences “Ion Ionescu de la Brad”, Faculty of Agriculture, Iasi, Romania

³ PhD, student, Academy of Economic Studies of Moldova, Chisinau, Republic of Moldova

⁴ PhD, Assoc. prof., University of European Studies of Moldova, Faculty of Economics, Chisinau, Republic of Moldova

a given area or region. This valuation is more useful than a simple physical analysis of the land, as many agricultural land use decisions are made on the basis of economic considerations. Methodological approaches to economic land valuation, involving mathematical modelling to determine indicators of sustainable land use development, have been developed by researchers such as McDonald G.T., Yakubovich E.N., Stokov A.S., Glenn N.A., Kalogirou S., Smith C.S.

In the international literature there is no single methodology for the economic evaluation of agricultural land, thus in Germany the economic evaluation of agricultural land focuses on determining the relative fertility, taking into account economic, organisational and soil quality factors, of plots of land on a scale from 0 to 100 points. In the UK, land valuation is based on natural factors and economic valuation is based on the degree of productivity of the land, and the calculation of economic valuation of land is done by the method of capitalising net product costs, taking into account the yield capacity of agricultural crops and comparing the yields obtained under different modes of farming. In the United States, the economic valuation of agricultural land is based on farm product prices, distance from the parcel of land to the required infrastructure and location on criteria such as agroclimatic assessment, land use structure, farm location, cropping intensity, crop yield capacity and production costs on varied soils.

The use of economic evaluation methods for agricultural land, focusing on the economic efficiency, productivity and profitability of land use, has significant potential for application not only in Romania but also in other EU countries, and these approaches can play a key role in promoting sustainable, competitive and more economically and environmentally responsible agriculture.

2. LITERATURE REVIEW

Sustainable development has become a fundamental conceptual framework for the analysis of the agricultural sector, approaching it in a comprehensive and holistic way. Sustainability in agriculture is a relatively new concept, with international reach, and raises many important questions for policy makers, including farmers, economists, managers and industry leaders. This increased focus on sustainability in agriculture by international organisations has led to a significant increase in research in this area at regional and national level. These studies have contributed to a deeper understanding of how agriculture can become more sustainable and have had a significant impact on discussions and decisions within the agricultural sector.

Estimating the economic value of agricultural land on the financial sustainability of farms in the North-East region of Romania aims to conduct a literature review on the valuation of agricultural land, covering the determinants of land value and the models used to determine the value of agricultural land. To achieve this objective, we combined recent literature with classic and well-known works in the field, synthesizing and comparing all the factors considered in these studies to explain the value of agricultural land and to model them.

Authors from different studies consider various aspects of agriculture and farmland valuation to address different aspects of sustainability and efficiency in this sector, thus Taratula et al. (2019) focus on the application of mathematical models for optimizing land management, thus providing a way to make more efficient decisions in managing land resources, Coppola et al. (2020) examine income levels and economic viability of Italian farms using data from the European Farm Accountancy Data System (FADN), providing insight into the economic situation in the Italian agricultural sector, Ait Sidhoum et al. (2022) investigate the balance between economic, social and

environmental sustainability on crop farms in Spain, using a latent class efficiency model to assess these issues and provide a detailed perspective on them. Špička and Dereník (2021) discuss opportunity costs and their influence on farm viability prospects in the European Union, highlighting how these factors can affect the economic sustainability of farms. Moutinho, et al. (2018) focus on the economic and environmental efficiency of European agriculture, using a generalized maximum entropy approach to optimize farming practices and achieve a balance between economic and environmental efficiency in Europe.

Gavrilescu et al. (2012) uses the IDEA (Indicators for Sustainability Assessment in Agriculture) method to assess the sustainability of farms in Macoregion 1, attempting to quantify economic and environmental sustainability in this region, and Leń et al. (2023) discusses automated data processing in comparative land value assessment during land consolidation works, highlighting the importance of technology in improving land value estimates.

Other studies provide a rich range of perspectives on the valuation of agricultural land and farming in different regions and contexts, contributing to the development of a deeper understanding of these issues as follows: Rusali (2012) discusses the critical dimensions of farm capitalization in Romania, highlighting the importance of analyzing capitalization and asset utilization in the Romanian agricultural sector, and Czubak and Pawłowski (2020) explore the sustainable economic development of farms in Central and Eastern Europe, focusing on the investment incentive mechanisms of the Common Agricultural Policy.

Barnes et al. (2015) investigate the influence of diversification on the long-term viability of the agricultural sector, bringing into question the impact of diversification on the sustainability of the agricultural sector, and Popović, et al. (2020) provide an assessment of the economic performance of farms in Serbia using data from the European Union Agriculture Dataset (EUADF).

Castillo et al. (2021) focuses on modelling the process of agricultural land abandonment in the European Union, providing an insight into this phenomenon at the European level. Wójcik-Len', et al. (2020) proposes an algorithm for identifying land suitable for consolidation, taking into account the spatial variability of soil quality, thus contributing to the development of a methodology for identifying land suitable for consolidation.

Authors Hiironen and Riekkinen (2016) bring to the fore the impact of land consolidation on agriculture and its profitability, providing an important insight into the effects of this process, and Janus and Taszakowski (2018) analyse regional differences in barriers affecting the productivity of agricultural areas and propose a regional approach to prioritising land consolidation, highlighting the importance of considering local specificities in this process.

Ertunç et al. (2022) carry out a comparative study on the legal, procedural and social aspects of land valuation in land consolidation in Central and Eastern European countries and Türkiye, highlighting the diversity of approaches and rules in different regions. Ertunç and Uyan (2022) propose an innovative method of land valuation in land consolidation projects using the Best Worst Method, thus addressing a new perspective on land valuation in this context, and Ivasenko (2008) examines the foreign experience in assessing the value of agricultural land, providing an insight into various valuation practices used in other countries.

Kovalyshyn et al. (2014) focus on methodological approaches to assessing agricultural land quality in Ukraine, highlighting the importance of developing appropriate methods to value land resources from a Ukrainian perspective.

Strokov et al. (2017) discuss the economic and ecological valuation of land use change, thus illustrating the impact of land use change on the environment and the economy in a specific context, and Trubina (2014) focuses on the valuation of agricultural land in the context of taxation, highlighting how land value assessment can impact taxation, thus highlighting the importance of this issue for tax policies.

Ustaoglu et al. (2016) focus on the economic valuation of agricultural land to assess changes in land use, providing an insight into how land value valuation can reflect changes in the way land is used, and Vasylieva (2015) explores economic and mathematical modelling in agriculture, providing a guide to the use of mathematical models in agricultural land valuation, with a focus on analytical and quantitative approaches.

Yushkova (2014) discusses the economic valuation of potential land resources in agriculture, focusing on the valuation of agricultural land potential and highlighting the importance of this aspect in agricultural sector planning and development, and Zamula (2008) deals with the valuation of agricultural land, contributing to a deeper understanding of the process of assessing the value of agricultural land and identifying relevant methods and factors in this process.

3. RESEARCH METHODOLOGY

The main objectives of the study "Estimating the economic value of agricultural land on the financial sustainability of agricultural holdings in the North-East Region of Romania" are to assess the value of agricultural land and analyse its impact on the financial sustainability of agricultural holdings in this Region.

The study provided a detailed assessment of the value of agricultural land in the North-East Region of Romania, involving the analysis of several factors, including soil quality, geographical location and market conditions, to determine the value of this land.

The study demonstrated that the value of agricultural land has a significant impact on the financial sustainability of farms in the Region, and changes in land values can directly influence the financial performance of farms.

The regional approach of the study highlighted differences in land values and financial sustainability between the regions of Romania, and in order to carry out this study, a careful collection of relevant data was carried out, including information on land transactions and the financial situation of farms.

The study has made a significant contribution to knowledge in the field of economic valuation of land values and its impact on financial sustainability in the specific context of the North-East region of Romania.

3.1. Research Model and Hypothesis

The theoretical basis for the economic valuation of agricultural land in the North-East region of Romania is based on the idea that land is the fundamental resource in agriculture. The process of agricultural land valuation involves both a general and a partial economic evaluation, taking into account the efficiency of the main agricultural crops grown. The general economic evaluation of agricultural land in the North-East region of Romania was based on cost indicators, cost recovery and differential income, while the partial evaluation was based on crop yield capacity, cost recovery and differential income, thus determined:

1. *Yield capacity of each agricultural crop,*
2. *Indicators for the period of cost recovery and differential income,*
3. *Score of a partial economic valuation of agricultural land,*

4. *The equation for calculating the farmland valuation score,*
5. *Indicators of economic valuation of agricultural land,*
6. *Calculation of the weighted average economic valuation score of agricultural land.*

3.2. Explanation of Indicators

1. The yield capacity of each agricultural crop, defined for the North-East region of Romania, is one of the main indicators for the scientific planning of agricultural production. This yield capacity is differentiated according to land quality and is calculated using the formula:

$$\text{Yield capacity of an agricultural crop} = \frac{\text{Average yield capacity at farm level}}{\text{Weighted average soil quality score}} \times \text{Total soil quality score in agropedological group} \quad (1)$$

2. Indicators for the period of recovery of expenses and differential income are calculated using the following formula:

$$\text{Depreciation of expenditure per hectare (euro/ha)} = \frac{\text{Production capacity of an agricultural crop}}{\text{Total cropping costs of agricultural crops}} \quad (2)$$

$$\text{Differential income per hectare (euro/ha)} = \text{Production capacity of an agricultural crop} \times \text{the selling price of agricultural production} - 1,35 \times \text{total expenditure on growing agricultural crops} \quad (3)$$

3. In order to calculate the score of a partial economic valuation of agricultural land in the North-East region of Romania, it is necessary to determine its score price in terms of expenses and differential income:

$$\text{Price per score based on depreciation of expenditure (euro/t/ha)} = \frac{\text{Depreciation of expenditure per hectare}}{\text{Agricultural crop quality score}} \quad (4)$$

$$\text{Price per score according to differential income} = \frac{\text{Differential income per hectare}}{\text{Agricultural crop quality score}} \quad (5)$$

4. The equation for calculating the farmland valuation score is based on depreciation of expenses and differential income.

$$\text{Farmland valuation score according to recovery of expenses} = \frac{\text{Recovery of expenditure per hectare}}{\text{Price per score based on cost recovery}} \quad (6)$$

$$\text{Scorul de evaluare a terenului agricol în funcție de venitul diferențial} = \frac{\text{Differential income per hectare}}{\text{Price per score according to differential income}} \quad (7)$$

5. Indicators of economic valuation of agricultural land in the North-East region of Romania, taking into account gross production value, depreciation of expenses and differential income.

$$\text{Gross production value} = \text{Area of agrobiological groups of soils assessed} \times \text{Yield capacity of an agricultural crop} \times \text{Selling price of agricultural production} \quad (8)$$

6. The calculation of the weighted average score of the economic evaluation of agricultural land according to its land use management indicators is as follows:

$$\begin{array}{l} \text{Weighted average} \\ \text{score of the} \\ \text{economic valuation} \\ \text{of agricultural land} \end{array} = \frac{\begin{array}{l} (\text{Area of agrobiological soil groups assessed} \times \\ \sum \text{Score associated with the economic land evaluation} \\ \text{indicator for a specific soil group}) \end{array}}{\sum \text{Area of agrobiological soil groups assessed}} \quad (9)$$

3.3. Data Analysis

3.3.1. Demographics

The North-East region of Romania has a total area of 3,684.9 thousand hectares, which represents about 15.45% of the total area of the whole country. Out of the total area of the region, 2,122.7 thousand hectares are designated as agricultural land, meaning almost 14.54% of Romania's total agricultural land is located in this region.

A significant part of the agricultural land in the region, namely 2,007 thousand hectares, is privately owned, generating about 94.5% of the agricultural area, suggesting that subsistence agriculture and private farmers have a strong presence in this region.

In 2022, the majority of the cultivated area in this region was devoted to cereal crops for grain, accounting for about 58% of the total area. Within cereal crops for grain, grain maize crops occupied the largest share of area, about 69%. Wheat, sunflower and oilseed rape together occupied 21% of the total area. For grain maize crops, the largest areas cultivated are found in Iasi (22%), Botoşani (23%), and Vaslui (18%) counties, accounting for a significant share of the total area under this crop, with a similar situation for wheat, sunflower and rape.

The problem of determining the differentiated income is complicated by the lack of information on the actual values of the necessary production indicators, especially through simplification, and often by the absence of proper accounting and reporting. The main reason for this situation is that the calculations on the economic valuation of agricultural land were based on average data of the differentiated rental income for cereal production to obtain their weighted average indicator.

Consequently, the lack of an objective valuation of agricultural land is one of the causes of the sub-optimal use of agricultural land and sometimes of its inefficient economic management. It is therefore essential to calculate new indicators of partial economic land valuation for the North-East region of Romania on agricultural land use management.

3.3.2. Normality and Validity of Scales

To calculate the yield capacity, data provided by the National Statistical Institute (INS) from the year 2022 were used for the specific agricultural crops in the crop rotation: I - autumn wheat, II - oats, III - rapeseed, IV - maize, V - sunflower (table 1).

Table 1 Production capacity of agricultural crops in the North-East Region of Romania in 2022

Group	Agricultural crops	Indicators	Agropedological soil code	Weighted average score of agricultural land suitability	Average production capacity of the region t/ha
I	Autumn wheat	Total bonus score	41	45	5,9
		Production capacity, t/ha	5,1		
II	Oats	Total bonus score	38	41	4,8

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

		Production capacity, t/ha	4,7		
III	Rapeseed	Total bonus score	32	43	3,4
		Production capacity, t/ha	3,3		
IV	Maize	Total bonus score	47	47	11,2
		Production capacity, t/ha	10,8		
V	Sunflower	Total bonus score	40	43	4,0
		Production capacity, t/ha	3,7		

In order to calculate the indicators of partial economic valuation of land according to the recovery of expenses and differential income, the agricultural economic indicators of the North-East Region of Romania were used (according to INS, 2022). The statistical data provided data on expenses associated with the cultivation of agricultural crops and the selling price (table 2).

Table 2 Evolution of expenditure and selling price of agricultural crops in the North-East Region of Romania in 2022

Agricultural crops	Expenditure per 1 ha (euro)	Selling price (euro/t/ha)
Autumn wheat	1.250	200
Oats	1.100	240
Rapeseed	1.300	340
Maize	1.420	220
Sunflower	1.410	320

After obtaining the values of total expenses and the selling price for the cultivation of agricultural crops, according to their average production capacity in the North-East Region of Romania, calculations were carried out to determine the indicators of depreciation of expenses and differential income (table 3).

Table 3 Indicators of partial economic valuation of land according to depreciation of expenses and differential income in the North-East Region of Romania in 2022

Agricultural crops	Production capacity (t/ha)	Total expenditure (euro/ha)	Depreciation of expenses (euro/ha)	Cost of gross production (ha/euro)	Differential income (euro/ha)
Autumn wheat	5,1	1.250	300	910	280
Oats	4,7	1.100	270	870	300
Rapeseed	3,3	1.300	310	920	310
Maize	10,8	1.420	290	930	280
Sunflower	3,7	1.410	320	990	300

In order to determine the score in a partial economic evaluation of agricultural land in the North-East Region of Romania (as shown in Table 4), taking into account the depreciation of expenses and the differential income, we need to calculate the score values using formulae 3 and 4, then obtain the evaluation score using formulae 5 and 6.

Table 4 Partial economic evaluation score of agricultural land according to depreciation of expenses and differential income in the North-East Region of Romania in 2022

Agricultural crops	Price of the expenditure depreciation score	Crop credit score	Recovery of expenses		Differential income	
		Price of the score/income difference	euro/ha	score	euro/ha	score
Autumn wheat	22	0,52	310	18	280	16
Oats	18	0,49	275	20	300	22
Rapeseed	20	0,50	255	22	310	25
Maize	21	0,47	300	21	280	20
Sunflower	20	0,51	295	19	300	19

The differentiated income plays a crucial role in determining the differentiated income I (based on natural fertility) and II (based on economic fertility) and represents the total value of economic efficiency in the use of agricultural land, taking into account the quality and intensity of agricultural crops within the North-East Region of Romania. Thus, the calculated differentiated yield indicators are used to compare the conditions of agricultural crop cultivation in the different areas of the region. This is done by assessing the additional income obtained from agricultural crops on higher or medium quality land compared to lower quality land due to higher labour productivity.

The reduction of expenditure in the form of differentiated income is used as an optimisation criterion in planning the use of agricultural land with different degrees of intensity of use.

Optimisation of agricultural land use management involves the application of differentiated income indicators on high and low quality soils, using a matrix model to determine the optimal proportion of agricultural crops cultivated in order to achieve maximum gross income and thus financial sustainability of farms in the Region.

The matrix model is a mathematical tool for modelling the agreement between the parties involved. This mathematical model, referred to as a "game", answers the question of the necessary changes in the game conditions to achieve an efficient outcome of a new optimal strategy. A farm's strategy is considered optimal when it provides the highest possible benefit or the lowest possible loss after several scenarios. The strategy provides the most efficient outcome under all conditions, regardless of the farm's actions, and the value of the outcome is not diminished even under the worst conditions.

The maximum income gap (a guaranteed benefit) for the first farm (H1) on less fertile land is calculated as follows:

$$H1 = \max_{i=1} \min_{j=1} x_{ij} \quad (10)$$

The smallest differential income (an insured loss) for the second farm (H2) on the higher quality soils of the Region is determined as follows:

$$H2 = \min_{j=1} \max_{i=1} x_{ij} \quad (11)$$

where: x_{ij} is the optimal strategy for growing crops ij .

Thus according to the proposed matrix model it is determined to find an optimal combination of agricultural crops in the structure of a crop area either on high or low quality soils within the two farms (table 5).

Table 5 Optimisation of agricultural land use management for financial sustainability of farms in the North-East Region of Romania

Agricultural crops	Coding	Optimal strategy for growing crops		min _j	Structure of the culture surface. P _{ij}
		Differential income (euro/ha)			
		less fertile soils	high quality soils		
		Agricultural holding 1 (H1)	Agricultural holding 2 (H2)		
Autumn wheat	C1	147	310	147	0,40
Oats	C2	125	285	130	0,30
Rapeseed	C3	130	330	125	0,20
Maize	C4	150	345	150	0,40
Sunflower	C5	143	290	143	0,40
max _i		150	345	Objective function V max _i	
max _i min _j		133	320		

To achieve this goal, we have optimized the Objective V function through customization:

$$V = C1 + C2 + C3 + C4 + C5 \rightarrow \max, \quad (12)$$

Additional unknown variables P_{ij} and restrictions were introduced to obtain the following equation:

$$\max_i \geq 0, P_{ij} \geq 0, V = 1 \quad (13)$$

The results showed that, according to the farm differential income indicators, a crop rotation (winter wheat, oilseed rape, maize, sunflower) with an average farmland size of 11.50 ha is the most rational choice. Establishing the optimal crop rotation structure for soils with different fertility, we used the partial economic land evaluation materials obtained in the mixed matrix structure to calculate the economic efficiency of agricultural land in the North-East Region of Romania using formulae 7-10. These provided the overall economic land valuation indicators (table 6).

Table 6 General economic evaluation indicators of agricultural land in the North-East Region of Romania in 2022

Crop rotation	Agricultural crops	Agro-productive soil group		Production capacity, t/ha	Costs, euro/ha	Sale price, euro/t/ha	Cost of gross production (ha/ euro)
		Code	Surface (ha)				
I	Autumn wheat	38	11,50	5,1	1.250	200	910
II	Oats	38	20,30	4,7	1.100	240	870
III	Rapeseed	40	14,70	3,3	1.300	340	920
IV	Maize	40	25,70	10,8	1.420	220	930
V	Sunflower	32	18,45	3,7	1.410	320	990
Total			90,65	-	6.480	1.320	4.620

Table 7 Economic valuation of agricultural land in the North-East Region of Romania in 2022

Agricultural crops	Depreciation of expenses		Differential income	
	Euro/Ha	Score	Euro	Score
Autumn wheat	295	14	310	16
Oats	250	10	285	14
Rapeseed	295	14	320	17
Maize	310	16	335	18
Sunflower	290	15	310	16
Total	1.440	-	1.560	-
Weighted average score of the economic evaluation of the lands in the North-Eastern Region of Romania	-	13,8	-	16,2

At the region level, the weighted average score is 13.8 for depreciation of expenses and 16.2 for differential income. However, these figures are considered insufficient due to the low humus levels and fertility of the region's agricultural land. Nevertheless, the indicators obtained from the partial economic evaluation of the land, based on the yield capacity of agricultural crops, the depreciation of expenses and the differential income in absolute and relative values on the more fertile and less fertile soils of agricultural holdings in the North-East Region of Romania (as shown in table 6), should be used for planning the area of crop cultivation, determining their yield capacity, comparing soil fertility and evaluating the economic results of agricultural production. These indicators are also valuable for the development of a set of agro-technical measures within a crop rotation field, in order to achieve a sustainable use of agricultural land on farms in the Region.

4. CONCLUSION

The methodical approach to the economic valuation of agricultural land can be applied to different types of land use. The use of partial economic land evaluation data to promote sustainable development of land use management, as illustrated by the example of the North-East Region of Romania, can significantly contribute to the valorisation of its productive and social potential. This can lead to the development of rural areas and increase the production of agricultural products with high added value for the country's population.

Differential income indicators are the basis for balancing economic conditions in agriculture, organisation and planning of agricultural production in the Region. The highest differential income figures are recorded on more fertile land, especially for maize, where they reach 334 euro/ha (with a score of 18) and rape, with 320 euro/ha (score 17). In contrast, less fertile land records the lowest differential income figures, such as 285 euro/ha (score 14) for oats. On such land, the depreciation of expenditure is 250 euro/ha. These values are taken into account for the optimisation of land use management through the matrix game. The results obtained by the differentiated approach confirm that it is rational to introduce a crop rotation, given an average farmland size of 11.50 ha, for major crops such as winter wheat, oilseed rape and maize.

REFERENCES

- Ait Sidhoum, A., Dakpo, K. H., Latruffe, L. (2022). Trade-offs between economic, environmental and social sustainability on farms using a latent class frontier efficiency model: Evidence for Spanish crop farms. *PLoS One*, 17(1), e0261190.
- Angus, A., Burgess, P. J., Morris, J., Lingard, J. (2009). Agriculture and land use: demand for and supply of agricultural commodities, characteristics of the farming and food industries, and implications for land use in the UK. *Land use policy*, 26, S230-S242.
- Barnes, A. P., Hansson, H., Manevska-Tasevska, G., Shrestha, S. S., Thomson, S. G. (2015). The influence of diversification on long-term viability of the agricultural sector. *Land use policy*, 49, 404-412.
- Brzozowska, A., Bubel, D. (2020). Estimation of the Imperative of Rural Area Development on Panel Data in the Process of Managing Agricultural Holdings in Poland. *Agriculture*, 10(7), 294.
- Castillo, C. P., Jacobs-Crisioni, C., Diogo, V., Lavallo, C. (2021). Modelling agricultural land abandonment in a fine spatial resolution multi-level land-use model: An application for the EU. *Environmental Modelling & Software*, 136, 104946.
- Coppola, A., Scardera, A., Amato, M., Verneau, F. (2020). Income levels and farm economic viability in Italian farms: An analysis of FADN data. *Sustainability*, 12(12), 4898.
- Czubak, W., Piotr Pawłowski, K. (2020). Sustainable economic development of farms in Central and Eastern European Countries driven by pro-investment mechanisms of the Common Agricultural Policy. *Agriculture*, 10(4), 93.
- Darwish, M. R., Hamadeh, S., Sharara, M. (2001). Economic sustainability of dry land use: the case study of Irsal, Lebanon. *Journal of Sustainable Agriculture*, 17(4), 91-102.
- Domagała, J. (2021). Economic and environmental aspects of agriculture in the eu countries. *Energies*, 14(22), 7826.
- Ertunç, E., Muchová, Z., Tomic', H., Janus, J. (2022). Legal, Procedural and Social Aspects of Land Valuation in Land Consolidation: A Comparative Study for Selected Central and Eastern Europe Countries and Türkiye. *Land*, 11, 636.
- Ertunç, E., Uyan, M. (2022). Land valuation with Best Worst Method in land consolidation projects. *Land Use Policy*, 122, 106360.
- Gavrilescu, C., Toma, C., Turtoi, C. (2012). Assessment of the sustainability degree of agricultural holdings in Macroegeion 1 using the IDEA Method. *Bulletin UASVM Horticulture*, 69(2), 122-130.
- Hiironen, J., Riekkinen, K. (2016). Agricultural impacts and profitability of land consolidations. *Land Use Policy*, 55, 309–317.
- Ivasenko A., (2008). Foreign experience of evaluation of agricultural land value, *Vestnik UGTU-UPI*, vol. 4, pp. 80-85.
- Janus, J., Taszakowski, J. (2018). Spatial differentiation of indicators presenting selected barriers in the productivity of agricultural areas: A regional approach to setting land consolidation priorities. *Ecol. Indic.*, 93, 718–729

- Kovalyshyn, O., Kryshenyk, N., Havryshkiv, N. (2014). Analysis of methodological approaches to evaluation of land quality in Ukraine, *Econtechmod. An International Quarterly Journal*, Vol. 3, No. 4, p. 97-101.
- Leń, P., Maciąg, K., Maciąg, M., Wójcik-Leń, J., Kocur-Bera, K. (2023). Automated Processing of Data in the Comparative Estimation of Land Value during Land Consolidation Works. *Sustainability*, 15(10), 8110.
- Moutinho, V., Robaina, M., Macedo, P. (2018). Economic-environmental efficiency of European agriculture—a generalized maximum entropy approach. *Agricultural Economics*, 64(10), 423-435.
- Popović, R., Bojčevski, M., Čolić, S. (2020). Assessing the economic sustainability of Serbian farms based on FADN dataset. In *International Conference: “Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region “*. Institute of Agricultural Economics, Belgrade, Republic of Serbia (pp. 451-467).
- Rusali, M. (2012). Critical dimensions of romanian agricultural holdings'capitalisation with productive means--sample evaluations. *Agricultural Management/Lucrari Stiintifice Seria I, Management Agricol*, 14(1).
- Sayılan, H. (2014). Importance of Land Consolidation in the Sustainable Use of Türkiye's Rural Land Resources. *Procedia Soc. Behav. Sci.*, 120, 248–256.
- Sidhoum, A. A. (2018). Valuing social sustainability in agriculture: An approach based on social outputs' shadow prices. *Journal of Cleaner Production*, 203, 273-286.
- Špička, J., Dereník, P. (2021). How opportunity costs change the view on the viability of farms? Empirical evidence from the EU. *Agricultural Economics*, 67(2), 41-50.
- Strokov, A., Yakubovich, E., Krasilnikov, P. (2017). Economic and Ecological Evaluation of Land Use Change: Evidence from Karelia, *Ekonomika Regiona-Economy Of Region*, Vol. 13, Issue 2, pp. 422- 433.
- Syp, A., Osuch, D. (2018). Assessing Greenhouse Gas Emissions from Conventional Farms Based on the Farm Accountancy Data Network. *Polish Journal of Environmental Studies*, 27(3).
- Taratula, R., Kovalyshyn, O., Ryzhok, Z., Malakhova, S. (2019). Application of mathematical modelling for optimization of land-use management. *Real estate management and valuation*, 27(3), 59-68.
- Trubina, M. (2014). Foreign experience of evaluation of agricultural land parcels: taxation aspect, *Financial law*, vol. 3, pp. 55-58.
- Ustaoglu, E., Perpiña Castillo, C., Jacobs-Crisioni, C., Lavalle C. (2016). Economic evaluation of agricultural land to assess land use changes, *Land Use Policy*, England, vol. 56, pp. 125-146.
- Vasylieva, N., (2015). Economic and mathematic modeling in agriculture, *Dnipropetrovsk: Bila K.O.*, p. 155.
- Wójcik-Len', J., Postek, P., Strećk, Z', Len', P. (2020). Proposed algorithm for the identification of land for consolidation with regard to spatial variability of soil quality. *Land Use Policy*, 94, 104570.
- Yushkova, V. (2014). Economic evaluation of potential land resources in agriculture, *Voronezh*, p. 181.

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Zamula. I. (2008). Land evaluation of agricultural lands, Problems of the theory and methodology of accounting, control and analysis – Zhytomyr: ZhDTU, Vol. 1(10), pp. 97-107

Quality of Life – Conceptual Approaches and Quantification Methods

Milian Neguțoiu¹

Abstract

Introduction: Quality of life remains a complex concept which has developed significantly over the last decades, but which is still highly debated among researchers, both from the perspective of a more generally accepted definition, and especially from the perspective of identifying the factors defining quality of life.

Aim: Given the complexity of the term and the diversity of the indicators employed for the quantification of quality of life, this article aims to identify the main research paths which have been approached over time in its study.

Methodology: Identifying the available research in the specialized literature meant a meticulous selection process of the scientific articles indexed in different international databases, which have been interrogated using the following keywords: history of quality of life, quality of life and economic development.

Findings: Concerning the conceptual approach to quality of life, following the examination of the specialized literature, five definitions of quality of life have been employed.

Originality and value: This paper, given its research aims, provides an overview of the way in which the phenomenon of quality of life has been studied over time, especially from an economic point of view.

Keywords: Quality of life, material well-being, environmental protection, sustainable growth.

Jel codes: I31, J11.

1. INTRODUCTION

Quality of life is a concept which has increasingly found its place into the studies of researchers of the past until today. On a global scale, it has become an increasingly researchable subject, associated with different concepts such as well-being, satisfaction with life, happiness, satisfaction with the health status or self-satisfaction, noting that certain experts also develop other transdisciplinary discussions such as: sustainable well-being, sustainable happiness and sustainable health. Thus, they identify a series of conceptual elements of quality of life. All these elements are formulated in an integrated model combining social, environmental and personal aspects. Another concept of quality of life is the environmental factor. This factor contributes to the increase of the quality of life and refers to the vegetation, the forest environment and the existence of the tree in the urban environment. The latter is considered a protector against climate change, but also an absorber of CO₂ pollution, which is increasingly growing in urban environments. Among people, citizens present three perceptions regarding quality of life: the environmental perception, the perception of social inclusion and the perception of urban management. The increase in quality of life indicators began in the 60's and 70's in the 20th century and recorded a significant multidisciplinary progress in scientific research on a scientific and academic level, but

¹ University of Economic Studies, Faculty Economic 1. Department of Economic and Communication, Bucharest Romania

also as a factor employed in the governance policy of democratic states, and also for other governmental organizations. For this reason, the Human Development Index was developed. It is used to measure the quality of life. All the selected and analyzed indicators can be aggregated into a synthetic index on a continental level up to a global level and used in a unique and uniform form of measurement.

2. LITERATURE REVIEW

The vast majority of economically developed countries with a higher degree of quality of life compared to other countries with a low consumption of natural resources discusses, analyzes and measure quality of life growth indicators. Thus, it is important that the index of sustainable life quality be defined, as it is simultaneously supported by quality of life factors from an ecological and social point of view thanks to the purchase of local-grown and less processed food. The effects of quality of life growth are positive for health, as well as for the growth of material well-being, increasingly including the environmental protection factor for a durable and sustainable society. Wiesli, et al. (2021) asserts that the term of quality of life has been associated with other different concepts such as: well-being, satisfaction with life, happiness, satisfaction with one's health, satisfaction with the self, satisfaction with one's family. There are also other terms related to satisfaction which are widespread in society, especially within the transdisciplinary discussions of expert authors, such as sustainable well-being, sustainable happiness and sustainable health, environmental supporters which one could consider to be in full development and implementation for environmental protection and the decrease of carbon emissions for natural protection. Wiesli, et al. (2021) identified in their work nine conceptual elements of quality of life: social relations and equality; nature and landscape; education and knowledge; participation, identification, and collective emotions; living; mobility; health and safety; leisure and recreation; and income and employment. All these elements are formulated in an integrated way related to social environmental and personal aspects. Wiesli, et al. (2021) present a research article of Giannico, et al. (2021) about urban green spaces and forest environment, elements which contribute to the improvement of health and human well-being. These alleviate the effects of climate change and consequently contribute to the quality of life growth. The denser the surface covered by trees, the greater the possibility to reduce cities being exposed to floods and other calamities, storms and other meteorological phenomena which are more and more frequent, abundant and stronger in intensity. Urban forests can bring about cooling benefits and stop the evapotranspiration of the soil. Additionally, urban forests can act as carbon absorbants, acting against polluted air and alleviating noise. They also produce benefits on a short and long term concerning the quality of life growth. Urban forests and green indexes can greatly contribute to individual well-being and to the growth of a sustainable and durable life.

Moreover, it has been proven that proximity and accessibility to green spaces reduce the likelihood of obesity, cardiovascular diseases, and mental health degradation. They also reduces depression or anxiety and generally lower mortality. From everything presented, it appears that a major contribution to the quality of sustainable life is the percentage allocated from GDP/capita for the arrangement of green spaces on a local, rural and urban community level, which unconditionally contributes to the increase of the quality of sustainable life. Giannico, et al. (2021) mention that among the general population citizens present three perceptions: the environmental perception, the perception of social inclusion and the perception of urban management. Feneri, et al. (2013) say that the first scientists who used quality of life to assess ecological risks from

the uncontrolled growth of polluting factors processed environmental data and identified the following factors: temperature, land, land coverage and vegetation index.

Kamp (2003), cited by Feneri, et al. (2013), researched the concept of the quality of working hours, the quality of the environment where they carry out their work and the overtime resistance at that workplace. They noted that the lack of a complete methodological framework for analysis in relation to the quality of life determined by empirical analysis in urban areas leads to the inaccuracy of work results and factual states, both while the individual is at work and after the end of working hours .

Feneri, et al. (2013) mention that the International Institute for Sustainable Development of the Quality of Life divided quality of life into five parts: the urban environment, the urban economy, community assets, individual well-being, community leadership, citizen pride. Here other main categories of indicators that derive from health, environment, social equality and economic equality can also be included. These generally lead to an increase in the quality of life and human well-being. These are factors which are accompanied by indicators of urban management and urban planning and are related to social equity, housing conditions, air pollution, noise pollution, but also to climate changes that lead to a downward study of the quality of life.

Karel and Barvi (2023). In the first half of the 20 th century, the theme of quality of life was mainly associated with economic well-being. However, once with economic growth of the post-war years, other aspects of quality of life opened up and exceeded the value of GDP/capita. In the 60's and 70's in the 20th century, there was a significant increase in the number of indicators that were correlated with the quality of life. Karel and Kradek (2022) cite Andrews (1986) and Smith (1973), where they state that the study of quality of life is a complex and multidisciplinary topic which later became the subject of scientific research on an academic level. This practice is a good governance tool, both for a government and for other functional organizations of governments, being a public policy-making factor in their planning and decision-making processes at the governmental level. Following the international responses for the assessment of the quality of life, the Human Development Index (HDI) was established. It is used to measure the quality of life, becoming a form of measuring progress in an ever changing world

According to Pacione (2003), measuring quality of life has several benefits: comparing the state of society, identifying long-term trends, understanding the distribution of quality of life in space and monitoring the effects of government policies. But, despite the great interest in quality of life, there is also a lack of consensus on how to measure this phenomenon, because there is a considerable diversity of approaches used (Moons and Colab) 2006, cited by Pacione (2003). We can see in this article that the conflict of terms related quality of life as opposed to health is mentioned.

Indicator domains are described as individual indicators that can be aggregated into a synthetic index. Here, several indicators of the quality of life were identified at the continental to the global level, taking into account the regional quality of life index, the UNDP 1990 deprivation index (Noble and Colab, 2019), and the Canadian Index of Wellbeing (Michalos et al., 2011).

Yusoff (2020) states that there are four main components for measuring quality of life growth indicators: natural environment, land, water, air. These biological aspects contribute to improving the quality of life, appreciating that the development of the area and the improvement of land use for the efficient use of resources bring a significant benefit for increasing the quality of life, as well as for the development of more beneficial opportunities for society, being considered the catalyst for the achievement of sustainable development. The definition of sustainable development was formulated to meet the needs of the present, without compromising the development of future

generations, but also to meet their own survival needs, considering that human beings are at the center of the analysis concerns. Yusoff (2020) also cites Felice and Perry 7, who identify a more appropriate approach, consider the dimensions of quality of life as physical well-being, material well-being, social well-being, psychological well-being, religious well-being and human well-being. He defines the quality of life as individual happiness or great satisfaction with life, also highlighting the environment, including needs, desires, aspirations, lifestyle preferences, but also other tangible and intangible factors that determine material well-being, as a good what can be measured within the quality of life, based on two requirements: biological requirements of people living in urban and rural environments, as well as cultural requirements including all cultural and spiritual activities.

Feneri, et al. (2013). Quality of life is a multidimensional concept taking on direct meanings and which includes aspects of social, spatial, economic, psychological and physical and human well-being. These aspects of the quality of life depend on several natural factors and of climate propagation, which contributes to the satisfaction of human well-being, based on a good health, an appropriate infrastructure, high-quality material goods and freedom of choice.

In addition to the factors presented above, there are other factors which influence the quality of life: the measurement of environmental pressures, water management, noise levels, air pollution, pollution prevention and the state of the environment. (Ordway, 1953 and Osborn, 1954), cited by Feneri et al. (2005) mention that social indicators refer to personal feelings, attitudes, preferences, opinions, judgments or beliefs of a certain kind. They are called subjective indicators and cannot be measured as well as objective indicators. The author also presents other indicators with specifications for other directions, such as human health, attitudes towards science or scientists, beliefs about the dangers arising from new technologies, as well as social indicators which refer to relatively easy-to-identify elements. Nováková and Šoltés (2016), the definition of quality of life does not equate to well-being, but represents a concept of a broader meaning, consisting of several different aspects of the human being, which indicate its multidimensional character. In general, there is a distinction between two sides of the quality of life: one is subjective, the other is objective. The objective descriptive one consists in the living conditions of the people, while the subjective evaluative one is based on judgment, analysis, and evaluates the living conditions and the feelings towards them. Veenhove (2000) also distinguishes four indicators of the quality of life: the living capacity of the environment, the living capacity of the person, the usefulness of life for the environment and the appreciation of life by man. Nováková and Šoltés (2016) cite a multidimensional measurement report of the quality of life, supplementing traditionally used economic and social development indicators: living conditions, productive activity, health, education, leisure and general life experience. All these indicators represent a useful tool for analyzing public communication policies, but also a person's standard of living, which can be measured through three different parts: income, consumption, materials and housing. Chiarini, et al. (2021) shows in his work how important sustainable development is, noting that worldwide 55% of the population is living in the urban environment. This part of the population represents the biggest consumers of natural and environmental resources prone to CO₂ pollution.

The author focuses on the air quality in urban areas and takes it as a particular dimension of the degradation of the urban environment, considering the increase in CO₂ pollution, the increase in the consumption of fossil fuels and the consumption of energy resources. In order to understand more holistically how urban environments affect air quality, the author presents the two basic indicators of the quality of life: the objective indicator and the subjective indicator. The objective indicator presents socially limited

aspects of individuals. The subjective one presents aspects in the following order: health, human well-being, air pollution, the citizen's habitat and the citizen's workplace environment. In the same context, air quality is an important indicator of quality of life. For this reason, he exposed some work ideas which he presented in his paper, touching on the need for sustainable and sustainable development Lysenkol, et al. (2021). The model of sustainable societal development for which we strive on the economic and educational level can only be presented in the form of a natural evolution, controlled and based on public intelligence and the quality of the educational systems in society. Education is the main foundation of modern culture, science, technology, spiritual and material activities, as well as the sustainable development of society. Improving its quality requires a general theory of education.

Experts call the quality of education a prerequisite for attractiveness, mobility and confidence in education, producing results in the involvement of various objectives with maximum safety and quality. Quality is assimilated by the author with a conceptual object of quality, namely the degree of compliance with quality and environmental requirements, standards and desired expectations, including target or acceptable values. This word acquires a completely different condition in the phrase "quality of life", being basic indicators of the general well-being of people. This discussion about the quality of life prompts us to remember the brilliant intuitions of the philosophers of antiquity, which have a characteristic and very important foundation: happiness, which is part of a person's life. Thus, meaning and direction, power and honor, necessity and virtue are discussed, giving priority to spiritual qualities. Here the author quotes Aristotle, saying that he believes that happiness is nothing but the joint completion of three benefits: mental and bodily, strength and health, wealth and nobility, fame and honor. Aristotle's ontology distinguished two aspects of being: being in possibility and being in reality. These two aspects are aspects which build the principle of education.

In the prophetic expression, education appears as the greatest comfort of knowledge for the citizen only if it is of the highest quality, and the quality of education and the quality of the person meet together the term quality of life. Education shapes a person from an economic, cultural and social point of view. The author of this analysis defines "quality of life" as a unit of indicators characterizing the levels of human life and the degree of his satisfaction with his life plans, which are correlated with the minimum standards offered by society, and the criterion close to the content is the the integrated indicator of quality of life. The formation of the gradualization of quality of life indicators is divided into: well-being, health, work activity, educational activities, standard of living and standard of culture. The culture of human life is also considered as a synergistic combination in three categories: life, subjectivity and culture. The culture of human life implies an appeal to the triads of the concepts of "cult-cultivation-cultural conformity".

Valerie (2001) mentions in her research the use of a series of proxy indicators to infer quality of life through healthcare, crime rate, leisure and recreation. From all these indicators, several key indicators grouped in the five basic areas of the economy were ranked: physical infrastructure, social infrastructure, environment and political system, health status and interpersonal communication. Other authors approach people with only two important factors: the quality of a person's life and the quality of a person's described life. These are analyzed by two indicators: subjective and objective. Both of these indicators have an intrinsic link between them and are used in all measurements of quality of life indicators. Paraskevi (2013) An individual's quality of life is a difficult concept to measure and define, but it can be viewed in general terms as a multidimensional concept which emphasizes the self-perception of an individual's current state of mind. For this reason, quality of life must be seen as a concept consisting

of a series of social and environmental, psychological and physical values and qualities. Adam Smith (1973), cited by Paraskevi (2013), proposed that well-being should be used to refer to objective living conditions applying to a population at large, while quality of life should be more properly limited to subjective assessments of individuals on their lives. Because of this, Smith considered the evaluative nature of the term, but nowadays this distinction has disappeared. The human being is undefined or used consistently or interchangeably within research situations. Quality of life is the well-being of the human being, which has evolved through quantitative and qualitative measures taken by people. A second reason for the loss of distinction between the terms is caused by the fact that quality of life and material well-being have both objective and external components to an individual, which are measured by others, but also subjective components, that is, personal evaluations of one's own life or of particular aspects of life. Thus, measurements of happiness through self-rating scales are used. Richard and Young (2005) The well-being and quality of life of a population is an important concern in economics and political science, being measured by several social and economic factors: standard of living, access to goods and services, happiness, freedom, art, health, medicine and innovation, research and development. These elements are more difficult to measure. We delineate the most important categories designated as important: education, economy, environment, social and health conditions, public safety, culture and education, leisure and relaxation, government administration or civic participation. In order to have an effective measurement, the criterion of the level of education is usually used through graduation rates, school dropout rates or the results of tests carried out in various categories of educational sectors. Their results present the expenses per student and teacher, economy and income, education and the results of education. All of these measurements include data on unemployment rates, labor force participation, poverty rates, income, productivity and industry diversity. Most indicator systems use quantifiable or numerical data, which are mostly universally recognized as statistically sound and objective. These traditional measurement systems are widespread and extremely useful, but they have a more humanistic and eloquent interpretation in the measurements which constitute well-being, satisfaction and desirability, that is, the quality of life over time. The measurement of quality of life indicators presents non-monetary forms of measurement, socially and quantitatively oriented in the context of a measurement that is carried out both inside a society and outside it.

Diener and Suh (1997), cited by Richard and Young (2005), mention that the first researchers in the field took all the research models of the quality of life and stated that the empirical study of the quality of life is more than a simple intellectual exercise. it is a deliberate effort to understand and analyze people's fundamental concerns, showing the lifestyle they have and the directions they want. The quality of life cannot be compared as another factor of the economy or other products, because these indicators measuring the well-being of man and the environment in which he spends his daily life are the most relevant and eloquent. Jordan and Alvan (2002) Quality of life measurements are made with various methods and components used in different studies, as follows: general health, functional capacity, emotional function, well-being level, life satisfaction, happiness level, intellectual level, pain, nausea and vomiting, level of symptoms, fatigue, sexual functioning, social activity, memory level, financial status and job status. The assessment of quality of life may originate in an unsatisfactory framework for current measurements. The author draws attention to the fact that this conceptual framework must be organized on the basis of a general worldwide rating for measuring and interpreting the quality of life. Since 1966, we have been working on the conceptualization of quality of life indicators, moving from the quality of survival in life to the quality of life. In 1937, the first research project took place through the office

of the welfare board in New York. Public welfare and social welfare have undergone a multitude of social, political and environmental transformations. The quality of life cannot be measured only from a public or social point of view. It must be measured and evaluated starting from the state of health, the living conditions, the workplace, the financial state, the public and educational conditions, as well as the protection of the environment. Daniel et al. (2010) cite Easterlin (1973, 1995, 2005a, 2005b), who pointedly supported the disagreement among economists on the increase in the quality of life. He finds no significant statistical evidence of a link between a country's GDP and the well-being of its citizens, but he still argues that a focus on this evidence would lead to empirical results that are valid for measurement and quantification. However, he claims that when people become richer, no one becomes happier. Daniel et al. (2010) asks the question: "Does economic growth improve human quality?". They develop a research that was carried out in 140 countries regarding life satisfaction, identifying three distinct elements. Citizens of the countries studied report higher levels of life satisfaction, and richer countries generally have a higher level of life satisfaction, correlated with the level of economic development. Absolute income plays an important role in determining subjective well-being, the indicator for measuring the quality of life and environmental protection. The relationship between income and satisfaction is remarkable and similar, based on the logarithm of income growth. From this analysis made by the author in the study of 140 countries, it appears that economic growth improves human quality, increases the standard of living and raises the degree of satisfaction with life. Karmi (2016) presents in his work an analysis of the term health and quality of life, which are used and defined interchangeably and holistically in order to investigate the directions and meanings they take. He reviews the history and definition of the terms considered for this analysis, namely health status, health-related quality of life, quality of life in general. These three key terms defined in the specialized literature are the main factors of human well-being, he says.

Health is defined and influenced by the World Health Organization as a state of mental well-being combined with physical and social well-being (but not all researchers agree with this definition). The quality of life proved to be a challenge of historical research, there are several approaches for its definition, as well as different subjective prejudices. Some authors have approaches based on human need and subjective well-being. There are many definitions of quality of life that focus on subjective judgments, noting that in this case some authors argue that objective factors should be included in quality of life as general well-being that includes objective descriptors and subjective assessments of physical, material and social well-being, emotional and of health. Health-related quality of life has been problematic, because it has been assigned at least four different definitions of quality of life, interpreted by various researchers in their own specific way.

- The first definition: How well a person functions in his life, with his well-being, perceived in the physical, mental and social domains of health
- Second definition: Quality of life is a concept that includes all factors with a positive or negative impact on an individual's life
- Third definition: Those aspects of self-perceived well-being related to health or are affected by the presence of disease
- The fourth definition refers to the value of the health states attributed to the different states that a person has in his life

Şerban Oprescu (2011) defines the quality of life as a relatively new concept, arising from the pressing need to better understand the complexity of human action and its interpretation, from the need to understand the perspective of these goals: prosperity, human well-being and material well-being. In this article, the author analyzes the

concept of quality of life as being located in economic studies that have aroused the interest of several scholars from various fields such as sociology or ethics and law, acquiring a strong interdisciplinarity of character. This is not only validated as a purely scientific notion, but also as a defining element in public policies.

The quality of life has the role of an important factor in the development of public governance policies in order to increase economic progress and the development of the quality of life. In the theory of scientific knowledge, i.e. epistemological, there appears a certain uncertainty of narration. More precisely, how can we know whether the norms of evaluation are the best or the worst theories of the quality of life. This is where the ethical danger of paternalism appears, because relationships are insensitive to many things of value in the lives of people from different corners of the world. John and Winters (2011) Higher education institutions and colleges in a city increase the level of education of human capital. The presence of these institutions is correlated with the individual's salary, positively controlling the individual characteristics of the workers that positively influence the quality of life, increases economic development, increases qualified personnel on the labor market and determines the growth of the population and GDP per capita in the respective area and the degree of air quality. Quartiroli, et al. studied and analyzed the quality of life through personal care, taking as a study senior practitioners from the world of sports, who act to improve health and well-being. The role of self-care and professional quality in sustaining a long-term environment leads to increased mental health, improves health, increases material well-being, decreases the stress factor related to the work performed, increases the power of focusing on positive aspects and caring for others. Research in the field of self-care and prevention is rarer, although we recognize from various studies that one of the important factors of the quality of life is the time spent outdoors or in the gym.

Carrasco et al. (2017) On an European level, there are more and more studies being done regarding the increase in the number of indicators for measuring the quality of life. However, traditional indicators for measuring life, such as GDP, gross income, employment, unemployment, poverty, social exclusion rates and demographic decline are excluded. In this context, other studies are being carried out for the inclusion of other relevant indicators related to personal satisfaction, well-being, the level of achievement of the indicators proposed that day, as well as social policies, the inclusion of subjective indicators related to the private life of families, such as self-care, preventive actions, actions to create satisfaction at work and in general the perception of satisfaction with personal life. All this leads to an increase in the quality of life. In order to refer to the quality of life and material well-being, several indicators proposed by the OECD are highlighted: adjusted net disposable income of households, net financial wealth of households, jobs and earnings, long-term unemployment rate, average gross earnings of employees in relation to full-time work, job and employment insecurity, quality of family housing, number of rooms per person, housing, housing expenses, health status, life expectancy, health self-assessment, professional life balance and family, employees who work very long hours, free time dedicated to personal care, education and skills acquired in educational cycles, level of education, students' cognitive abilities, type of social ties, support for social networks, political engagement and governance.

3. RESEARCH METHODOLOGY

Identifying the available research in the specialized literature meant a meticulous selection process of the scientific articles indexed in different international databases addressing directly the concept of quality of life growth. These have been interrogated using the following keywords: history of quality of life, quality of life and economic

development, quality of life and environmental protection, as well as other combinations of terms addressing aspects such as the definition and research forms of quality of life. Following the employment of these research terms, twenty articles have been initially selected. These have been thoroughly analyzed and included into the analysis presented in this paper, proposing different conceptual approaches of quality of life or quantification instruments of quality of life or of the factors defining this phenomenon. Moreover, the scientific works whose relevance and notoriety are evidenced by the number of citations from their publication date until today have been analyzed in particular.

4. CONCLUSIONS

Regarding the conceptual approach to the quality of life, following the analysis of the specialized literature, a number of four definitions of the quality of life were retained. In general, the analysis of these definitions reveals the fact that the term quality of life is related to terms such as economic growth, material well-being, health, environmental protection, pollution reduction and sustainable growth. From the perspective of the indicators used to measure the quality of life and the analysis undertaken within this research, it highlights the fact that there is no common approach among those who have researched this phenomenon. There are authors who have a degree of skepticism regarding some indicators of the quality of life, considering that in order to define universal indicators, all the indicators discovered by various researchers should be quantified, as a general integrated system is needed worldwide.

In this context, we believe that worldwide research in the field of quality of life will never end, so more and more indicators will continue to be identified, taking into account technological change and climate change. In general, the quantification methods, as is natural, differ depending on the way in which the quality of life phenomenon was conceptually approached. In this way, two major research directions can be identified. On the one hand, studies that use indicators that globally measure the quality of life, and on the other hand, studies that focus on some aspects or dimensions that make up this phenomenon which is of major importance in the development of mankind.

REFERENCES

- Angel, C-C. Almudena, M. Martinez Martinez, L-C. Quality of life, well-being and social policies in European countries Intech Open The world's leading publisher of Open Access Books <http://dx.doi.org/10.6772/68003>”
- Chiarini, B. Antonella, D-A. Marzano, E. Regoli, A (2021) Air quality in urban areas: Comparing objective and subjective indicators in European countries. www.elesevier.com/locate/ecolind
- Daniel W. Sacks. Bestey, S-J. Wolfers (2010). Subjective Well-Being, Income, Economic Development and Growth <http://www.nber.org/papers/w>
- Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. *Social Indicators Research*, 40(1-2), 189–216. <https://doi.org/10.1023/A:1006859511756>
- Feneri, A-M. Vagiona, D. Karanikolas, N. Measuring Quality Of Life (QOL) in Urban Environment: An integrated Approach 3th. Proceedings of the International

Conference on Environmental Science and Technology, Athens, Greece, 5-7 September 2013

John V, Winters (2011) Capitalul uman, Invatamant superior institutii si calitatea vietii. <https://mpra.up.uni-muenchen.de/28484/Documentul> , MPRA nr.28484, postat la 01 februarie 2011 09:37 UTC.

Joseph, M-S. Alex, Michalos, Abbott L, Ferriss, Richard A, William Pavot (2005). Research of social indicators (2006)76:343-466, Springer 2006

Jordan Matthew Prutkin. Alvan R. Feinstein (2002). A History of Quality of Life Measurements. EliScholar- A Digital Platform For Scholarly Publishing at Yale

Karmi, M (2016). Orchid. Health, quality of life related to health and quality of life: what is the difference. Pharmacoeconomic 34(7),p.645-649. ISSN 1170-7690, <https://doi.org/10.100/s40273-016-0389-9>

Karel Macků & Radek Barvíř (2023) Quality of life indices: how robust are the results considering different aggregation techniques?, Journal of Maps, 19:1, 2126801, DOI: 10.1080/17445647.2022.2126801. <https://doi.org/10.1080/17445647.2022.2126801>

Lysenkol, Ei-M. Zharinova, Ye-N. (2021), Quality of education as an indicator of the quality of life. <https://doi.org/10.1051/shsconf/202110103045>

M M Yusoff (2020). Improving the quality of life for sustainable development. Department of Geography, Faculty of Arts and Social Sciences, University of Malaya, Kuala Lumpur IOP Conf. Series: Earth and Environmental Science561 (2020) 012020 IOP Publishing doi:10.1088/1755-1315/561/1/012020.

Nováková, B. Šoltés, V. (2016), Quality of Life Research: Material Living Conditions in the Visegrad Group Countries, Economics and Sociology, Vol. 9, No 1, pp. 282-294. DOI: 10.14254/2071-789X.2016/9-1/19

Pacione Michael, Urban environmental quality and human wellbeing—a social geographical perspective, Department of Geography, University of Strathclyde, 50 Richmond Street, Glasgow, Scotland G1 1XH, U

Prutkin, J-M. Alvan, R. Feinstein (2002). A History of Quality of Life Measurements. EliScholar- A Digital Platform For Scholarly Publishing at Yale

Paraschievi Theofilou (2013) Quality of life: definition and measurement, European Journal of Psychology 2013. Vol. 9(1), 15-162, doi: 10.5964/ejop.v9i1.337

Richard D. Young.(2005) Quality of Life Indicator Systems—Definitions, Methodologies, Uses, and Public Policy Decision Making

Ruut Veenhoven, (2000) The Four Qualities Of Life, Ordering conceptand measures of the good life. Jurnal Of Happiness Studies, 200, Vol1, pp1-39

Quartiroli, A. Rebeca, A. Zakrajsek, Sharon, M. Knight. Edward, F. Etzel. (2021) The Role of Self-Care and Professional Quality of Life in Sustaining a Long-Lasting

Serban Opreacu, G-L. An Epistemological Perspective on the Quality of Life Concept. Theoretical and Applied Economics, Volume XVIII (2011), No. 2(555), pp. 171-180 Volumul XVII(2011), Nr.2(555), pp.171-180

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

Thea Xenia Wiesli, Ulf Liebe, Thomas Haumer, Roger Bar Sustainability (2021) 13,9187. Sustainable Quality of Life: A Conceptualization That Integrates the Views of Inhabitants of Swiss Rural Regions 13,9187 <https://doi.org/10.3390/su13169187>

Valerie Moller, Monitoring quality of life in cities: the Durban case . Development Southern Africa Vol 18, No 2, June 2001

Vincenzo Giannicoa, Giuseppina Spanoa,*, Mario Eliaa, Marina D’Estea, Giovanni Sanesia, Raffaele Lafortezzaa. (2021) Green spaces, quality of life, and citizen perception in European cities.Environmental Research196(2021)110922.journal homepage: www.elsevier.com/locate/envres

Yusoff, M-M (2020). Improving the quality of life for sustainable development. Department of Geography, Faculty of Arts and Social Sciences, University of Malaya, Kuala Lumpur IOP Conf. Series: Earth and Environmental Science561 (2020) 012020 IOP Publishing doi:10.1088/1755-1315/561/1/012020.

Dealing with the Covid Crisis in a Professional Environment Being Emotionally Intelligent

Tanya Chouhan¹

Abstract

Introduction: The coronavirus sickness, originally discovered in Wuhan, China, in December 2019, has given rise to a new normal. A vast number of individuals have been infected as a result of the virus's global spread since its discovery. The virus was spreading so widely that on March 11, 2020, the World Health Organisation declared a pandemic. More than 2.3 million individuals have died as of the beginning of February 2021 as a consequence of COVID-19 being found in around 106.2 million people throughout the globe. Both the mortality toll and the number of individuals without work increased over this period. It's becoming harder and harder to get a customer these days. Some employees were being paid less or delayed, and promotion-related concerns were found. In addition, the overall state of the world economy was affected.

Aim: The purpose of this study is to raise awareness of the significance of comprehending one's feelings and emotions in difficult situations. It also investigates that how EI correlates with job performance and effectiveness in managing challenges possessed by Covid.

Method:For conducting this study, the researcher has used empirical research method and relevant data collection is done through primary and secondary sources. In primary sources, questionnaires are prepared based on the Likert scale and questionnaire were sent to the phenomenal experts for their reviews, their inputs were incorporated, and changes were made to it.

Findings:Despite many drawbacks of the year 2020 due to Covid , we can overcome the situation if we maintain our emotional stability. During the survey, the researcher noticed that employees were already working from home, and it was discovered that the corona virus had a significant impact on them.

Originality and value: The originality of the research paper lie in its specific focus on emotional intelligence in the professional context during the Covid-19 crisis, it practical implications, comprehensive analysis and potential contributions to organizational resilience and crisis management strategies.

Key Words: Covid-19, Workplace, Work Environment, Work from Home, Emotional-Social Intelligence, Work Performance

Jel Codes:Y 20, P 17, Z 00

¹Assistant Professor, Galgotias College of Engineering and Technology, Faculty, Management Department, Greater Noida, India

1. INTRODUCTION

Everyone is struggling with strong emotions and extreme anxiety in the post-COVID-19 world. These feelings are not harmful; in fact, when we know how to deal with them, they can be beneficial. However, if we allow them to take over, they have the power to immobilize us or plunge us into a dark hole. Understanding and controlling emotions is the essence of emotional intelligence, not trying to force them out of the decision-making process. That can help us think clearly and balance our emotions with reason during a crisis, preventing us from acting in a way that we will later come to regret. This is what it is preferred to refer to as "To make emotions work for you, instead of contrary to self." (Bariso 2023).

Because of the epidemic, many people have found it more difficult to maintain social connections with their friends and family. Before the coronavirus, people would only see each other on rare occasions. Now, they no longer do so due of the virus. The epidemic has sparked the idea of an online class. Online lessons have made students more sedentary. The five- to six-month lockout surprised the organization's development solution. Businesses suffer greatly as a result of Covid. As a result of the shift to risk-based management in almost every industry, the number of individuals without work has risen.

In this study, it is shown that how covid-19 has affected workers, workplaces, and work behaviours. A new unknown challenge will be analyzed before we examine and apply our remedy to help us grasp the crisis. Due to the coronavirus, working from home was previously an option, but it is now required for all workers. Because of this, COVID-19 was a total failure for 2020.

This epidemic has afflicted people all around the globe. Viruses like the coronavirus have undoubtedly had a financial and psychological influence on people (joblessness, reduced pay and job loss, for example) (mental pressure, work pressure). An investigation on the influence of covid-19 problems on workers was the goal of this article. COVID-19 has affected people's livelihoods, enterprises, personal development, and health, according to the available research.

2. LITERATURE REVIEW

Literature review includes the following points Covid-19, Workplace, Work Environment, Work from Home, Emotional-Social Intelligence, and Work Performance. For research of the literature review there are some papers which are used in this paper are selected from international journals. This papers are selected randomly in between year 2010 to 2021. Literature review belonging to dealing with the covid crisis in a professional environment being emotionally intelligent.

According to research by Carlton Brown (2021) on times of crisis, especially the one brought on by COVID-19, an organization needs a combination of innovative management and emotional intelligence to drive efficient change that will help it recover and continue to operate profitably and sustainably. In recent decades, effective management theories, beliefs, and research have centred more emphasis on interpersonal

skills and a leader's ability to uplift, support, and inspire followers, as well as establish and sustain a sense of beneficial contribution to the organisation as a whole. This understanding stands in stark contrast to earlier research and understandings that resonate with commanding, premeditated, and focused leadership.

Thus, in the context of COVID-19 pandemic obstacles, this paper's premise is the connection between transformational leadership and behavioural intelligence. So it is argued here that an approach to leadership that centers on emotional intelligence and is mediated by innovative leadership can play a crucial role in guiding business organizations through the current crisis that mankind (and the organization specifically) is facing due to the COVID-19 pandemic. The approach taken here is deeply rooted in an in-depth investigation of earlier, pertinent literature on these phenomena and how it contributes to the development of a conceptual framework that may help shed new light on how to effectively address the challenges posed by COVID-19.

According to research done by Fr. Dr. Bobby John (2021), difficulties can take many different forms. However, opportunities are frequently presented by life-threatening circumstances as well, such as natural disasters and epidemic diseases. Consequently, the virus struck us hard in the face. When it comes to medical research on the novel coronavirus crisis, emotional intelligence is a powerful tool. Since we are going through a difficult time, we must practice emotional intelligence, empathy, and self-control.

Moreover, young children must have emotional intelligence in school so they can handle stress in the future. Higher emotional intelligence is demonstrated by those who are better able to regulate, tolerate, and manage stress. The study concentrated on teachers' stress in COVID-19 environments and emotional intelligence.

According to studies by Athanasios Drigas (2020), those with a high level of emotional intelligence are better able to manage and mitigate stress, as well as adopt resilience and control strategies. In everyday life, critical and anxious circumstances can take on a variety of shapes. Certain stressful events, like illnesses and natural disasters, can occasionally be more serious on a national or international scale. Everyone was in such a difficult and demanding situation when the virus first appeared. Emotional intelligence is making a significant contribution to the fight against the coronavirus pandemic at a time when the world's medical and scientific community is attempting to contain this new threat.

The purpose of Alam F. J.'s research from 2021 was to find out how emotional intelligence and cross-cultural practices affected nurses' work engagement and well-being during the COVID-19 pandemic. In four Pakistani tertiary hospitals, 300 survey responses from patients were given out to test our hypotheses. According to this research, nurses who possess cross-cultural competencies engage patients in their work tasks in an appropriate manner. Additionally, nurses who were emotionally intelligent displayed low levels of job stress. To promote work engagement and well-being at work, cross-cultural training and emotional intelligence development programmes should always be incorporated into nursing course curricula. On the forefront of the COVID-19 pandemic are thousands of nurses.

Nurses in Pakistan, like those across the globe, deal with a great deal of stress, the possibility of infection, long hours, and intense emotions. Cross-cultural behaviours and emotional intelligence have been linked to improved outcomes in emergency situations, according to earlier research.

Researching environmental psychology and neuroscience, Edward Finch (2021) presents preliminary findings from reflective practice approaches regarding the effects of pandemics on workplaces in Australia and the UK. Today, it's acceptable to work from home, and new opportunities and challenges present themselves. The ability of humans to control their emotions is more crucial than ever in the age of automation, artificial intelligence, and smart offices. The most important competency that employers still seek is emotional intelligence. It's the one skill that will most likely help you land a job and the one that will most likely make you lose one. The pandemic has brought to light the significance of human attributes in contemporary organisations.

The current study was carried out by Ana Soto-Rubio (2020) to examine the impact of psychosocial risks and emotional intelligence on the health, well-being, degree of burnout, and job satisfaction of nurses in Spain during the COVID-19 pandemic's development and the primary peak. 125 Spanish nurses were used as a convenience sample for this cross-sectional study. Emotional intelligence scores, psychosocial demand variables (role conflict, interpersonal conflict, lack of organizational justice, and workload), social support, psychological impact on burnout, fulfillment in work, and the well-being of nurses were all taken into account when calculating multiple hierarchical linear regression models.

Lastly, it was determined how emotional work, psychosocial variables, social support, and emotional intelligence levels affected nurses' health, job satisfaction, and burnout in a moderating way. Overall, the research indicates that emotional intelligence has a positive impact on job satisfaction and protects workers against the negative effects of psychosocial risks like burnout and psychosomatic grievances. To ascertain the function of workplace engagement as a mediating factor in the direct correlation between emotional intelligence and the productivity of medical professionals.

Martin Sanchez-Gomez (2021) conducted research. In multiple Spanish hospitals, a cross-sectional study was carried out in the latter part of 2020. The Utrecht Job Engagement Scale, the Wong and Law Emotional Intelligence Scale, and the Individual Work Performance Questionnaire were completed by 1549 healthcare workers (mean age: 36.51 years; 62.1% women). Even after considering sociodemographic factors, our research showed that work engagement has a mediating role between emotional intelligence and job accomplishments.

In a multidisciplinary sample of 1048 professionals (60.7% of whom were women), Max Sadovyy (2021) investigated the moderating role of emotional intelligence (EI) in the direct impact of the stress caused by the pandemic on job satisfaction and adverse work behaviors. The Impact of Event Scale 6, Wong and Law's Emotional Intelligence Scale, and the Individual Work Performance Questionnaire were completed by the

participants. Even after controlling for socioeconomic factors, the results demonstrated a relationship between COVID stress, performance, and EI, implying a moderating effect between stress and both outcome indicators.

To put it briefly, professionals with high EI and low Covid stress performed best and had the lowest CWB in contrast to those with lower emotional intelligence and higher stress.

According to research by Peerayuth Charoensukmongkol (2020), there is a significant negative correlation between supervisory support and employees' perceived levels of uncertainty. Another important moderator of the harmful impact of supervisory support on workers' emotional weariness is perceived uncertainty. Most importantly, the analysis of the moderating effect reveals that the negative impact of supervisory support on staff members' perceived uncertainties only exists for workers in low-intransigence workplaces; supervisory support does not affect workers' perceived uncertainties in high-intransigence workplaces.

In 2020, Athanasios Drigas carried out research on In our daily lives, critical and stressful situations can take on a variety of shapes. Certain stressful events, like illnesses and natural disasters, can occasionally be more serious on a national or international scale. We were in such a challenging and demanding situation when the virus first appeared. Emotional intelligence is making a significant contribution to the fight against the coronavirus pandemic at a time when the world's medical and scientific community is attempting to contain this new threat. Basic emotional intelligence skills like empathy, awareness, and management are particularly crucial for people to be in control of challenging circumstances like the one we are currently facing.

Alam F J (2021) conducted research on to investigate the impact of cross-cultural practices and emotional intelligence on work engagement and wellbeing among nurses during the COVID-19 pandemic. To test our hypotheses, 300 self-reported questionnaires were distributed in four tertiary hospitals in Pakistan. Our findings revealed that nurses with cross-cultural competencies appropriately engage them in their job tasks. Moreover, emotionally intelligent nurses showed low levels of job-stress. Cross-culture training and emotional intelligence development program should constantly be included in the curriculum of nursing courses to foster work engagement and well-being at work.

According to Carlton Brown's (2021) research, organizations facing a crisis, especially the one brought on by COVID-19, require a combination of transformational leadership and emotional intelligence to effect meaningful change that will enable them to recover and continue to operate effectively and sustainably.

Peerayuth Charoensukmongko (2020) conducted research on the role of crisis communication on the perceived uncertainties and emotional exhaustion of employees who work at private international universities that have been affected by the COVID-19 crisis. Furthermore, this research explores the moderating effect of social support in terms of supervisor support and coworker support on the association between crisis communication and perceived uncertainties.

Bryan Cavins (2021) identified some of the fundamental concepts that are crucial to the growth and advancement of leadership in organisations through his research on the study of relational leadership and emotional-social intelligence. Relational leaders who possess emotional-social intelligence have an impact on the culture of their teams and organisations, fostering stability and assurance in the face of uncertainty. Long-term achievement in life and at work requires the growth and development of leaders with higher levels of emotional and social intelligence.

3. RESEARCH METHODOLOGY

The purpose of this research is to examine the effects of COVID-19 on workers as well as the state of the workplace and work environment.

Research Model

Methodology Process includes the following points: Objectives of the study, problem statement, data collections method either primary or secondary, SPSS analysis and results.

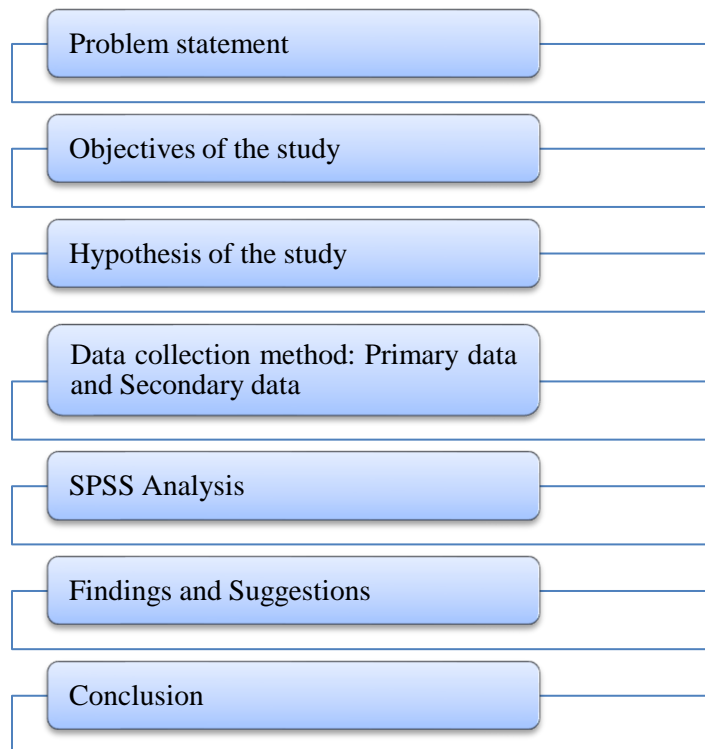


Figure 1. Research Model

Data Collection

For conducting this study, the researcher has used empirical research method and relevant data collection is done through primary and secondary sources. In primary sources, questionnaires are prepared based on the Likert scale.

The researcher sent a questionnaire to this phenomenon's experts for their reviews, their inputs were incorporated, and changes were made to it. After finalizing the questions, it was sent digitally to office-going employees for their feedback.

In secondary sources, data was collected through various research papers, articles, news, and journals. A primary data questionnaire with a total of 17 questions was created. Total of 104 respondents responded to the questionnaire, which was distributed digitally.

The author took total number of 104 respondents because due to lockdown and non-presence of employees she was unable to get in contact with them. The SPSS software is used to analyze the collected data, which includes factor analysis and correlation analysis.

In addition, the KMO score and Bartlett test were examined, resulting in a result based on employee feedback which for all intents and purposes is quite significant.

The online survey was created with the intention of determining whether or not covid has affected the organizational working culture. This research work will be later on publically shared with the same data material and findings so that it can be reached to many people so that they can understand the importance of emotional intelligent and taking decision accordingly even in unaccepted situation like covid-19.

3.1. Data Analysis

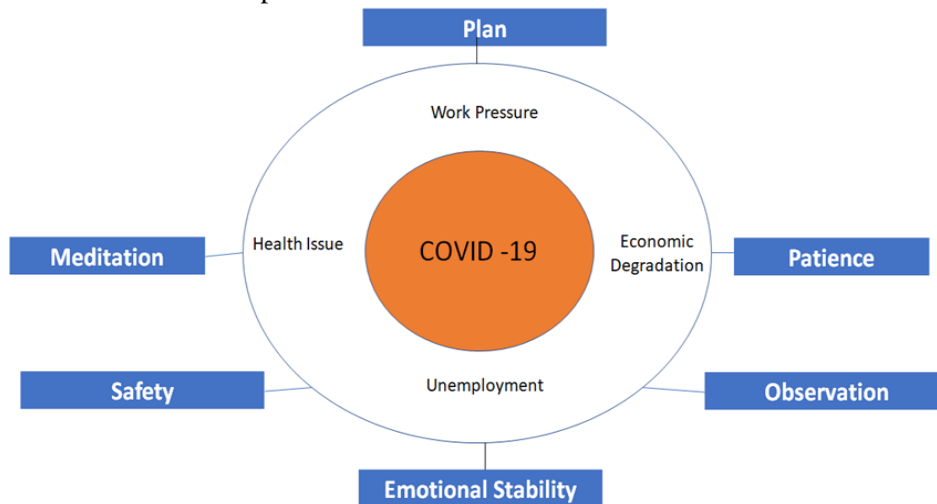
According to the above literature review, it is analyzed that pandemic has caused people to work from home. Some employees are pleased with this concept because it allows them to work from home, while others are dissatisfied with the concept. Employees are also experiencing issues with their salaries and working conditions. Employees are overworked, and less or no proper communication has harmed the clarity of their work.

This research found that covid has a devastating impact on professional life after analyzing the results from SPSS Software. The workplace and work-life balance has deteriorated, putting the companies' profitability at risk. According to this survey, the pandemic has also disrupted employees' salary-getting patterns. the main issues caused by this virus are health issues, economic degradation, work pressure, and unemployment. Covid has also resulted in a large number of deaths around the world. Every employee has been subjected to work pressure, and some have resorted to seeking employment.

- ✓ As a result, the beginning point of factor analysis is a correlation matrix, which displays the effect of covid with different variables like WFH effect, salary getting pattern and covid effect on employees. The included work from home criteria includes the work performance of the employees during this pandemic.

The variables also included the salary getting pattern and the emotional stability of the employees.

- ✓ The analysis suggests that some employees were happy with WFH and hence it does not affected their organisational productivity more. Rather some employees were getting disturbed while doing their work from home and also ensured that the pandemic have affected their salary getting pattern and their working atmosphere. The analysis abruptly accepts that being emotionally intelligent and making plans for future with health safety may support every employees to overcome this pandemic positively.
- ✓ The study's findings could be used as a guide for developing emotional intelligence by acknowledging and rethinking about the futuristic approach for organisational productivity and adapting a new organizational culture that will ensure that employees in the organization perform better during the pandemic. Therefore, Empirical analysis revealed that the characteristics of pandemic has caused employees in lowering their overall performance. The researcher also ensures that this data is new and have not been used in any other publications and manuscripts.



Correlation Matrix

Correlation Matrix^a

		WFH Effect	Work Performance	Covid Effect	ESI
Correlation	WFH Effect	1.000	.362	.306	.005
	Work Performance	.362	1.000	.416	.088
	Covid Effect	.306	.416	1.000	.042
	ESI	.005	.088	.042	1.000
	Salary Pattern	-.003	-.001	-.295	.430
Sig. (1-tailed)	WFH Effect		.000	.001	.482
	Work Performance	.000		.000	.188
	Covid Effect	.001	.000		.337
	ESI	.482	.188	.337	
	Salary Pattern	.488	.496	.001	.000

Interpretation

As shown above table we knowing the WFH performance of during covid-19 crisis. WFH Effect 1.000, Work Performance 0.362, Covid Effect 0.306, ESI 0.005.

Correlation Matrix^a

		Salary Pattern
Correlation	WFH Effect	-.003
	Work Performance	-.001
	Covid Effect	-.295
	ESI	.430
	Salary Pattern	1.000
Sig. (1-tailed)	WFH Effect	.488
	Work Performance	.496
	Covid Effect	.001
	ESI	.000
	Salary Pattern	

a. Determinant = .484

Interpretation

As shown above table we knowing the WFH performance of during covid-19 crisis. and salary pattern a.Determinant is a 0.484, WFH Effect is -.003, Work Performance is -.001, Covid Effect is -.295, ESI is 0.430, Salary Pattern is 1.000.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.517
Bartlett's Test of Sphericity	Approx. Chi-Square	73.022
	Df	10
	Sig.	.000

Interpretation

As shown above table , Kaiser-Meyer-Olkin Measure of Sampling Adequacy.for this 0.517 value. Bartlett's Test of Sphericity for this, Approx. Chi-Square value get 73.022, get Df value is 10 as well as Sig.value is 0.000.

4. CONCLUSION

The study concludes that, despite many drawbacks of the year 2020 due to Covid , we can overcome the situation if we maintain our emotional stability. During the survey, the researcher noticed that employees were already working from home, and it was discovered that the corona virus had a significant impact on them. Employees have undoubtedly been affected by the coronavirus, which has permanently altered the workforce. The transition needs to be well-thought-out and well-communicated. Maintaining patience and emotional stability by observing and planning for the future can also help to restore positivity in our lives. Including the emotional intelligence can add more boon and meaning to one's life and especially the current situation is provoking every individuals to remain emotional intelligent. Every organizations should also prioritize their employees safety and support.

REFERENCES

- Ahmad, N. (2022). Patient Care COVID-19 and well-being among nurses : The Role of Cross-Cultural Practices and Emotional Intelligence in the tertiary hospitals of Pakistan. January.
- Sadovyy, M., Sánchez-Gómez, M., & Bresó, E. (2021). COVID-19: How the stress generated by the pandemic may affect work performance through the moderating role of emotional intelligence. *Personality and Individual Differences*, 180(May). <https://doi.org/10.1016/j.paid.2021.110986>
- Finch, E., & Aranda-mena, G. (2021). Creating the Emotionally Intelligent Home-Office. October.
- Sanchez-Gomez, M., Sadovyy, M., & Bresó, E. (2021). Health-care professionals amid the covid-19 pandemic: How emotional intelligence may enhance work performance traversing the mediating role of work engagement. *Journal of Clinical Medicine*, 10(18). <https://doi.org/10.3390/jcm10184077>
- Cavins, B. (2021). Uncertain Times: Emotional-Social Intelligence and Relational Leadership Practices: A Conceptual Framework. *Visions in Leisure and Business*, 22(2), 10–31. <https://doi.org/10.25035/visions.22.02.04>
- Brown, C., & Nwagbara, U. (2021). Leading Change with the Heart: Exploring the Relationship between Emotional Intelligence and Transformational Leadership in the

Era of Covid-19 Pandemic Challenges. *Economic Insights – Trends and Challenges*, 2021(3), 1–12. <https://doi.org/10.51865/eitc.2021.03.01>

Dr, F., & John, B. (2021). a Study on Emotional Intelligence and Teachers' Stresses in Covid Situation. 25(6), 1096–1106. <http://annalsofrscb.ro>

Charoensukmongkol, P., & Phungsoonthorn, T. (2020). The Interaction Effect of Crisis Communication and Social Support on The Emotional Exhaustion of University Employees during the COVID-19 Crisis. *International Journal of Business Communication*. <https://doi.org/10.1177/2329488420953188>

Soto-Rubio, A., Giménez-Espert, M. D. C., & Prado-Gascó, V. (2020). Effect of emotional intelligence and psychosocial risks on burnout, job satisfaction, and nurses' health during the covid-19 pandemic. *International Journal of Environmental Research and Public Health*, 17(21), 1–14. <https://doi.org/10.3390/ijerph17217998>

Charoensukmongkol, P., & Phungsoonthorn, T. (2020). The effectiveness of supervisor support in lessening perceived uncertainties and emotional exhaustion of university employees during the COVID-19 crisis: the constraining role of organizational intransigence. *Journal of General Psychology*, 1–20. <https://doi.org/10.1080/00221309.2020.1795613>

Drigas, A., & Papoutsis, C. (2020). The Need for Emotional Intelligence Training Education in Critical and Stressful Situations: The Case of Covid-19. *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, 8(3), 20. <https://doi.org/10.3991/ijes.v8i3.17235>

Agarwal, S., Singh. A. (2020). Covid19 and its impact on Indian economy. *International journal of trade & commerce*. 9(1). Pp.72-79.

Alonazi, W. B. (2020). The impact of emotional intelligence on job performance during covid-19 crisis: A cross sectional analysis. *Psychology research and behaviour management*. Pp. 749- 757.

Bartik, A. W., Bertrand, M., Cullen, Z., Glaeser, E. L. , Luca, M. (2020). The impact of covid 19 on small businesses, outcomes and expectations. *Department of Economics*. 117(3) pp. 17656-17666.

Reimagining Employee Engagement in the Digital Age

Nermin Kişı¹

Abstract

Introduction: Embracing the digital transformation has brought about a paradigm shift in the modern workplace, redefining the employee engagement dynamics. This transformation has profound implications, impacting every facet of how employees engage, cooperate, and make contributions to their organizations.

Aim: The aim of the study is to examine the changing trends in employee engagement in the digital era and identify digital technology solutions that can enhance employee engagement levels.

Method: To achieve the aim, a systematic literature review on employee engagement in the digital age was conducted, with a specific emphasis on the most recent developments in the field.

Findings: The study underscores the need for a change in mindset and approach to attain effective employee engagement in the digital age. The integration of digital technologies significantly reshapes the employee-work interaction, offering opportunities for personalized development, real-time feedback, and remote work options. Cultivating a culture of continuous learning, transparent communication, and adaptability within organizations can significantly enhance employee engagement.

Originality and value: The study makes a theoretical contribution to the literature by emphasizing the need for organizations to reimagine their approach to employee engagement in the digital age. By adopting innovative approaches to employee engagement, organizations can ensure their competitiveness and adaptability in an ever-evolving digital world, ultimately adding value to their long-term success.

Key Words: Digital transformation, technology, employee engagement, human resource

Jel Codes: D23, J24, O15

1. INTRODUCTION

The era of digital transformation we are currently witnessing, has marked a series of societal changes, necessitating continual adaptation and acquisition of new knowledge by both companies and professionals (Pereira et al., 2022). In the context of influential paradigms like Industry 4.0, Society 5.0, the forces of globalization, digitalization, and the disruptive impact of the pandemic, employers are grappling with a significant workforce shortage. Employees, who are hesitant to change their workplace, return to conventional contractual employment, or start working, are increasingly displaying lower levels of engagement across various aspects of organizational processes and performance. As a result, organizations are confronted with the compelling need to attract, retain, and enhance employee commitment through the utilization of a diverse

¹ Assoc. Prof. Dr., Zonguldak Bülent Ecevit University, Çaycuma Vocational School, Department of Management and Organization, Zonguldak, Turkey.

range of contemporary tools and methodologies. Notably, the concept of employee engagement, which correlates with corporate performance, customer satisfaction, and financial outcomes, has gained considerable prominence among human resource managers in this current era (Girdauskiene, 2022).

This study aims to examine the changing landscape of employee engagement in the digital age, seeking to discover the innovative and creative solutions that can empower organizations to foster higher levels of engagement among their workforce. With this aim, an extensive literature review is undertaken to shed light on the recent trends, best practices, and emerging challenges that define this critical aspect of the modern workplace. In pursuit of this aim, the study has been structured as follows: Following the literature review, the research methodology employed in this research will be introduced. Subsequent sections will delve into the study's findings, providing a comprehensive analysis of the innovative strategies discovered in the research process. The study acknowledges its limitations and offers suggestions for future research in its conclusion.

2. LITERATURE REVIEW

The concept of employee engagement is defined as a management-oriented activity that emerges in connection with the organization's goals to achieve better performance in a constantly changing and competitive environment (Gupta and Sharma, 2016). On the other hand, it can be identified as the extent to which employees experience emotional connection with the organization, exhibit enthusiasm for their roles, and willingly invest discretionary effort into their work (Swaroop and Sharma, 2022). Therefore, it is a multidimensional construct that encompasses behavioral, cognitive and emotional elements (Kahn, 1990). Engaged employees tend to not only focus their efforts on their tasks but also exhibit a diminished desire to leave their positions, all while displaying a positive and constructive attitude in carrying out their responsibilities (Chan et al., 2021). These employees actively pursue self-improvement, bring new ideas to their work, support their colleagues, consistently exceed expectations, and contribute to the enhancement of the business (Marciano, 2010).

The existing body of literature offers insights into the diverse facets of employee engagement. These studies have explored various antecedents and consequences associated with this concept. For example, leadership styles, efficient communication, and organizational culture have all been identified as significant contributors to employee engagement, as demonstrated in the research conducted by Ramirez-Lozano et al. (2023). Furthermore, Saks (2019) has foreseen that multiple factors, including perceived organizational support, perceived supervisor support, job characteristics, rewards and recognition as well as perceptions of distributive and procedural justice, can serve as predictors for both job and organizational engagement. Nasir Ansari and Irfan (2023) have investigated the impact of corporate social responsibility as significant determinants of employee engagement. In the study carried out by Liu et al. (2023),

work-life balance emerges as another critical determinant in comprehending and augmenting employee engagement.

Furthermore, it is crucial to recognize that employee engagement is linked to a variety of positive outcomes. These include increased productivity, improved job satisfaction, and enhanced customer satisfaction (Pieters, 2018). Recent research, as indicated by Desta et al. (2023), has further demonstrated a strong link between employee engagement and improved job performance. On the other hand, Saks (2019) has highlighted that engaged employees are more inclined to exhibit greater levels of organizational commitment and participate in organizational citizenship behavior. Such a dynamic organizational environment transforms individuals from mere employees into advocates and champions of the company's mission, driving the entire workforce towards greater success. Additionally, Marciano (2010) has pointed out that there are other factors associated with higher levels of engagement, such as reduced lost-time accidents, improved work quality, lower turnover, decreased absenteeism, and increased profitability.

Although current research predominantly centers on studying the factors influencing employee engagement and its consequences, further investigation is warranted to explore the influence of digital technologies on employee engagement (Kişi, 2023). As workplaces increasingly embrace digital advancements, understanding the intricate interplay between technology and employee engagement has become paramount. This evolving landscape necessitates an exploration to unravel the nuanced ways in which digital technologies shape and influence employee engagement dynamics. Building upon this premise, the present study aims to examine employee engagement within the context of the digital age.

3. RESEARCH METHODOLOGY

This study conducts a systematic literature review, utilizing secondary sources, previous studies in the related literature, and recent scientific publications, with a focus on employee engagement within the digital age. Special attention was given to current trends and emerging technologies that characterize the realm of employee engagement amidst digital transformations.

3.1. Data Sources

The research heavily relied on peer-reviewed journals, conference proceedings, and authoritative books related to employee engagement and digital technologies. Online databases and academic repositories were extensively searched to gather a diverse range of perspectives and insights in the field.

3.2. Data Analysis

The collected literature underwent a meticulous analysis, wherein key themes, innovative strategies, and noteworthy findings were systematically extracted. This process enabled the synthesis of valuable insights, facilitating a nuanced understanding of the subject matter.

4. RESULTS

In the ever-evolving digital landscape of the 21st century, characterized by automation and structural transformations, modern organizations find themselves in need of a resilient and actively engaged workforce to sustain their competitive edge (Malik and Garg, 2020). Simultaneously, within the framework of the new normal brought about by the Covid-19 pandemic and the increasing prominence of hybrid work arrangements, there is a discernible emphasis on the imperative to reassess employee engagement (Boccoli et al., 2023). In the contemporary work environment, the demand for digital communication and collaboration skills has become increasingly pronounced. High stability exists between digital communication and collaboration competencies and work engagement (Oberlander and Bipp, 2022). Employee engagement, as a dynamic concept, can be reimagined and explored with the integration of contemporary digital technologies, opening doors to innovative research methodologies (Boccoli et al., 2023).

Research into employee engagement in the digital age has produced findings that can be comprehensively explored through four key themes: Personalized development opportunities, real-time feedback applications, remote work arrangements, and organizational culture.

Personalized development opportunities and employee engagement: The integration of artificial intelligence into human resource management enhances employee experiences and job satisfaction by enabling personalized interactions and communication. In this context, AI-powered chatbots act as direct communication channels within organizations, providing personalized support to employees and empowering them to express their thoughts and concerns, ultimately promoting heightened engagement (Dutta et al., 2023). Moreover, technological tools like collaborative platforms, intranets, and instant messaging applications facilitate smooth, transparent and open communication between employees and managers. This, in turn, enables regular feedback, recognition, and open dialogue, ultimately a feeling of participation and engagement (Bella, 2023). The Personalized Messaging Engine (PME) integrates with systems enabling employee-employer interactions, utilizes service-oriented computing principles to systematically process data from these systems and delivers customized messages to employees regarding health, wealth, and career. As a result, these systems empower employers to inspire their employees, fostering collaboration and cultivating a more engaged workforce (Sharma et al., 2015). Furthermore, these systems redefine the scope of employee engagement by underscoring the importance of personalization, communication, and empowerment as fundamental elements for developing an engaged workforce.

Digital human resource management systems have the capability to monitor individual preferences, skills, and career aspirations, enabling the creation of customized training and development plans, individualized learning journeys, and opportunities for career advancement. This level of personalization serves to boost employee engagement by emphasizing the organization's commitment to their personal growth and development (Bella et al., 2023). Digital learning tools such as online learning platforms,

e-learning modules and virtual training sessions enable organizations to offer customized learning experiences for employees, especially in our rapidly evolving business landscape. These platforms use technology to tailor learning opportunities to meet individual needs effectively, enhancing employees' skills and knowledge (Ghosh et al., 2023). Moreover, it is crucial for employees to grasp the proper utilization of various technology applications, such as social media and video conferencing. Therefore, achieving digital employee engagement requires empowering employees through diverse training, access to resources, and various digital connectivity options (Sudrajat et al., 2021).

Additionally, it is important to highlight that both the enjoyment individuals experience and the presence of effective game dynamics have a positive influence on work engagement. When individuals experience mutual benefits and when there is an element of fun or enjoyment during their interactions, their motivation and engagement tend to increase (Silic and Back, 2017). Therefore, gamification is a powerful tool for elevating employee engagement by facilitating the conversion of mundane and repetitive tasks into captivating and purposeful activities. It achieves this by actively involving and immersing employees in their work. The essence of gamification lies in its capacity to stimulate and motivate employees by addressing their intrinsic and extrinsic needs, thereby fueling their enthusiasm and dedication to their roles (Girdauskiene, 2022).

Real-time feedback applications and employee engagement: Digital tools can be employed to provide real-time feedback on employee engagement. This includes the ability to track employee emotions in real-time and immediately access the team's current status (Stanbery, 2023). Employee surveys and feedback platforms offer a channel for employees to voice their thoughts, ideas, and concerns, fostering a sense of value and involvement in decision-making processes (Bella, 2023). However, exploring alternative technological measurement methods and tools to complement traditional surveys can help bridge existing gaps in effectively and accurately assessing engagement at the individual, team, and organizational levels. In this regard, while digital technologies have made it easier to measure engagement more frequently, there has also been significant progress in tools and applications that transcend the mere collection of survey data. The adoption of wearable technologies, along with other innovative tools, allows us to move beyond simple inquiries about employees' satisfaction, commitment, and engagement levels, enabling direct measurement of these concepts. Traditionally, talent management professionals have tightly controlled employee feedback data to maintain confidentiality and allow for in-depth analysis before sharing the results widely. However, as the volume of data and feedback to managers and employees increases, it also brings more responsibility and the risk of misinterpretation. The challenge lies in preventing insignificant fluctuations from causing unnecessary concerns. Innovations in data visualization play a critical role in providing context and guiding those without statistical expertise toward actionable insights, thereby improving the feedback process (Burnett and Lisk, 2019). These advancements underline the

profound impact of digital transformation on shaping employee engagement in modern organizations.

Remote work arrangements and employee engagement: The prevalence of remote work has been on the rise, due to recent advancements in digitalization and the repercussions of COVID-19, leading to significant shifts in working conditions and employee engagement (Rodriguez-Modrono, 2022). As many businesses embark on digital transformation journeys, remote work has become increasingly common across various sectors (Swaroop and Sharma, 2022). As remote work becomes more common and virtual collaboration tools are increasingly utilized, technology empowers employees to connect, collaborate, and engage with their colleagues, regardless of their physical location. Team collaboration platforms, virtual meeting tools and video conferencing systems encourage teamwork, inclusivity, and engagement, even within geographically dispersed work settings (Bella, 2023). The increased prevalence of remote work is positively correlated with improved skills, autonomy, and work engagement (Rodriguez-Modrono, 2022). Many employees have found that remote work options bring flexibility to their daily schedules and contribute to work-life balance (Hajjami and Crocco, 2023). However, in the realm of remote work, where spontaneous face-to-face interactions in traditional office settings are limited, there is a critical need for alternative avenues to facilitate informal conversations and foster connections among colleagues. Managers should recognize this necessity and establish social support systems, particularly targeting individuals who perceive their social support to be lacking (Oberlander and Bipp, 2022).

Organizational culture and employee engagement: In the digital age, fostering an innovative workplace culture and promoting digitalization alone is insufficient. It is imperative to enhance employees' digital literacy to fully optimize the advantages of employee engagement within a digitalized and innovative work environment (Chan et al., 2021). Notably, digital competence exerts a positive influence on work engagement. Individuals with higher self-perceived digital self-efficacy tend to work more independently (Sang et al., 2023). Employees who lack proficiency in workplace digital tools, even if they accept digitalization and an innovative culture as the new norm, are less likely to demonstrate engagement (Chan et al., 2021). To harness employees' digital skills, education and development professionals must provide training and promote continuous learning through online platforms (Hajjami and Crocco, 2023). Offering employees access to ongoing learning experiences enables organizations to empower their workforce with the acquisition of new knowledge and skills, adaptability in the face of changing circumstances, and the impetus to drive innovation. Moreover, the promotion of a supportive learning environment, where employees are encouraged to explore new ideas, pose questions, and engage in knowledge-sharing activities, can further strengthen the organizational culture of learning. Establishing a robust culture of organizational learning depends on the proactive creation of diverse and easily accessible learning opportunities. By nurturing a culture that prioritizes continuous learning, organizations can remain ahead in the fast-paced and ever-changing business

landscape, thereby fostering growth, innovation, and adaptability among their workforce (Pereira et al., 2022). In addition to this, a positive organizational culture enhances individual adaptability to change and fosters higher levels of job and organizational engagement among employees (Parent and Lovelace, 2018). Given the increasing opportunities for self-improvement in the digital economy, the utilization of various tools for adaptability and professional development has become crucial. Therefore, contemporary programs should include a dedicated segment that emphasizes self-development (Chernysh and Kozyk, 2021). Furthermore, leaders play an essential role in guiding individuals to comprehend a transparent work environment and in promoting their well-being, motivation, and continuous engagement. Especially, agile leadership serves as a cornerstone for maximizing and enhancing employee engagement for improved corporate performance in today's rapidly changing business landscape (Busse and Weidner, 2020).

5. CONCLUSION

The modern workplace is experiencing a significant transformation, due to the continuous advancement of the digital age. The swift integration of technology into workplace has not only revolutionized our business practices but has also fundamentally reshaped the nature of employee engagement. As organizations contend with the challenges and opportunities arising from this digital transformation, it is becoming increasingly evident that traditional methods of engaging employees are no longer adequate. In this era of unprecedented change, adopting digital transformations has necessitated a reexamination of our understanding and promotion of employee engagement.

This study examines the recent literature on employee engagement in digital age. It illuminates the evolving landscape of employee engagement in the digital age, by shedding light on the innovative solutions, digital technologies and tools that can empower organizations to cultivate higher levels of engagement within their workforce. The impact of these technological advancements goes beyond merely improving engagement at a superficial level and reaches the core of organizational culture and values. To sum up, modern organizations have the capability to harness digital tools and technologies such as chatbots, instant messaging apps, social media, video conferencing, gamification, wearable devices, and data visualization. This enables them to promote personalized development, establish real-time feedback mechanisms, and support remote work arrangements. Additionally, they can nurture a corporate culture that champions continuous learning, open communication, and adaptability. Embracing these approaches empowers organizations to boost employee engagement and successfully navigate the digital landscape.

However, it is essential to acknowledge the limitations of the study. This study, based on existing literature, may not encompass the full spectrum of innovative practices adopted by organizations in practice. To gain a more comprehensive perspective on the long-term effects and benefits of these practices, additional quantitative research is

needed. Recommendations for further research include in-depth case studies to explore the successful implementation of these innovative approaches by specific organizations. Additionally, conducting comparative research across various industries and cultural contexts can provide insights into contextual factors that affect the strategies' effectiveness. Exploring these avenues can significantly enhance our understanding of the practical applications and adaptations of these approaches, ultimately benefiting organizations seeking to improve their employee engagement initiatives.

The findings presented in this study underline the critical importance of reimagining employee engagement for sustained success in the digital age. By embarking on this journey, organizations can not only adapt to the rapidly changing landscape but also enhance the value of their efforts, supporting the engagement of their workforce and ensuring their long-term viability.

REFERENCES

- Bella, M. J., Ramyasri, M. D., Vijayashree, P. (2023), "Revolutionizing HR Management: Embracing Technology for Enhanced Efficiency and Employee Engagement", *International Journal of Scientific Research in Modern Science and Technology*, 2(3), 28-34.
- Boccoli, G., Gastaldi, L., Corso, M. (2023), "The Evolution of Employee Engagement: Towards a Social and Contextual Construct for Balancing Individual Performance and Wellbeing Dynamically", *International Journal of Management Reviews*, 25, 75-98.
- Burnett, J. R., Lisk, T. C. (2019). "The Future of Employee Engagement: Real-Time Monitoring and Digital Tools for Engaging a Workforce", *International Studies of Management & Organization*, 49, 108-119.
- Busse, R., Weidner, G. (2020), "A Qualitative Investigation on Combined Effects of Distant Leadership, Organisational Agility and Digital Collaboration on Perceived Employee Engagement", *Leadership & Organization Development Journal*, 41(4), 535-550.
- Chan, A. J., Hooi, L. W., Ngui, K. S. (2021), "Do Digital Literacies Matter in Employee Engagement in Digitalised Workplace?", *Journal of Asia Business Studies*, 15(3), 523-540.
- Chernysh, I., Kozyk, M. (2021). "Improving the Process of Employee Adaptation in Hospitality Enterprises Based on ISO 10018:2015 Quality Management, Guidelines for Employee Engagement and Competencies", *Baltic Journal of Economic Studies*, 7(5), 204-212.
- Desta A., Tadesse W., Mulusem W. (2023), "Linking Aspects of Human Capital Management, Employee Engagement, Perceived Organizational Support, and Self-reported Employee Job Performance. *Organizational Psychology*, 13(2), 78-99.

- Dutta, D., Mishra, S. K., Tyagi, D. (2023), “Augmented Employee Voice and Employee Engagement Using Artificial Intelligence-Enabled Chatbots: A Field Study”, *The International Journal of Human Resource Management*, 34(12), 2451-2480.
- Ghosh, V., Bharadwaja, M., Mukherjee, H. (2023), “Examining online learning platform characteristics and employee engagement relationship during Covid-19”, *VINE Journal of Information and Knowledge Management Systems*, 53(2), 335-357.
- Girdauskiene, L., Ausrine Ciplyte, E., Navickas, V. (2022), “Gamification as an Innovative Instrument for Employee Engagement”, *Marketing and Management of Innovations*, 1, 10-17.
- Gupta, N., Sharma, V. (2016). “Exploring employee engagement-A way to better business performance”, *Global Business Review*, 17(3), 45-63.
- Hajjami, O., Crocco, O.S. (2023), “Evolving Approaches to Employee Engagement: Comparing Antecedents in Remote Work and Traditional Workplaces”, *European Journal of Training and Development*, <https://doi.org/10.1108/EJTD-10-2022-0103>
- Kahn, W. A. (1990), “Psychological Conditions of Personal Engagement and Disengagement at Work”, *Academy of Management Journal*, 33(4), 692-724.
- Kiş, N. (2023), “Bibliometric Analysis and Visualization of Global Research on Employee Engagement”, *Sustainability*, 15(13), 1-22.
- Liu, M., Jeon, J.-H., Lee, J.-H. (2023), “Core Job Resources to Improve Employee Engagement in China: The Role of Work-Life Balance, Autonomy and Expertise”, *Asia Pacific Business Review*, <https://doi.org/10.1080/13602381.2023.2241380>
- Malik, P. Garg, P. (2020), “Learning Organization and Work Engagement: The Mediating Role of Employee Resilience”, *The International Journal of Human Resource Management*, 31(8), 1071-1094.
- Marciano, P. L. (2010), *Carrots and Aticks Don't Work: Build a Culture of Employee Engagement with the Principles of Respect™*, McGraw-Hill, New York, United States.
- Nasir Ansari, J. A., Irfan, S. (2023), “Corporate Social Responsibility and Employee Engagement: The Mediating Role of Personal Environmental Norms and Employee Green Behavior”, *Social Responsibility Journal*, 19(9), 1728-1748.
- Oberlander, M., Bipp, T. (2022). “Do Digital Competencies and Social Support Boost Work Engagement During the COVID-19 Pandemic?”, *Computers in Human Behavior*, 130, <https://doi.org/10.1016/j.chb.2021.107172>
- Parent, J. D., Lovelace, K. J. (2018), “Employee Engagement, Positive Organizational Culture and Individual Adaptability”, *On the Horizon*, 26(3), 206-214.

Pereira, G. U., Machado, W. L., Oliveira, M. Z. (2022), “Organizational Learning Culture in Industry 4.0: Relationships with Work Engagement and Turnover Intention”, *Human Resource Development International*, 25(5), 557-577.

Pieters, W. R. (2018), “Assessing Organizational Justice as a Predictor of Job Satisfaction and Employee Engagement in Windhoek”, *SA Journal of Human Resource Management*, 16, 1-11.

Ramirez-Lozano, J., Penaflor-Guerra, R., Sanagustin-Fons, V. (2023). “Leadership, Communication, and Job Satisfaction for Employee Engagement and Sustainability of Family Businesses in Latin America”, *Administrative Sciences*, 13(6), 1-18.

Rodriguez-Modrono, O. (2022), “Working Conditions and Work Engagement by Gender and Digital Work Intensity”, *Information*, 13(6), 1-13.

Saks, A. M. (2019), “Antecedents and Consequences of Employee Engagement Revisited”, *Journal of Organizational Effectiveness: People and Performance*, 6(1), 19-38.

Sang, G., Wang, K., Li, S., Xi, J., Yang, D. (2023), “Effort Expectancy Mediate the Relationship between Instructors’ Digital Competence and Their Work Engagement: Evidence from Universities in China”, *Educational Technology Research and Development*, 71, 99-115.

Sharma, V., Tripathi, A., Srivastava, S., Hegde, A., Dasgupta, K. (2015), “Personalized Messaging Engine: The Next Step in Employee Engagement”, *Service-Oriented Computing: Proceedings of 13th International Conference* (Eds. A. Barros, D. Grigori, N. Narendra, H. Dam), Springer, Berlin, Heidelberg.

Silic, M., Back, A. (2017). “Impact of Gamification on User’s Knowledge-Sharing Practices: Relationships between Work Motivation, Performance Expectancy and Work Engagement”, *50th Annual Hawaii International Conference on System Sciences*, Hawaii, USA, 1308-1317.

Sudrajat, D., Nathasya, L., Saroso, H., Herman, R.T., Syahchari, D. H., Dwidienawati, D. (2021), “Enhancing Organizational Performance through Digital Employee Engagement during COVID-19 Pandemic: Empirical Evidence from Japan”, *2021 3rd International Conference on Cybernetics and Intelligent System (ICORIS)*, Makasar, Indonesia, 1-5.

Stanbery, K., Lindley, K., Huffman, C. (2023), “The Feasibility of Using Net Promoter Score to Measure Real-Time Employee Engagement”, *The Journal of Nursing Administration*, 53(1), 34-39.

Swaroop, S., Sharma, L. (2022), “Employee Engagement in the Era of Remote Workforce: Role of Human Resource Managers”, *Cardiometry*, 23, 619-628.

A Bibliometric Research on the Conceptualization of Sustainable Tourism with VOSviewer

Esat Saçkes¹, Fulya Güngör²

Abstract

Introduction: The concept of sustainability is becoming an increasingly important concept both in literature and in practice. There is a need to truly explain the concept of "sustainability", which different disciplines and sectors include in their missions and visions. In terms of sustainability, the tourism sector and sector stakeholders, which realize most of their production resources with the natural environment; It pays more attention to the dynamics of sustainability, the approaches it is related to and the developments taking place. For this reason, the basis, responsibilities and trends of this concept, whose boundaries are drawn as "sustainable tourism", should be examined.

Aim: By making a bibliometric analysis of studies on sustainable tourism; It is aimed to reach issues related to the approaches and developments to which this concept is related in scientific studies.

Method: In this study, content analysis, one of the qualitative research methods, was used. A bibliometric research was conducted by examining scientific studies with VOSviewer.

Findings: In this study, the citation links of authors and countries and the most frequently used keywords in existing studies on sustainable tourism were identified.

Originality and value: This study makes a unique contribution to scientific studies in the field of sustainable tourism. The study provides the most discussed expressions and approaches in the current literary field, and the countries and authors who work most in this field. It is expected that this analysis will be useful for future researchers in the study subjects they choose, and for industry stakeholders in the methods and decision-making stages they apply.

Key Words: Sustainability, Sustainable tourism, VOSviewer

Jel Codes: M1, Q01,Z32

1.INTRODUCTION

Today, it is seen that networks and alliances consisting of different actors are formed in the name of sustainability, and various institutions and organizations allocate increasing amounts of resources by creating projects. Sustainability, which is seen as the intersection point of actors in the field of science and politics, has an important role in this sense (Scoones, 2007, p. 589). Over the last three decades, there has been an increasing public awareness of the role of companies in society. Today, although many companies contribute to economic or

¹ Dr., Balıkesir University, Sındırgı Vocational School, Tourism Management, Turkey.

² Dr., Balıkesir University, Sındırgı Vocational School, Business Management, Turkey.

technological development, they are criticized for causing social and environmental problems such as air and environmental pollution, waste, employee rights, company corruption, product quality and safety. The pressures and demands relate to the fact that companies have responsibilities to a wider range of stakeholders, beyond shareholders and creditor groups. In this context, with the initiatives of supra-governmental organizations (BM, WB, OECD, ILO, EC) and international non-governmental organizations, companies' disclosure of economic performance information to shareholders and creditors has become insufficient and companies are required to submit social and environmental reports as well as financial reports in line with certain principles and standards. clarification has begun to be requested (Van Het Hof & Hoşut, 2015, p. 158). Considering the long-term economic, environmental and social impacts of the tourism sector, although the sector gains are high for all stakeholders, the resource consumption it causes is criticized and it is demanded that these be minimized. All this increases the growth of publications on tourism and sustainability and increases the interest and curiosity in the studies carried out in this field. Especially the rapid increase in areas where sustainability is included creates a need for more contributions on the subject.

In the light of all these explanations, it is aimed to gain a different perspective by examining the literary studies in the context of sustainability in tourism. The results of bibliometric analysis, which is the method of the study, will contribute to determining the preferred subheadings especially in sustainable tourism, determining the framework formed by frequently discussed concepts, preventing conceptual confusion and directing future studies. In order to make a more holistic assessment of the subject of sustainable tourism, the data obtained was visualized by creating maps based on network data through Wosviewer, thus providing a guiding study for future research.

2.THE CONCEPT OF SUSTAINABILITY

Although it is considered a new phenomenon, the concept of sustainability has been a part of discussions on the management and protection of resources for almost one hundred and fifty years. George Perkins Marsh's book "Man and Nature", first published in 1864 - later modified in Physical Geography and Human Action (1965) - had a major impact on resource conservation debates. The questions Marsh raises about the best economic use of natural resources continue to resonate in debates about sustainability to this day (Gossling, Hall, & Weaver, 2009, pp. 2-3).

The idea of sustainable development was emphasized for the first time in the World Conservation Strategy by the International Union for Conservation of Nature and Natural Resources (IUCN, 1980). In 1987, the Brundtland Commission Report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The Commission also emphasized that sustainable development is not a fixed state of adaptation, but rather a dynamic process of change 'all in harmony and enhancing both current and future potential to meet human needs and aspirations' (Liu, 2003, p. 460). In summary; concept of sustainability; It is defined as the ability to meet the current needs of people in terms of processes and activities, but to leave a good environment and order to future generations while preserving natural resources. Sustainable development, on the other hand, expresses the understanding of establishing a balance between satisfying the immediate interests of people and protecting the interests of future generations (Collin, 2004, p. 207).

The need for sustainability capability has arisen from the recognition that the wasteful and inequitable nature of global development leads to biophysical impossibilities when projected into the not-too-distant future. For this reason, the transition to environmental sustainability is urgent because the degradation of the global life support systems that make up the environment creates a time limit in which resources will be depleted (Goodland, 1995, p. 5). The essence of the concept of sustainable is “that which can be preserved over time”. This means that any unsustainable society cannot be sustained for long and will cease to function at some point (Heinberg, 2010).

The concept of sustainability covers all activities, from local to global, related to politics, economy or tourism (Uğurlar, 2017, p. 137). The tourism sector, by its nature, is one of the sectors most related to the three dimensions of sustainability: economic, social and environmental (Reddy & Thomson, 2015). For this reason, sustainable tourism should be adopted by all stakeholders of the sector as a long-term approach that will aim to eliminate all the negativities related to resource consumption that may be created in the field of tourism and balance the prosperity that tourism will provide and the negativity it will cause.

3.SUSTAINABLE TOURISM

While globalization of capital, population movements, and advances in transportation and communication technologies have helped tourism become one of the largest industries worldwide; Tourism has made significant contributions to the economies of many communities around the world through its capacity to

generate revenue, taxes and jobs. However, in addition to the economic benefits, the unplanned growth of tourism has damaged the natural and socio-cultural environments of many tourism destinations; It has caused significant environmental degradation, negative social and cultural impacts and habitat fragmentation. As decision makers became aware of the negative aspects of mass tourism, they looked for alternative tourism planning, management and development options (Choi & Sirakaya, 2006, p. 1275).

Sustainable tourism; "Meeting the needs of visitors, industry, the environment and host communities, taking full account of current and future economic, social and environmental impacts" (WTO-World Tourism Organization, 2023); managing tourist activities while protecting the interests of local infrastructure and the environment (Collin, 2004). , p. 207); it is expressed as the management of all resources and cultural integrity, basic ecological processes, biological diversity and life support systems in a way that economic, social and aesthetic needs can be met by protecting (Liu, 2003, p. 461). Sustainable tourism recommended by UNWTO According to the definition of development, sustainability indicators should cover environmental, economic, socio-cultural and tourism development for all tourism types and destinations (Lee, Jan, & Liu, 2021, p. 2).

Twelve targets have been stated by UNEP, addressing economic, social and environmental impacts. These; economic continuity, local prosperity, employment quality, social equality, visitor satisfaction, local control, social welfare, cultural richness, physical integrity, biological diversity, resource efficiency and environmental cleanliness. These goals aim to achieve two main objectives. The first is to minimize the negative impact of tourism on society and the environment; the other is to maximize the positive and creative contribution of tourism to local economies, the conservation of natural and cultural heritage, and the quality of life of host communities and visitors (UNEP, 2005, p. 18). Considering the global impacts of the tourism system in terms of environmental sustainability, the sustainability knowledge required for the society to choose a sustainable lifestyle and make decisions is necessary to understand ecosystem functioning, climate change, resource scarcity and the structure and functioning of the global economic system (Gössling, 2017, p. 11).

Although sustainable tourism is seen as both correct and feasible as a goal, achieving this goal may not be easy. The ideals it represents are probably indisputable; However, it should be possible to measure whether these ideals have been achieved, and the tools, problems and solutions to be used should be clarified. It is necessary to consider what should be analyzed about sustainable

tourism, from what perspective tourism developments will be evaluated, and from a broader perspective than just seeing sustainable tourism as a development tool (Mcminn, 1997, p. 141). Hjalager (2000) also argues that the components of sustainable tourism are multifaceted and that imprecise definitions may cause a lack of standards and common understandings on which consumer actions can be based. For this reason, the phenomenon of consumption should be discussed in terms of tourism and the existing and potential framework regarding consumption and sustainable tourism should be evaluated (Hjalager, 2000, p. 3). For example, Antimova, Nawjin and Peeters (2012) investigated the difference in awareness/attitude-behavior in the context of sustainability in tourism. It has been pointed out that consumers are aware of sustainability but have difficulty in converting this into behavioral change, therefore there is a gap in awareness and attitude-behavior regarding consumption habits (Antimova, Nawijn, & Peeters, 2012). Strategies that will raise awareness and create permanent behavioral change are needed. In the field of sustainable tourism, there is a need for people and applicable policies that the consumer can follow, imitate and follow by taking their behavior as an example.

In order for sustainable tourism activities to be realized and the expected economic, social and environmental benefits to be achieved, all necessary activities must be carried out on a community basis, that is, by gaining the participation and commitment of the society (Lee, 2013, p. 37).

4. METHODOLOGY

It was aimed to present a holistic perspective on the concept of sustainable tourism with the bibliometric analysis made as a result of quantitative data and numerical measurement indicators.

4.1. Data Analysis

In this study, the Web of Science database was used because it is a comprehensive and reliable database in terms of publication ethics, quantity and quality. The inclusion of different disciplines in the database and ease of access are other reasons for selection. The reason for choosing the VOSviewer program as an analysis tool is that it provides the opportunity to visualize and map bibliometric analysis results; It is a functional program for associating the data in the data set and discovering new concepts.

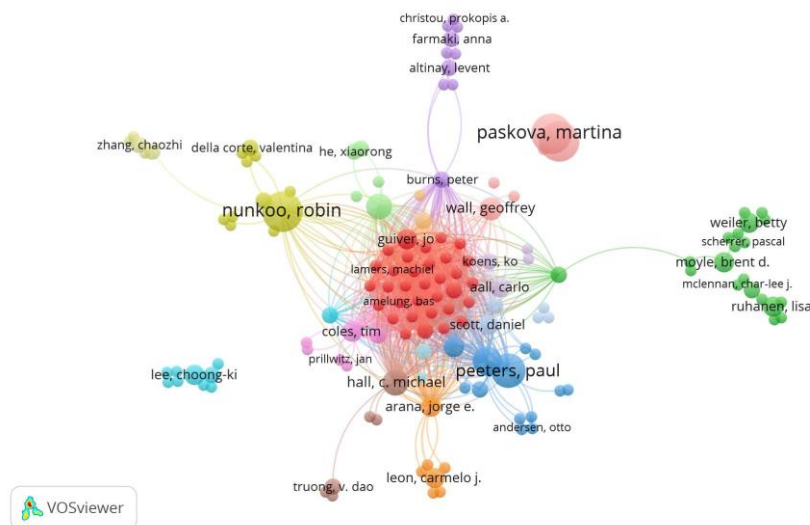
In the research conducted on 25.10.2023, with the keyword "sustainable tourism" and by selecting management (727), business (469), economics (437) and social sciences interdisciplinary (201) categories among the content indexed

in the Web of Science database, 1532 studies were reached. According to years, 995 articles, 443 proceedings, 6 books, 127 book chapters, 33 book reviews, 46 compilation articles, 34 early appearance studies and 26 editorials from different fields, the oldest being 1995 (6 studies) and the newest being 2023 (94 studies). content has been reached. The data obtained was examined through author-citation-country-keyword.

4.2. Co-authorship of Authors

According to the authors' co-authorship analysis, a network map was created by determining at least 1 publication and at least 1 citation criteria to identify the most connected and collaborative authors. According to the analysis made among the names with the highest connections, there are 16 clusters, 145 names and a total of 1557 connections. It is seen that there are 33 names that combine the most in a cluster and a total of 51 connections. Among the most cited authors (Tsung Hung Lee with 927 citations, Paul Peeters with 859 citations, Stefan Gossling with 815 citations, and Anne-Mutte Hjaleger with 815 citations), only Paul Peeters (61 links) and Stefan Gossling (59) have the most links. Among the authors who produce the most works (Zuzana Tuckova with 13 works, Robin Nunkoo with 12 works, and Martina Poskova with 12 works), only Robin Nunkoo (62 links) is seen as the author with the most connections.

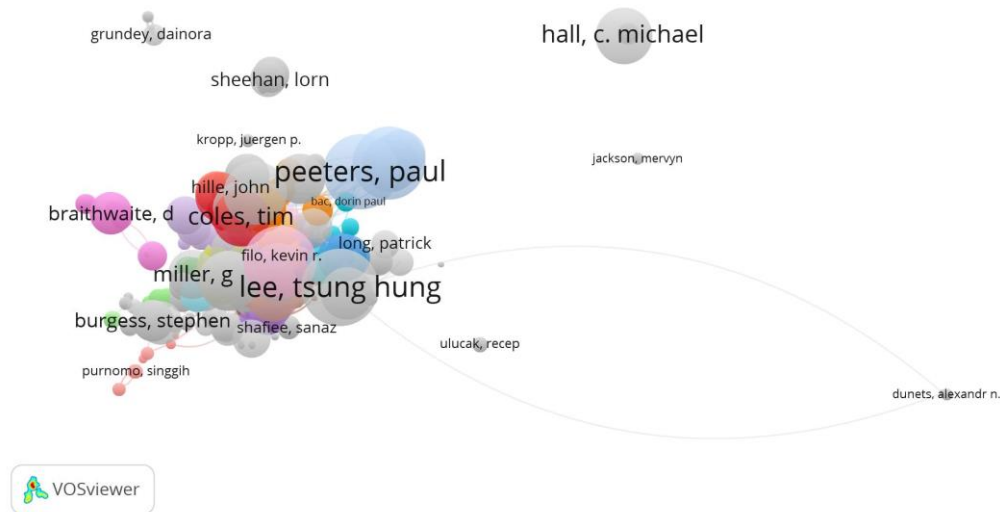
Figure 1. Co-Author Ties Showing Collaboration Between Authors



4.3. Citation Analysis of Authors

To identify citation networks, a network map was created for author citation analysis with the criteria of at least 1 publication and at least 1 citation. In the analysis made on 1501 units that were seen to be connected to each other, a total of 52 clusters, 7669 connections and a total connection strength of 7971 were detected. Among the most cited authors were Tsung Hung Lee with 927 citations, Paul Peeters with 859 citations, Stefan Gossling with 815 citations, and Anne-Mutte Hjaleger with 815 citations. However, in terms of total link strength, Tsung Hung Lee ranks first with 174 links, Hwansuk Chris Choi with 119 links and Ercan Sirkaya with 119 links.

Figure 2. Authors' Citation Links

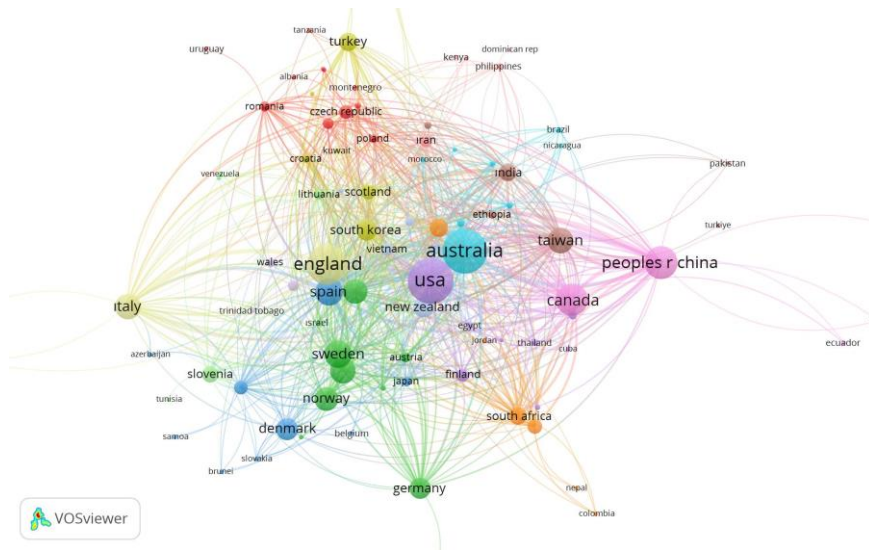


4.4 Citation Analysis of Countries

In order to create a network map of the citations received by publications according to their country of origin, an analysis was made on 92 observation units that have a relationship between them, within the scope of the criterion of publishing at least 1 work and receiving 1 citation by a country. 14 clusters, 848 connections and 2560 total connection strengths were identified. The countries

with the most citations were the USA (5130 citations), Australia (4872 citations) and the UK (3821 citations). These countries are in the top three in terms of total connection strength. In terms of the number of works, the order is as follows: China (170 publications), USA (140 publications) and Australia (126 publications).

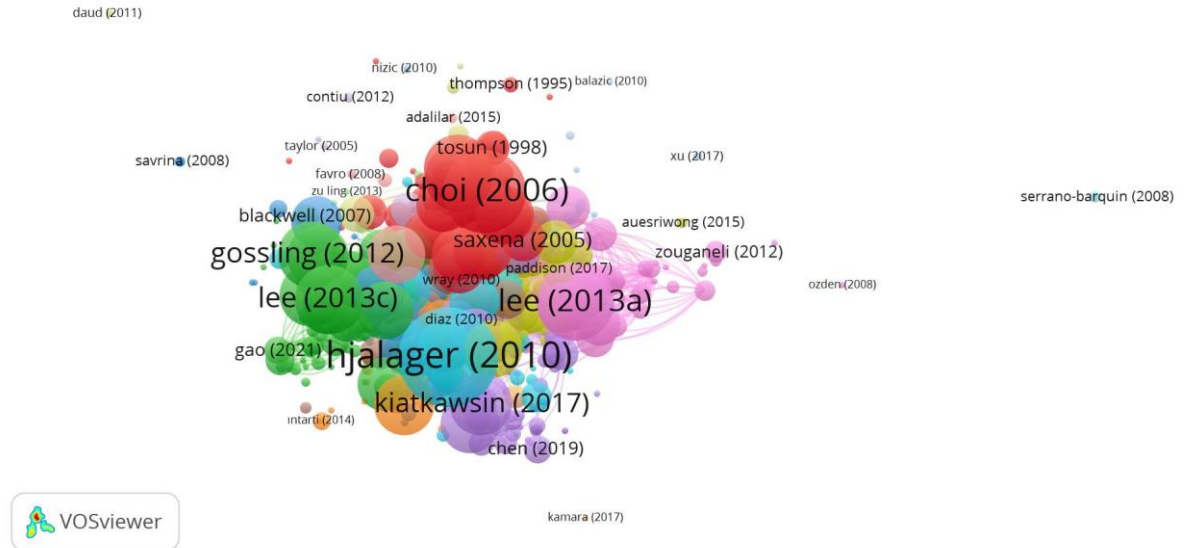
Figure 3. Citation Links of Countries



4.5 Keyword Analysis (Co-occurrence of All Keywords)

When we look at the most frequently used keywords in publications about sustainable tourism, the expressions sustainable tourism with 373 repetitions, tourism with 192 repetitions, sustainable development with 115 repetitions, sustainability with 104 repetitions, sustainable tourism development with 73 repetitions and ecotourism with 63 repetitions take the lead. The strongest statements in terms of total connection strength were sustainable tourism, tourism and sustainability. As a result of the analysis made with 317 observation units that were seen at least 3 times and had a relationship between them, a total of 20 clusters, 1780 connections and 2567 total connection strength were detected.

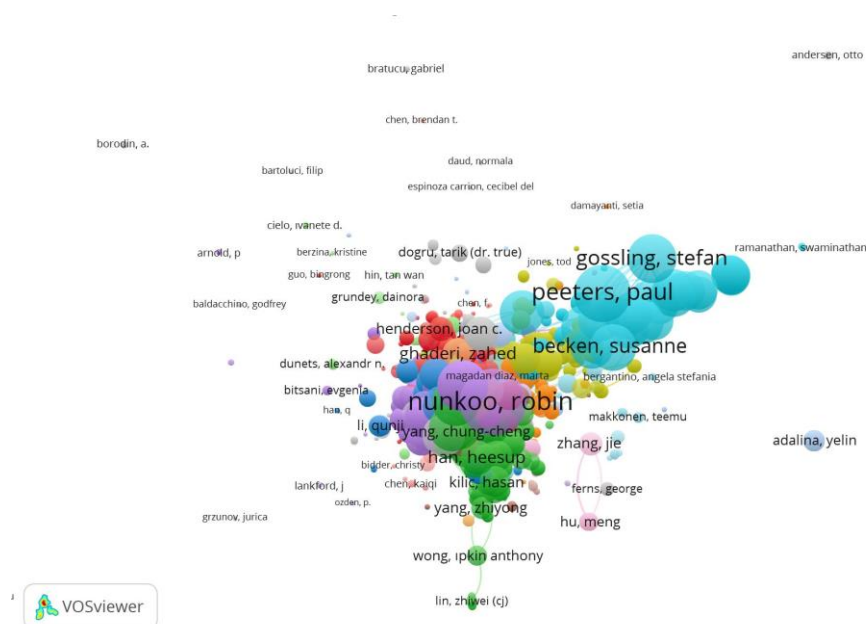
Figure 5. Bibliographic Matching Links of Works



4.7. Bibliographic Coupling of Authors Analysis

According to the analysis made with 2324 units with connections between them, selected with the criterion of having published at least 1 work and received 1 citation, 40 clusters, 300069 connections and 830469 total connection strength were obtained. The authors with the most bibliographic matches were Robin Nunkoo (11975 link strength), Paul Peeters (8879 link strength) and Husakova (6944 link strength).

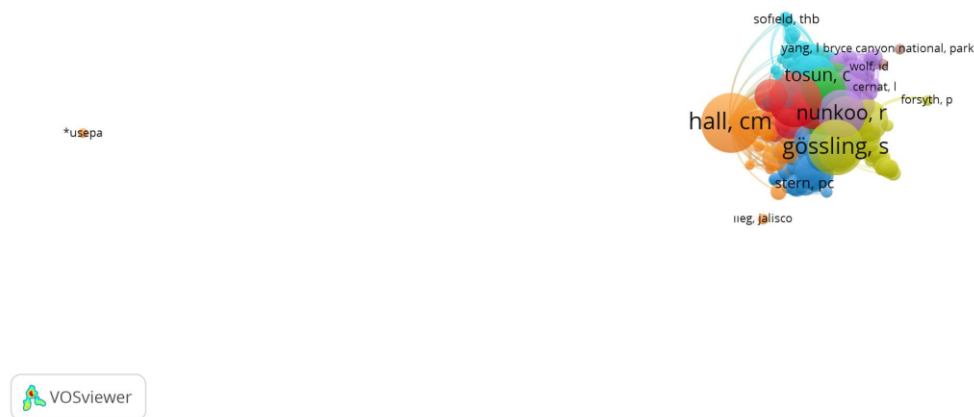
Figure 6. Bibliographic matching links of authors



4.8 Co-citation Analysis of Authors

Different sources cited in a publication are called co-citation. According to the analysis performed on 813 units with the minimum number of citations selected as 10, a total of 8 clusters, 94675 links and 297531 total link strength were detected. The most commonly cited authors were identified as Hall (323), Gössling (282) and Bramwell (259).

Figure 7. Links between co-cited authors



5. CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Perhaps the biggest fire of this age is taking place, where resource consumption occurs rapidly and negatively, and the resources of life entrusted to future generations are used excessively for short-term gains. The concept of sustainability is seen as a savior against this excessive consumption movement, which is not only about the unfair use of natural resources, but also causes economic and social inequalities. For this reason, sustainability goals, principles, standards, behavioral understanding and even philosophy were created, and countries, states, institutions and non-governmental organizations quickly created guidelines by adding the word sustainability to the titles of different fields. However, this concept, which needs to be truly understood and embraced, faces the concern of being overshadowed by many popular definitions and practices. For this reason, studies by scientists are needed for a more understandable, measurable and clutter-free understanding of sustainability. In the study, the concept of sustainability, which has a wide scope, was approached by considering the tourism sector. It was aimed to examine how sustainability is

realized in the tourism literature and with which dynamics of the sector it is associated.

In this study, a quantitative analysis was made on the concept of sustainable tourism. On 25.10.2023, 8,820 studies were found in the search made by selecting "all fields" in the Web of Science database with the keyword "sustainable tourism". It is seen that the studies were carried out between 1991 and 2023, and the year in which the most publications were made was 2021. In order to limit the number of works in the study, the "Management", "Business", "Economics" and Social Sciences Interdisciplinary" categories were selected as criteria from the indexed contents of Web of Science and the research continued by obtaining 1532 studies. Sustainable tourism is included in these categories: management with 727 works, business with 469 works, economics with 437 works and social sciences interdisciplinary categories with 203 works. According to years, 995 articles, 443 proceedings, 6 books, 127 book chapters, 33 book reviews, 46 compilation articles, 34 early appearance studies and 26 editorials from different fields, the oldest being 1995 (6 works) and the newest being 2023 (94 works). content has been reached. The year with the most publications was 2021, with 175 works. In addition, 1140 works were published in English, 42 works in Spanish and 20 works in Czech, which are among the top 3 most used languages. When all this data was examined using the VOSviewer program through author-citation-country-keyword, the authors who produced the most works were Zuzana Tuckova, Robin Nunkoo and Martina Poskova, while the authors who received the most citations were; Tsung Hung Lee, Paul Peeters, Stefan Gossling and Anne-Mutte Hjalager. When the connection strengths of these authors in terms of citation and work are examined, it is an important result that not all of them have high connections. The countries with the most citations were the USA, Australia and the UK, respectively. In terms of the number of works, the order is as follows: China, USA and Australia. In the analysis made according to the language in which the works are written, it is seen that the most works are written in English, Spanish and Czech. It can be seen that the concept of sustainable tourism finds a field of study in different languages and countries. Finally; When we look at the most frequently used keywords in publications about sustainable tourism, the expressions sustainable tourism with 373 repetitions, tourism with 192 repetitions, sustainable development with 115 repetitions, sustainability with 104 repetitions, sustainable tourism development with 73 repetitions and ecotourism with 63 repetitions take the lead. Other frequently used keywords are climate change, protected areas, innovation, environment, economic growth, green tourism, spatial planning and community-

based tourism. According to these results; The works of the authors who produce the most works, are cited and have high connections can be examined separately and their suggestions for future studies can be taken into consideration. The approaches to sustainability of countries where studies are not carried out intensively can be examined and evaluated as areas that need to be developed and studied more for practitioners. Keywords and highly related topics that are frequently used with sustainable tourism can create new areas of study. Finally, it is recommended to update and develop the study with a more comprehensive analysis by addressing the current limitations of the study in future studies. In this study, limitations were made using the Web of Science database and some categories; Databases such as Scopus and Pubmed can be used, as well as national archives such as TÜBİTAK Ulakbim and YÖK Thesis Archive can be included in the study.

REFERENCES

- Antimova, R., Nawijn, J., & Peeters, P. (2012). The Awareness/Attitude-Gap in Sustainable Tourism: A Theoretical Perspective. *Tourism Review*, 67(3), s. 7-16.
- Choi, H. C., & Sirakaya, E. (2006). Sustainability Indicators for Managing Community Tourism. *Tourism Management*, 27, s. 1274–1289.
- Collin, P. H. (2004). *Dictionary of Environment & Ecology*. (5. b.). Londra: Bloomsbury Publishing Plc.
- Goodland, R. (1995). The Concept of Environmental Sustainability. *Annual Review of Ecology and Systematics*, 26(1), s. 1-24.
- Gössling, S. (2017). Tourism, Tourist Learning and Sustainability: An Exploratory Discussion of Complexities, Problems and Opportunities. *Journal of Sustainable Tourism*, s. 1-15.
- Gössling, S., Hall, M. C., & Weaver, D. B. (2009). Sustainable Tourism Futures Perspectives on Systems, Restructuring and Innovations. S. Gössling, M. C. Hall, & D. B. Weaver (Dü) içinde, *Sustainable Tourism Futures Perspectives on Systems, Restructuring and Innovations* (s. 1-19). New York: Routledge.
- Heinberg, R. (2010). What Is Sustainability? Post Carbon Institute. <https://www.postcarbon.org/publications/what-is-sustainability/> adresinden alındı
- Hjalager, A.-M. (2000). Consumerism and Sustainable Tourism. *Journal of Travel & Tourism Marketing*, 8(3), s. 1-20.

- Lee, T. H. (2013). Influence Analysis of Community Resident Support for Sustainable Tourism Development. *Tourism Management*, 34, s. 37-46.
- Lee, T. H., Jan, F.-H., & Liu, J.-T. (2021). Developing an Indicator Framework for Assessing Sustainable Tourism: Evidence From a Taiwan Ecological Resort. *Ecological Indicators*, 125, s. 1-13.
- Liu, Z. (2003). Sustainable Tourism Development: A Critique. *Journal of Sustainable Tourism*, 11(6), s. 459-475.
- Mcminn, S. (1997). The Challenge of Sustainable Tourism. *The Environmentalist*, 17, s. 135-141.
- Reddy, T. L., & Thomson, R. (2015). Environmental, Social and Economic Sustainability: Implications for Actuarial Science.
- Scoones, I. (2007). Sustainability. *Development in Practice*, 14(4-5), s. 589-596.
- Uğurlar, A. (2017). Sustainability in Tourism:The Importance of Indicators as a Measurability Tool. *İdealKent Dergisi*, s. 118-140.
- UNEP. (2005). *Making Tourism More Sustainable: A Guide For Policy Makers*. United Nations Environment Programme World Trade Organization (WTO). <https://wedocs.unep.org/20.500.11822/8741>
- Van Het Hof, S. D., & Hoşut, S. (2015). *Kurumsal Sosyal Sorumluluk Kavramlar, Uygulama ve Örnekler* (1. b.). İstanbul: Nobel Akademik Yayıncılık.
- WTO-World Tourism Organisation. (2023). <https://www.unwto.org/sustainable-development>: www.unwto.org

Sustainable Development in Romania and the European Union

Cercel (Zamfirache) Camelia¹

Abstract

Introduction: Sustainable development represents an important objective both for Romania and for the European Union as a whole.

Aim: The choice of this research topic is motivated by the importance of achieving sustainable development. In this sense, we have identified and analyzed the fundamental elements that are the basis of sustainable development.

Method: The evaluation of specialized literature was the starting point in this research. I used the method of theoretical research and the method of reading the specialized bibliography, to outline the conceptual aspects addressed in the paper. We also carried out the comparative analysis of Romania, as an emerging country of Central and Eastern Europe, with the other countries of the European Union in order to know the state of sustainable development of our country.

Findings: To begin with, we made an introduction to the concept of sustainable development. We then looked at the Sustainable Development Goals, as they are the starting point for a sustainable future. Studies on the measurement of sustainable development must be included in this research, because the objectives and targets of sustainable development are monitored with the help of indicators.

Originality and value: The originality and novelty were achieved through a practical study in the emerging countries of Central and Eastern Europe in the EU, which aims to bring substantiated clarifications in the context of sustainable development and can contribute to reducing the gap between advanced countries and developing economies from the European Union.

Key Words: sustainable development, sustainable development objectives, sustainable development indicators

Jel Codes: Q01, O10, O11, P51

1. INTRODUCTION

Humanity needs to change the development model to neutralize the threats of the 21st century, in the context in which global warming, increasing inequalities and environmental degradation threaten the quality of life today and the inheritance of a better future for future generations. Constraints are related not only to the survival of the human species, but also to the preservation of the environment. All this is desired to be achieved through sustainable development, understanding the joint effort of both people

¹ PhD. student third year, University of Craiova, Faculty of Economics and Business Administration, Doctoral School of Economics Sciences, Finance Module, Romania

through individual actions on the environment and consumption behavior, as well as governments that must ensure the necessary policies and tools.

2. THE CONCEPT OF SUSTAINABLE DEVELOPMENT

The World Commission on Environment and Development in the Brundtland Report of 1987 explained sustainable development as a way of development that meets the needs of the present, but without affecting the needs of future generations. According to the definition given by the World Commission for Environment and Development of the UN (WCED), sustainable development means that the total volume of capital is kept constant or even increases over time.

The concept of sustainability starts from the premise that human actions depend on the environment that surrounds us and on resources.

Lester R. Brown brings into discussion, in the work "Plan B 2.0 Saving a planet and a civilization at a standstill", issues about the conflict between industrial civilization and the environment. Thus Brown points to the major role of waste recycling, thus saying that a sustainable society architectures its economic and social system so that global natural resources and life support systems are preserved.

After the Second World War, the concept of economic growth appeared. The concept of economic growth points out the essential aspects of the development of the contemporary economy. In this context, the process of economic growth became a kind of panacea for the economic difficulties that the countries of the contemporary world faced and are still facing.

The concept of sustainable development belongs to the new theory of economic development, being a relatively new branch of the general economic theory. In summary, the main terms referring to this field are: expansion, growth, progress, development, underdevelopment (Pohoață, 2012).

In general, the expansion is seen as short-term economic growth, with openness to reversibility. This represents the "peak of the wave" that defines the ascending phase of an economic cycle seen in its classical development, in which the crisis and depression overlap the descending phase.

Economic growth is more often used in everyday language as an increase in absolute dimensions referring to the macroeconomic indicators "national income" or "global product". The increase over a longer period of time in production, in general or in the economic potential, has the same meaning as economic growth. If the increase in the absolute value of the macroeconomic indicators is reported seen in a relative way, related to the dynamics of the population, the concept of economic progress comes into play. It can be described as an increase in national income per inhabitant. Depending on these, economic growth can be: progressive (when there is also technical progress), recessive (when there is also economic regression) or static (when there is economic growth, without progress) (Pohoață, 2012).

We can say that development includes economic growth and progress. Development means changes in the quality of life as a whole, so that, in total, people can feed themselves better, take better care of themselves and gain better knowledge. In order to achieve such desired goals, development must be seen as the total of changes in mental structures and social behaviors that allow the growth of the global real product, but which transform progress into social progress in general.

Referring to the term sustainable development, we must refer to a whole. This is the only way the "magic triangle", which points to sustainable development, social cohesion and environmental protection, represents what is actually needed (Pohoață, 2003).

Researchers in this field admit that sustainable development is a multidimensional concept that has as its starting point the Brundtland Report, according to which "humanity has the ability to achieve sustainable development - to guarantee the satisfaction of current needs without compromising the ability of future generations to meet their own needs" (Report of the World Commission on Environment and Development: Our Common Future, accessed September 2023).

3. SUSTAINABLE DEVELOPMENT GOALS – ESSENTIAL DIRECTIONS FOR A SUSTAINABLE FUTURE

Worldwide concerns regarding the efficient use of natural resources have been included in the Sustainable Development Goals, within the global sustainable development agenda "Transforming our world: Agenda 2030 for sustainable development". Figure 1.1 shows the Sustainable Development Goals, structured in 169 specific targets, which have as their common goal "achieving sustainable development in its three dimensions - economic, social and environmental - in a balanced and integrated way" (United Nations, Transforming our world: the 2030 Agenda for Sustainable Development).



Figure 1.1 Source: https://commission.europa.eu/strategy-and-policy/sustainable-development-goals/eu-and-united-nations-common-goals-sustainable-future_ro

The 17 objectives of sustainable development, shown in Figure 1.1, must be approached in an integrated vision, because one cannot be achieved without taking into account the others. The goals and their targets will spur action over the next 15 years in areas of critical importance to humanity and the planet.

The UN 2030 Agenda represents the action of all member countries in a global partnership, which aims to eradicate poverty and prosperity for all the inhabitants of the planet, but these actions take place protecting the environment, considering the limitation of climate change and the protection of marine and terrestrial biodiversity.

I believe that a very important objective is also SDG 8 "Decent work and economic growth", due to the fact that it refers to the importance of inclusive ecological economic growth, economic productivity as well as resource efficiency in consumption and production. Sustainable economic growth can only be achieved by taking into account the new elements of the circular economy, improvements in ecological efficiency and actions to mitigate climate change, in the context of an active labor market and social inclusion policies.

The objective of sustainable economic growth and the other SDGs have complex links between them, which is why the strict delimitation of sustainable economic growth from the other SDGs is not possible. There are connections of varying intensity between the SDGs, the SDGs being indivisible and integrated according to the 2030 Agenda.

The World in 2050 model conceptualizes the SDGs, with global partnerships for sustainable development (SDG 17) and governance (SDG 16), which provide the framework for the other SDGs, grouped into five main SDG categories: social and economic development (SDGs 8, 9, 11), universal values (SDGs 4, 5, 10), basic human needs (SDGs 1, 2, 3) and sustainable use of resources (SDGs 6, 7, 12) (IIASA, The World in 2050 (TWI2050))

TWI2050 aims to develop some science-based equitable transformation pathways to sustainable development that provide much needed information and guidance to decision makers responsible for implementing the SDGs. The aim of this scientific initiative is to provide evidence-based knowledge to support the policy process and the implementation of the 2030 Agenda.

The development of the United Nations Sustainable Development Goals (SDGs) have been supported by the European Union since the 1990s, as one of the EU's long-term priorities being a priority for its external policies (e.g. development and trade cooperation), but also for internal ones (e.g. environment, social exclusion and discrimination)

The EU and the UN can be said to be partners, making joint efforts for a better, safer world for all, through regional and global stability, prosperity, and for the health of the planet. Thus, in 2015, the concept called "Coherence Policy for Sustainable Development" (PCSD) appeared, existing both at the UN and EU levels. This policy covers all the SDGs, and aims to advance the integrated implementation of the 2030 Agenda, as shown in Figure 1.2.



Figure 1.2 PCSD objectives in the context of the 2030 Agenda

Source: OCDE, Recommendation of the Council on Policy Coherence for Sustainable Development, 2019

The analysis of the goals of sustainable development is of particular importance, as they represent the starting point for a future that ensures the health of the planet and stability.

4. MEASURING SUSTAINABLE DEVELOPMENT

The way to evaluate progress in sustainable development was initiated in the Brundtland Report. This initiative has as its starting point the fact that the measurement methods based only on production were not satisfactory and did not meet the demands of the new development concept. At the Rio de Janeiro Conference in 1992, it was discussed that for the successful implementation of the concept of sustainable development, it is necessary to develop univocal ways of measuring the level of sustainable development. The established indicators are intended to provide information on the stage at which certain objectives have been achieved.

Sustainable development goals and targets will be tracked and reviewed using a set of global indicators. They will be complemented by indicators at the regional level and indicators at the national level that will be developed by the member states (Transforming our world: The 2030 Agenda for sustainable development).

Sustainable economic development is considered to be the support of real growth of the economy in order to achieve the goals of sustainable development and is generally measured by GDP. But if we look through the lens of factors that have a strong influence on sustainable development, such as the environment, social inclusion, etc. we find that the GDP is not sufficient as a measurement indicator of sustainable development, which is why I consider it necessary to supplement it with other measurement indicators regarding social and environmental aspects.

In this sense, in 2007, the "Beyond GDP" Conference was held, organized by the European Commission, the European Parliament, OECD, which aimed to create more adequate indicators to measure the progress made in certain countries. It is suggested to use a monetary indicator, such as adjusted net savings, but also a physical indicator, such as ecological footprint, carbon footprint. There are other indicators of social integration and human well-being, such as the GINI coefficient and the human poverty index or the social health index. Among the indicators exemplified at this Conference are the "Index for Sustainable Economic Welfare", "Genuine Progress Indicators" or the "National Welfare Index" (European Commission, REPORT on "Beyond GDP - Measuring Progress in a Changing World").

From a more analytical perspective, the Human Development Index (HDI) stands out as a specific indicator of sustainable development, which includes a series of social and economic parameters. Another indicator of utmost importance in sustainable development is called the Index of Viable Economic Prosperity considered the most comprehensive regarding the standard of living, because it is able to simultaneously measure average consumption and the distribution of environmental degradation.

Wealth of Nations is another example of an indicator that shows how the World Bank tracks capital growth or decline.

One of the most complete lists of indicators that now exists worldwide was developed by the United Nations Commission on Sustainable Development (U.N.

Commission on Sustainable Development) and includes more than 100 indicators that refer to multiple aspects related to the environment and social development -economic.

The impressive number of indicators has been grouped into 14 fundamental areas and refers to: Poverty; Governance; Equity; Health; Education; The demographic aspect; Atmosphere; Soil; Oceans, seas and coastal areas; Drinking water; Biodiversity; Economic development; Global partnership; Production and consumption patterns.

Another measurement indicator is the Human Development Index (HDI), which is a quantitative measure of how successful a country is in developing its human capital. The introduction of this index in the early 1990s was caused by the need to measure human progress. These metrics focus on people rather than the economy.

The HDI signifies the structure and trajectory of the progress (or regression) of human capital during economic growth in a country. HDI reflects national priorities, highlights disparities, measures progress and stimulates aid policy dialogue. Many countries have found that HDI disaggregated by region, sex, ethnic group, income class, and other criteria provides an opportunity to study the human profile of their society.

As indicators of measuring the development of a country, many can be found; the level of pollution; unemployment rate; poverty level; level of education, etc. And only by analyzing all these indicators can we talk about sustainable development through a well-established plan for the future.

First of all, we will do a brief analysis for the Gross Domestic Product indicator, which reflects the value of the final production of goods and services obtained by all economic agents (indigenous and foreign) that carry out their activity inside the country, intended for final consumption. This is a strong indicator and used by all countries to monitor economic activities, especially in recession periods. The gross domestic product is the most important macroeconomic indicator of a country's economy, it shows the level of productivity and efficiency of the country.

Next, I consider it necessary to analyze the GDP in the EU member countries.

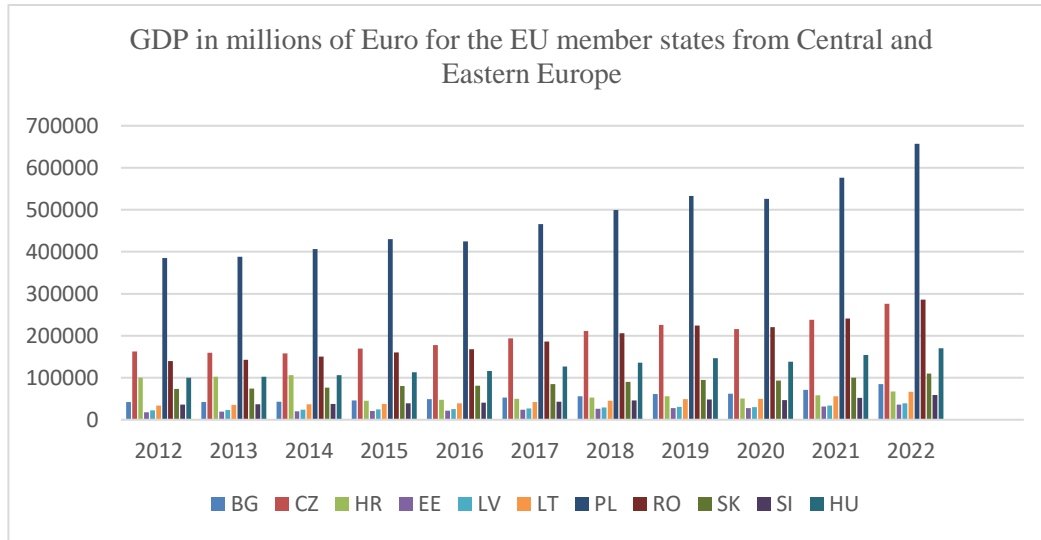


Chart 1.1 GDP of the EU member countries in Central and Eastern Europe

Source: data taken by the author from <https://ec.europa.eu/eurostat/databrowser/view/TEC00001/bookmark/table?lang=en&bookmarkId=e3030c9f-8b66-48ae-b1be-43199d1060eb>

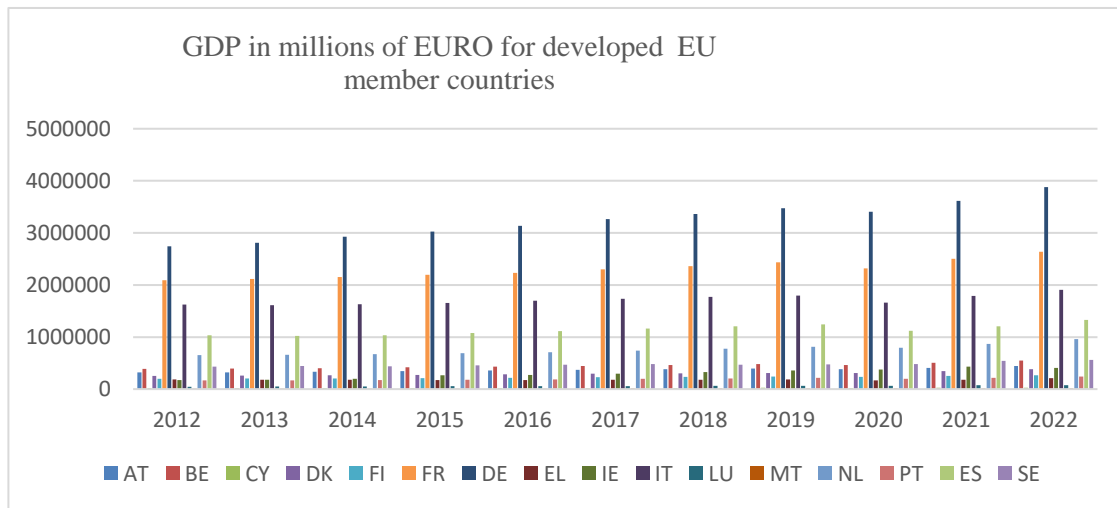


Chart 1.2 GDP of developed EU member countries

Source: data taken by the author from <https://ec.europa.eu/eurostat/databrowser/view/TEC00001/bookmark/table?lang=en&bookmarkId=e3030c9f-8b66-48ae-b1be-43199d1060eb>

From Charts 1.1 and 1.2 it can be seen that there is an increase in GDP in the EU countries in the period 2012-2022. Germany records the highest value in the analyzed period, reaching 3,876,810 million Euros in 2022. Of the emerging EU countries in Central and Eastern Europe, Poland is the country with the highest GDP values in this period. It is observed that emerging countries also have an increase in GDP.

I believe that it is necessary in parallel to analyze the specific indicator of sustainable development, the Human Development Index (HDI), which is the index used by the United Nations to measure the progress of a country, in order to see its trend during the years 2012-2021. In the following I will make a comparative analysis between the values of the HDI indicator and those of the GDP per capita for EU member countries in Central and Eastern Europe.

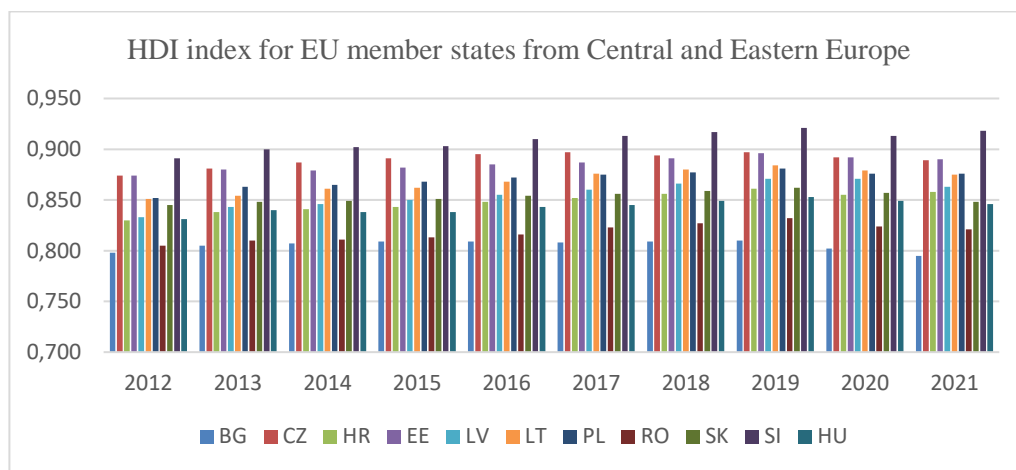


Chart 1.3 HDI indicator for EU member countries from Central and Eastern Europe

Source: data taken by the author from: <https://hdr.undp.org/data-center/specific-country-data#/countries/>

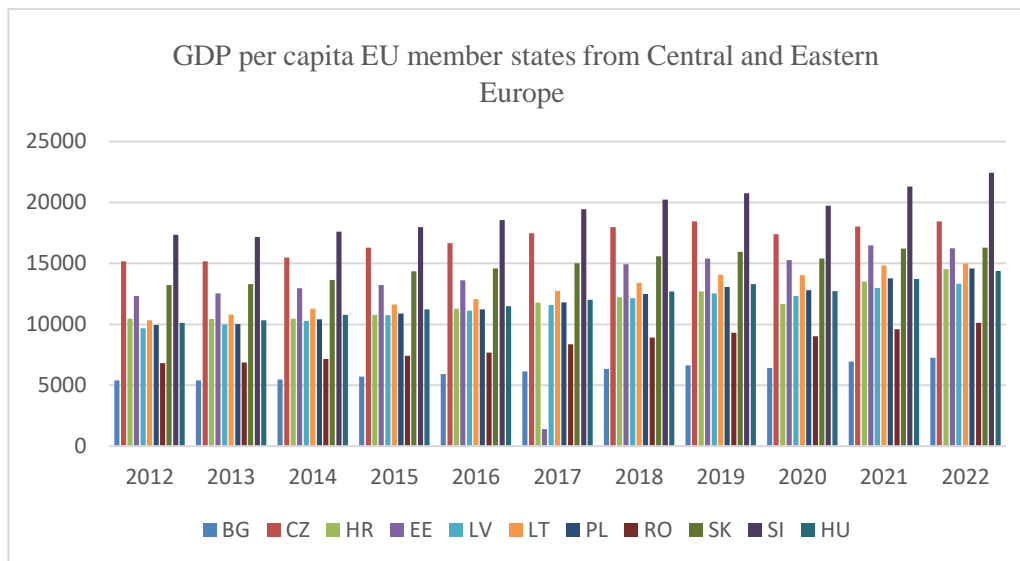


Chart 1.4 GDP per capita for the EU countries of Central and Eastern Europe (EURO per capita)

Source: data taken by the author from https://ec.europa.eu/eurostat/databrowser/view/sdg_08_10/default/table

Table 1.1 Romanian HDI values

ANUL	Valoare IDU	Variația IDU față de anul anterior
2012	0,805	-0,03
2013	0,810	+0,005
2014	0,811	+0,001
2015	0,813	+0,002
2016	0,816	+0,003
2017	0,823	+0,007
2018	0,827	+0,004
2019	0,832	+0,005
2020	0,824	-0,008
2021	0,821	-0,003

Sursa: <https://hdr.undp.org/data-center/specific-country-data#/countries/ROU>

From Table 1.1 it can be seen that from 2012 to 2019 the HDI values for Romania are increasing, which means that in 2020, against the background of the shock generated by the Covid-19 pandemic, this indicator also registers decreasing values. Also from the analysis of Charts 1.3 and 1.4, we notice that there is a correlation between the GDP per capita indicator and the HDI indicator. Countries like Slovenia and the Czech Republic have the highest GDP per capita values of the countries of Central and Eastern Europe,

and the HDI values of these countries at the highest level. At the opposite pole, Bulgaria and Romania register the lowest values.

The indicators for measuring sustainable development provide an overview of the European Union and the progress made by each country towards sustainable development.

The measurement of progress is one of the actions included in the EU's sustainable development strategies and it is Eurostat's task to periodically draw up monitoring reports based on sustainable development indicators.

5. CONCLUSIONS

I believe that the effects of the crisis caused by the COVID-19 virus, the consequences of the war in Ukraine, are factors that motivate the need to analyze and evaluate the way in which Romania, together with the other countries within the EU, is moving towards the path of sustainable development.

The comparative analyzes in the paper are mainly for the emerging countries of Central and Eastern Europe, members of the EU, which include the following countries: Romania, Hungary, Bulgaria, Estonia, Poland, Lithuania, Latvia, Czech Republic, Slovenia, Slovakia, Croatia. The rationale for selecting these countries is based on the similarities between them (countries that were under communist regimes), the progress made by these countries after the fall of communist regimes, and also the potential for public investment for development, which is higher than that existing in developed countries .

In the current global context, I believe that the need to move to greener economies is obvious, in order to ensure sustainable economic development.

REFERENCES

Jovovic, R., Draskovic, M., Delibasic, M., & Jovovic, M. (2017), „The concept of sustainable regional development – institutional aspects, policies and prospects”, in Journal of International Studies, 10(1), p. 255-266 www.jois.eu/files/18_Jovovic.pdf .

Lester R. Brown (2006), *Plan 2.0 – Rescuing a Planet Under Stress and a Civilization in Trouble*, Earth Policy Institute, Bucharest.

Mariana SORLESCU, Emilia GABROVEANU (2018), ANALIZA INDICATORILOR DE DEZVOLTARE DURABILĂ A ROMÂNIEI, Universitatea Româno-Americană, București https://ibn.idsi.md/sites/default/files/imag_file/130-156.pdf .

Pohoată, I. (2012), Strategii și politici europene de dezvoltare durabilă. Universitatea „Alexandru Ioan Cuza” – Iași, Centrul de Studii Europene.

Pohoată, I. (2003), Filosofia economică și politica dezvoltării durabile, Editura Economica, Bucuresti.

https://ro.wikipedia.org/wiki/Dezvoltare_durabil%C4%83 (Accessed: Oct.2023).

<http://www.wbcsd.org> (Accessed: Oct.2023).

<https://dezvoltaredurabila.gov.ro/web/dd-ro/>(Accessed: Oct.2023).

<https://sustainabledevelopment.un.org/milestones/unced> (Accessed: Oct.2023).

<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (Accessed: Oct.2023).

https://commission.europa.eu/strategy-and-policy/sustainable-development-goals/eu-and-united-nations-common-goals-sustainable-future_ro (Accessed: Oct.2023).

<https://hdr.undp.org/data-center/specific-country-data#/countries/> (Accessed: Oct.2023).

https://ec.europa.eu/eurostat/databrowser/view/sdg_08_10/default/table (Accessed: Oct.2023).

<https://countryeconomy.com/countries/romania> (Accessed: Oct.2023).

<https://sdgs.un.org/2030agenda> (Accessed: Oct.2023).

<https://eur-lex.europa.eu/RO/legal-content/glossary/sustainable-development-goals.html> (Accessed: Oct 2023).

IIASA, The World in 2050 (TWI2050). A Global Research Initiative in Support of a Successful Implementation of the United Nations 2030 Agenda. Brochure, Austria (Accessed: Oct 2023).

<https://www.oecd.org/gov/pcsd/oecd-recommendation-on-policy-coherence-for-sustainable-development.htm> (Accessed: Oct.2023).

https://publications.europa.eu/resource/cellar/a6322567-d6b8-11e7-a506-01aa75ed71a1.0021.02/DOC_1 (Accessed: Oct.2023).

<https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf> (Accessed: Oct.2023).

<https://ec.europa.eu/eurostat/databrowser/view/TEC00001/bookmark/table?lang=en&bookmarkId=e3030c9f-8b66-48ae-b1be-43199d1060eb> (Accessed: Oct.2023).

The Evolution of Employment and ICT in Accommodation Industry in Romania and Surrounding Economies

Ioana Gutu¹, Camelia Nicoleta Medeleanu², Romeo Asiminei³

Abstract

Introduction: For the past decade, the employability displacements caused by the technological advancements adopted within the different sectors across the world resulted into a peer pressure for employers to react. The latest developments resulted into the creation of systems capable to reduce or even replace the human interaction with the task itself; websites and service technologies, along with online and/or mobile apps led to visible changes in the degree of productivity, employment and occupancy rates specific to the accommodation sector.

Aim: the current study intends to analyze the evolution of employment and productivity 16 accommodation sectors (out of a total of 27 European Union members) for which data was provided by country representatives. Whether these transformations are already affecting the tourism industry, and more specific, the accommodation inputs, are under analysis.

Method: As for estimating the change in regard to the selected indicators, it was applied a logarithmic model.

Findings: The current research proves that an increase in productivity leads to a decrease in employment within the accommodation sector, within a timeframe when the majority of the accommodation entities subscribe to high and very high ranges of digital intensity.

Originality and value: After decades of similar evolution., the hotel industry's productivity and employment started a process of departure, symbolically mirroring the jaws of a snake. The current results prove that the 2020 pandemic caused a rift for this evolution, aspect that was captured only within the following results, across the entire literature.

Keywords: employment, ICT, accommodation, Covid-19, digital intensity

JEL classification: J23; L83

1. INTRODUCTION

As one of the buzz expressions within the social sciences debates and research, the information and communication technologies (ICTs) impact on employment has been extensively addressed within different channels as media (Morgenstern, 2016), academic through institutional and academics (World Economic Forum, 2016; Autor et.al., 2018) and private environment through consultancy companies (Chui et.al., 2015). With the continuous evolution and steep technological advancements within most of the industries, scholars find

¹ Department of Sociology and Social Work, "Alexandru Ioan Cuza" University of Iasi, 700506 Iasi, Romania

² Department of Sociology and Social Work, "Alexandru Ioan Cuza" University of Iasi, 700506 Iasi, Romania

³ Department of Sociology and Social Work, "Alexandru Ioan Cuza" University of Iasi, 700506 Iasi, Romania

difficult to accurately predict technology changes within areas as artificial intelligence, robotics, machine learning or big data, with a stringent connection with employment data.

According to Frey et.al. (2017), a pessimistic perspective shows an evolutionary ITC that destroys a higher amount of jobs than it produces. Another view (Autor, 2015) relies on a more optimistic scenario where the jobs destroyed by ICT will be offset by the ones replaced by the technological environment advancements. Therefore, the probability of jobs automation mainly corresponds to manual routine work sequences in industries as Production, Agriculture, and to analytic routine jobs as Administrative; on another perspective, non-routine manual jobs are unlikely to be easily automated (support-service workers and/or drivers), along with the non-routine jobs that rely on analytic occurrences in areas as law, management, engineering, health or teaching (Zafar, 2022; Shanker, 2008; Gretzel et.al., 2021; Schönherr et.al., 2023).

2. LITERATURE REVIEW

Marcolin et.al. (2019) proved that for the time period 2000-2010, employment growth resides within the non-routine occupations coming from the service sector. According to Vries et.al. (2020) results, by using a panel of 19 industries within the 2005-2015 timeframe show that an increased use of digital machinery corresponds to positive changes within the non-routine jobs, while negative changes correspond to the share of routine jobs. The current trend was also undertaken by Bernstein (2011,2013) whose results show that work is not the main driver for the organizational productivity, but for the second half of the XXst century, the increase on organizational productivity was supported by the employment growth. Mainly known by literature under the name of snake jaws or as the great decoupling (Brynjolfsson et.al. (2013), Bernstein (2011), the research detected a permanent rift between two traditionally linked variables (i.e. work and productivity). Literature used these results in order to hypothesize about the relationship between ICT and employment, where the increase in organizational productivity was possible without increasing work, based on the positive technology intake specific to work tasks (Brynjolfsson et.al., 2013). A latter analysis (Bernstein, 2013) proved the great decoupling to take place within the years when internet and technology was generally adopted by both industry and society.

Functioning under traditional structure, the tourist-based businesses have been residing within high effectiveness of human resources; however, the technological progress did not bypass the tourism industry (Buhalis et.al., 2008; Bulchand-Gidumal et.al., 2015).

According to Eurostat (2022), in 2021 just 16.6% of companies within the accommodation sector use ERP and/or Customer Relationship Management in order to capture and further analyze/make available for other businesses clients information; moreover, data specific to Romania in 2022, from the entire accommodation sector, only 2.5% of the enterprises have a very high digital intensity, 22% have a high digital intensity while 31.2 and 44.3% have low and very low digital intensity.

According to Law et.al. (2013), ICT has been unanimously recognized by literature as a change force within the hospitality industry, thus including online check in and out systems, online booking, automated luggage storage systems, concierge or cooking robots or chat-

boots for (prospective) clients, thus making possible for a client to book, pay and stay into a room without any support human interaction. For this reason, the Brynjolsson et.al. (2013) observation in regard with the jaws of a snake could also be successfully be applied within the tourism industry.

The debate in regard with technology advancements effects in a variety of industries is not new to the literature; Morisi (1996) presented the results of the effects in bank employment of the ATMs installation; similarly, Ou et.aal. (2009), Campanella et.al. (2017) proved that ATMs can replace simple tasks, thus contrasting with the skilled labor that cannot be easily replaced; the banking sector employment decline resides within the software developments of home/online vs. on site banking. According to Oh et.al. (2013), within the tourism industry, SSTs were proved to have an impact on labor costs, but further research is deemed to be necessary.

For a large array of regional and/or state economies, tourism is a key activity; in Romania, in 2021, 3.55% of the population was employed within the tourism industry, a 0.14% increase compared to 2020 and a -0.15% decrease from 2019 (INSSE, 2023). Within the predominant automated and progressive ICT context, the importance of tourist-related businesses to understand if they will continue to call for skilled workers at least with the same occurrence, becomes stringent. Compared to other sectors, tourism related employment figures could suffer massive shifts.

3. RESEARCH METHODOLOGY

Although the data in Romania about the ICT replacement of activities related to tourism industry is inconclusive, there are signs that the trendline from other industries could be adopted and adapted. Recent years show a massive and easier development of ICT products designed for the use of touristic and/or tourism activities. The current research proposes an exploration of the employee's importance within the tourism industry in Romania, in the context of accelerated technology changes.

Data on the Hotels in Romania, EU 27 (as from 2020) and 14 other countries were considered for the current analysis. As for representing the hotels' activities, indicators as number of bed places, Covid impact on ICT usage, number of employed persons, enterprises with a website, enterprises use of social media, the enterprise digital intensity, occupancy rates, turnover rates and productivity were used for analysis. Data was accesses from the Eurostat database and only comprises data available for accommodation industry.

For the development of the current study, the authors considered to be with utmost importance providing explanatory notes for some of the indicators used. Therefore accommodation (as rented or non-rented) is considered to be a core tourism sector at the EU level, which according to NACE rev 2 classification, includes three pillars: hotels and similar accommodation, along with holiday and short stay accommodation and camping and recreational vehicle grounds.

As for the number of persons employed (as compared to the usual employees indicator) the database includes the total number of individuals that work inside the observation unit (and here are also included the unpaid family working members, proprietors and working partners) but also persons that work outside the observation unit who belong and get paid (as sales representatives, maintenance team, delivery personnel). For an accurate understanding of the current manuscript views, the authors analyzed the number of persons employed and not the number of employees (defined as individuals that work for an employer under a paid contract and receive recognition for their work under the form of wages, salaries, fees or any kind of remuneration).

The turnover refers to the totals invoiced over a reference period by the observation unit, with the exception of VAT and other similar deductible taxes.

In order to estimate the change in regard to the selected indicators, a logarithmic model was applied. As for testing the consistency of the results and avoid limiting the current methodological approach to Romania, the EU 27 (after 2020) and other 14 countries were proposed for analysis: Albania, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Montenegro, North Macedonia, Poland, Serbia, Slovakia, Slovenia, thus resuming the analysis to a total of 16 regional and/or national entities.

It is important to note that while in Romania, statistics offer data in regard to hotels, hostels, motels, inns, touristic villas and chalets accommodation, along with touristic pensions that range from one star (economy) to luxury (five star), while the agrotourism pensions range from one to five flowers, at the EU level, the tourism/accommodation data offers a singular view that only refers to accommodation, as previously explained.

For a better understanding of the Romania's accommodation industry, Table 1 reveals the evolution based on quality ranking (as stars for hotels, ranging from 1- as the lowest to 5- as the highest and flowers for agritourist entities ranging from 1-as the lowest to 5 – as the highest quality). Data shows that for the Romanian accommodation industry, 3 stars for hotels and 3 flowers for agritourist facilities are preferred, as opposed to higher class accommodation entities.

Table 1. Romania tourism industry structure by class

Confort category	2012	2016	2017	2020	2021	2022
	No.	No.	No.	No.	No.	No.
Total	5222	6946	7905	8610	9146	9120
5 stars	65	87	96	93	95	96
4 stars	337	588	648	741	819	834
3 stars	1295	2475	2682	2908	2966	2933
3 stars	1200	1261	1313	1284	1259	1247
1 star	742	395	497	458	458	441
5 flowers	10	19	26	49	49	55
4 flowers	91	229	261	318	368	389
3 flowers	434	1129	1470	1794	2081	2093
2 flowers	727	598	743	809	902	887

1 flower	92	53	56	52	60	60
-----------------	----	----	----	----	----	----

Source: Tempo database

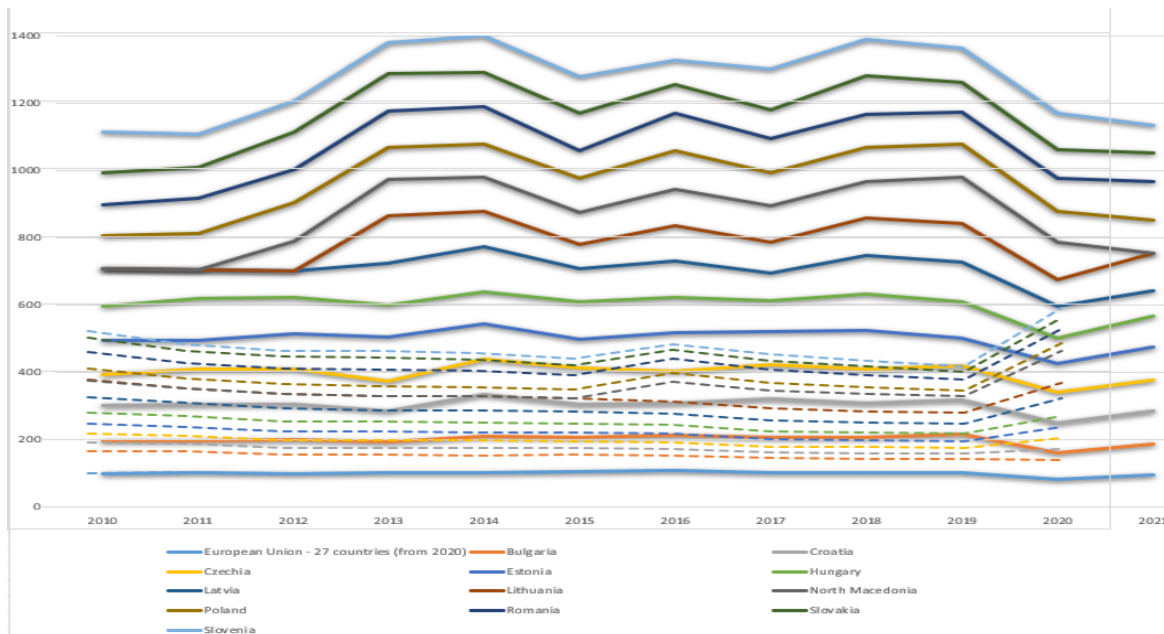
4. DATA ANALYSIS

According to Sahadev et.al. (2005), the higher the rank of a tourism establishment, the larger the tendency to adopt more ICTs.

As for analyzing the tendency of accommodation industry for all the 16 geographical indicators, an analysis of the industry productivity was considered, calculated as the ratio of number of persons employed and turnover gross premium written (million euro) for the accommodation industry, under the employed persons evolution for the 2010-2021 timeframe.

Authors intended the evolution of the two indicators, by following the model proposed by Brynjolfsson et.al. (2013) also known as the great decoupling; by following the same pattern, as the data shows, the traditional linkage between employment and productivity is absent from the economic accommodation evolution across time; as the employment shows great variations for the considered timeframe, productivity remains close to constant; for the 2010-2020 period of time, for the large majority of the countries, there are only two observations that worth mentioning: year 2016, that shows a parallel increase of the two indicators and 2019-2020 timeframe that shows an unexpected rift for the two variables, as a decrease in employment that caused an inverse effect- an increase in productivity.

Fig. 1. The evolution of employment and productivity for EU 27 and the 16 considered accommodation sectors



* Employment – full line; ** Productivity – dashes.

Source: own development

By considering the previous remarks, the analysis intended to analyze the connection among two important variables for the accommodation industry, namely employed persons and number of bed places available.

A short analysis of the evolution of the two indicators for the 16 national and regional entities involved, Evoque a linear trendline with lower bed places percentages compared to the employed persons indicator, with a common shift in 2019, when the parallel evolution reverses; this situation is common not only for EU 27, but also for Bulgaria, Czechia, Croatia, Estonia, Hungary and Latvia (see Figure 2). A similar evolution (see Figure 3) is also available for Lithuania. A more complex evolution of the two indicators with frequent overlapping of the two indicators is common for Montenegro, Poland, North Macedonia and Romania, when year 2012 created a very high increase in terms of bed places, leading further to an increase in employed persons for the next year (2013). As for Slovakia, Serbia, Poland, North Macedonia and Montenegro, year 2017 induced a very abrupt decrease in the number of bed places, compared to the relative number of employed persons that also decreased.

Fig. 2. Evolution of %Bed places and %Employed persons for EU 27, but also for Bulgaria, Czechia, Croatia, Estonia, Hungary and Latvia

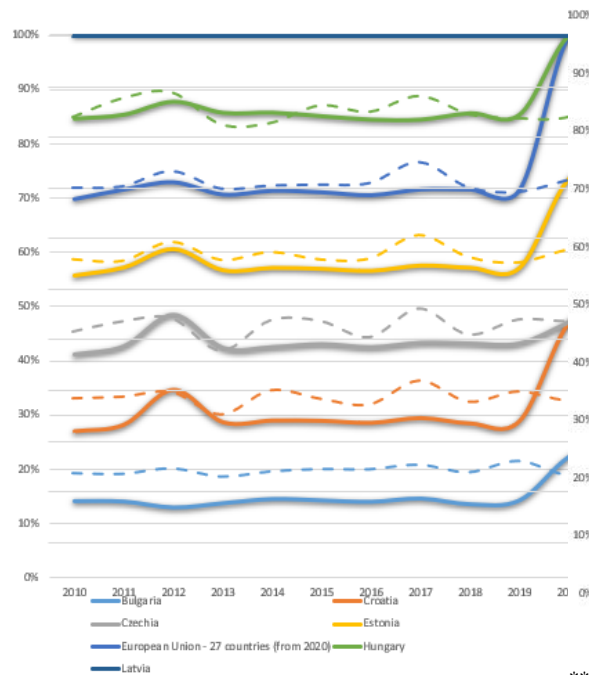
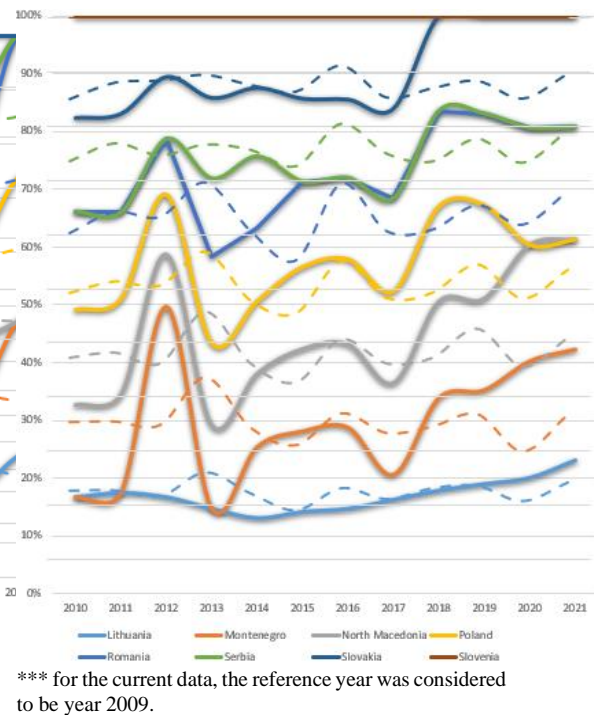


Fig. 3. Evolution of %Bed Places and %Employed Persons for Lithuania, Romania, Montenegro, Serbia, North Macedonia, Slovakia, Poland, Slovenia



Source: own development

In accordance with Eurostat database, the accommodation industry was also subject to irregular developments due to the ICT evolution, measured for the current case as enterprises with a websites and the use of social media. As part of websites reference, data considered online ordering, booking, web access, social media profiles, electronic submission complaints, order tracking or job advertisement and description of goods and services, price lists, policy statements and certifications. Social media includes paid internet advertisement (based on webpages or keywords), targeted advertising, information about visitors' behaviors on websites, web sales B2C, use of social networks and organizational blogs, websites and homepages and online ordering, reservation and booking.

Fig. 4. Evolution of occupancy rates in accordance of use of organizational websites and social media for EU 27, Bulgaria, Czechia, Hungary, Lithuania, Albania, Croatia, Estonia, Latvia

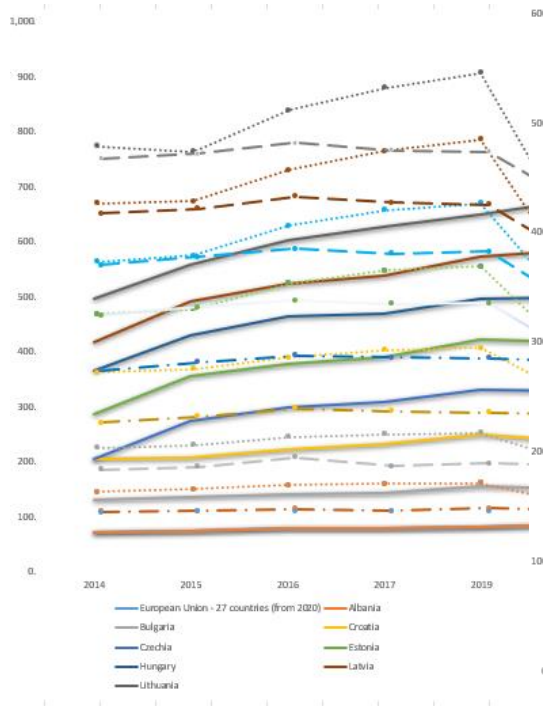
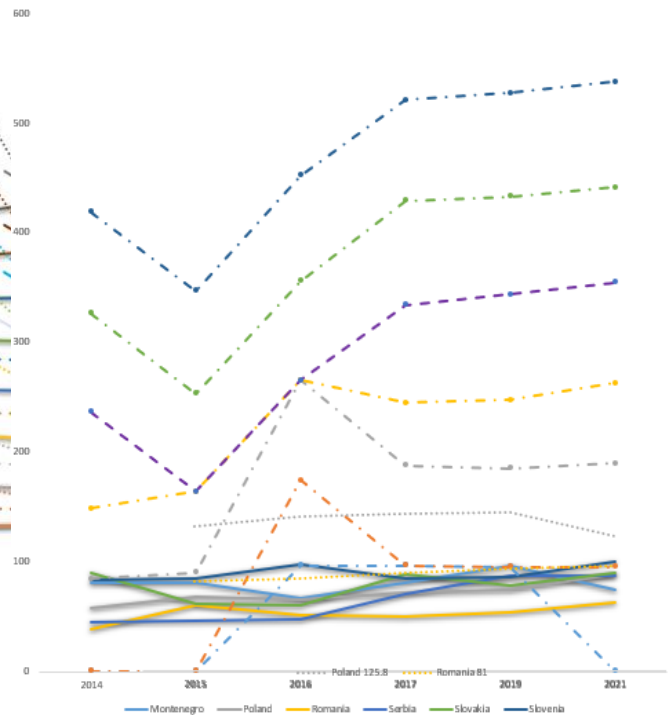


Fig. 5. Evolution of occupancy rates in accordance of use of organizational websites and social media for Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia



* Small dashes – Occupancy rates; Full Line – Use of any social media; Large dashes – enterprises with a website

The percentages in regard to occupancy rates for Albania, North Macedonia, Serbia, Slovakia and Slovenia were not available; moreover, data in regard to % of any use of social media was not available for Albania and North Macedonia. Lacunary data in regard to the

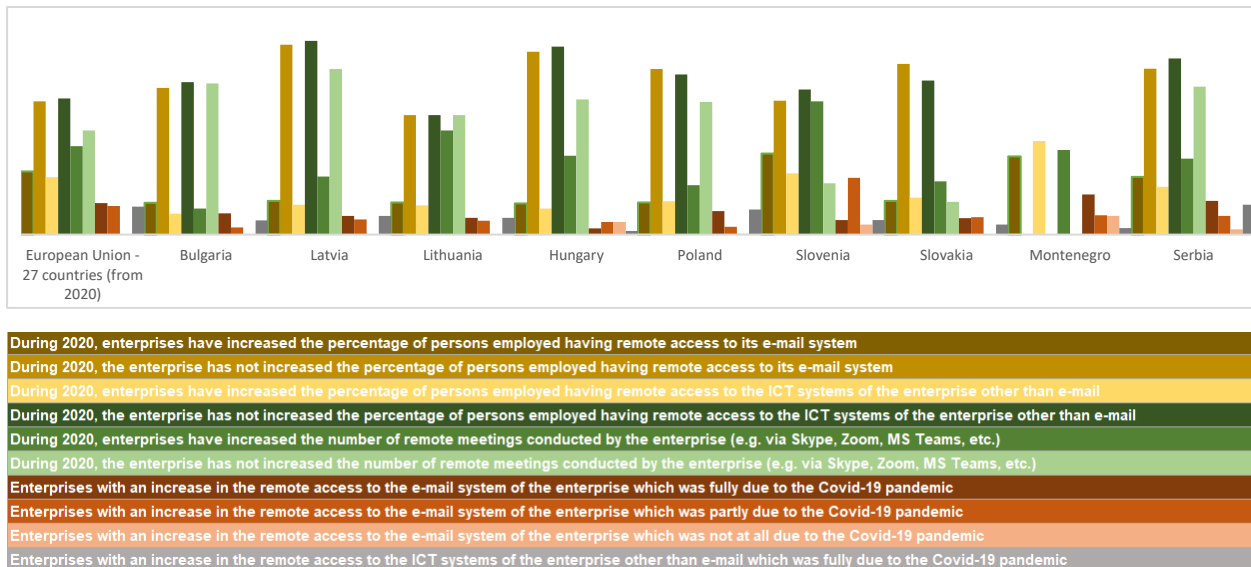
Use of a website indicator was only available for North Macedonia and Albania. Authors note that for the rest of the national entities considered, missing data was replaced with median values of the last three years.

As Figure 4 shows, the occupancy rates for the countries analyzed increased considerably in 2019 and registered a considerable decrease for the period 2009-2021. The use of social media rates show an increasing trendline for all the accommodation sectors from the considered countries (see Figure 4) except for Albania. The percentage of enterprises with the use of a website increased similarly with the % of occupancy rates, only that in 2019 decreased considerably. As a result, Figure 4 shows that the use of social media lead to an increase of the % of the occupancy rates, while the use of the organizational website does not bring considerable improvements.

As for the accommodation sectors in Figure 5, the occupancy rates in the case of Poland and Romania do not vary for the considered time frame in accordance to the use of social media, nor with creating a website, despite the fact that most of the accommodation sectors considered here registered high percentages of the organizational website use in 2016 and 2017 respectively; as for the rest of the considered economies, data was not available.

Since for all the countries, year 2020 brought major changes within the normal course of the accommodation industry development, authors considered to analyze the Covid-19 impact on the ICT usage (in enterprises with 10 persons employed or more) within the accommodation industry.

Fig. 6. Covid-19 Impact on ICT usage in Accommodation (% of Enterprises)



Source: own elaboration based of Eurostat Database

As Figure 6 shows, data in regard to the COVID19 aspects in regard to the ICT usage in accommodation is only available for 9 of the selected countries, and EU27. As opposed to the previous analysis, the data only regards the employees and not the employed persons.

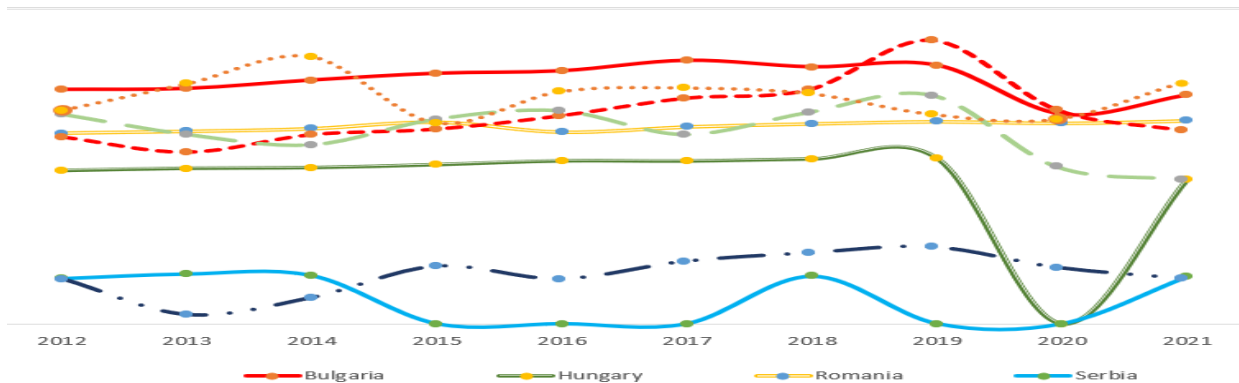
The highest percentages of remote-mail access during 2020 within the accommodation industry belong to Slovenia (36.2%), Montenegro (34.9%) and Serbia (25.8%) as compared to the EU27 average of 28.2%. A general view shows that within 2020, the remote access to the e mail system of the employees has not increased for all the countries; although, highest values have been registered by Latvia with 84.9%, Hungary with 81.7% and Slovakia with 76.3%.

When about the remote access to the ICT systems other than e mail, Montenegro leads the sector with 41.8%, followed by Slovenia (27.3%), as opposed to Latvia (86.6%) and Hungary (84%).

The analysis also concerns remote meetings and remote access to the e-mail systems, and ends with a remark on the enterprises with an increase in the remote access to ICT other than e-mail, fully due to Covid-19 pandemic; on this indicator, the most ingenious accommodation industries belong to Serbia (13.4%) and Poland (11.2%), as opposed to the European benchmark of 12.5%.

For a better understanding, authors considered to extract and fully analyze the evolutive aspects of the two indicators based on a geographical approach, therefore Romania and surrounding countries (Bulgaria, Hungary, Serbia) data was extracted (see Figure 4).

Fig. 7. Parallel evolution of % Employed persons and % Occupied bed places in Romania and surrounding countries



* Dashes= employed persons; ** Full line=No. of bed places available

Source: own elaboration

Figure 7 portrays the evolution of Romania and three neighboring countries tourism indicators (number of persons employed and number of bed places available) for the hotels and similar accommodation. The data shows that of the all four economies considered, Serbia's tourism has the lowest registered values, both in terms of available bed places and no. of employees that activate in tourism activities. This evolution confirms the Bernstein's theory (2001) where the industry productivity does not depend on the number of employees, only that in Serbia, starting with 2014, this inverse relation presents an inverse course. Data shows therefore that a decrease in the number of bed places led to an increase in the number of tourism employed individuals; this evolutionary perspective seems to have come to an end in 2021, when the two variables intersect, with a decreasing number of employees and increasing number of bed places trendline.

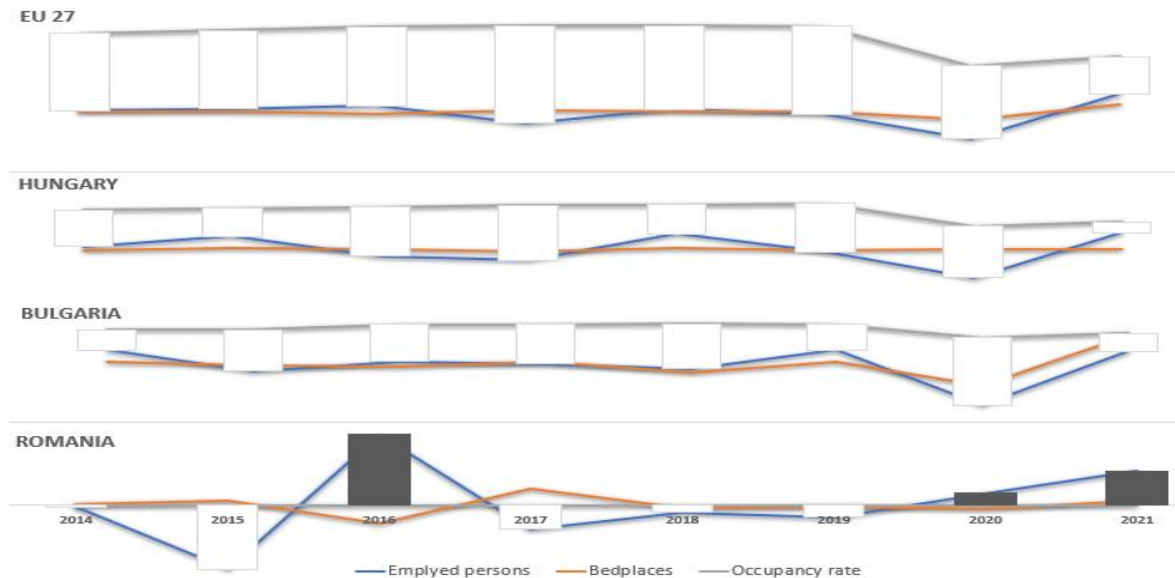
Hungary shows a similar tendency of parallel evolution of bed places number and number of employed individuals, with a very steep fall in 2020, when the number regarding employment rapidly decreased with 32.13% compared to the previous year, while the number of available bed places; data shows a 19.43% increase of employed persons in 2021.

Bulgaria occupies the first positions in terms of bed places available and number of employees that activate within the tourism industry that showed a parallel evolution of the two indicators until 2018, when the number of employees became larger compared to the number of available bed places which remained close to constant, with very small variations. This contrasting evolution lasted until 2020, when both indicators' values decreased, but the number of employed persons became smaller than the number of bed places available.

In Romania, data shows the highest peaks for the number of employed persons for years 2014 and 2016; the evolution of the two indicators within this economy shows a perpetual higher number of employees in tourism industry compared to the number of available bed places; year 2020, as in the majority of the economies, shows a decrease in the effectives of employed persons in tourism, but data from 2021 shows a traditional tendency of resuming to increasing these numbers.

For a better understanding, data in regard to the percent of available bed places, nights spent and occupancy rate was considered (see Fig.8).

Fig. 8. Evolution of bed places, nights spent and occupancy rate for Romania and surrounding countries



Source: own elaboration

Further, because of the lack of data, Serbia was not considered for the third variable forecast (namely occupancy rate), but authors considered instead the EU 27 forecast, for a better comparison. Results show that a similar trendline of occupancy rates with a visible decrease in 2020 was reported for all of the industries, except Romania. In the light when the average decrease in employed persons for all the analyzed tourism sector rated -30.71%, Romania reported an increase in accommodation employed persons of 5.71% in 2020,

reaching to 16.23% in 2021, an increasing trendline reported by all the considered economies. Out of the considered tourism sectors, Bulgaria reported the largest decrease of number of bed places (-19.54%), while for the rest of the countries, the numbers did not vary significantly.

As for answering the research question of the current research, a further analysis of the digital intensity of the accommodation economic activities with a size class in number of persons employed of 10 or more. The size considerations rely on the assumption of ICT access and use on organizational level. The only data available for all of the four tourism sectors include year 2022, add offers a specific characterization for enterprises with very high, high, low and very low digital intensity index. The percentage of enterprises (see Table 2) with very high digital intensity is lacking in consistency for all of the analyzed tourism sectors.

While the EU average for very high digital intensity averages 4.4%, the countries subscribing this section average 19.6% as the largest value in the case of Montenegro, followed by Poland with 13.5%, while the lowest values belong to Slovakia (1.4%), Romania (2.5%) and Czechia (2.6%).

A High Digital intensity averages 17.6% for EU27, but multiple accommodation sectors in different economies overtop this value; therefore, Lithuania averages 48.9% in high digital intensity, followed by Estonia (44.8%) and Poland (43.5%); on the opposite side are Slovakia (19.7%) and Romania with 22%.

Low digital intensity ratio for EU27 averages 39%, with Latvia leading the top with 44.8% and Serbia with 44.7%; on the opposite pole, a low percentage of low digital intensity characterize Montenegro (17.5%) and Slovenia (19.8%).

As for the very low digital intensity, Romania displays a value of 44.3%, overcoming the EU27 average with 24.3%, while the lowest values are displayed by Serbia (6.7%) and Poland (11.2%).

Table 2. Digital intensity on the tourism sector

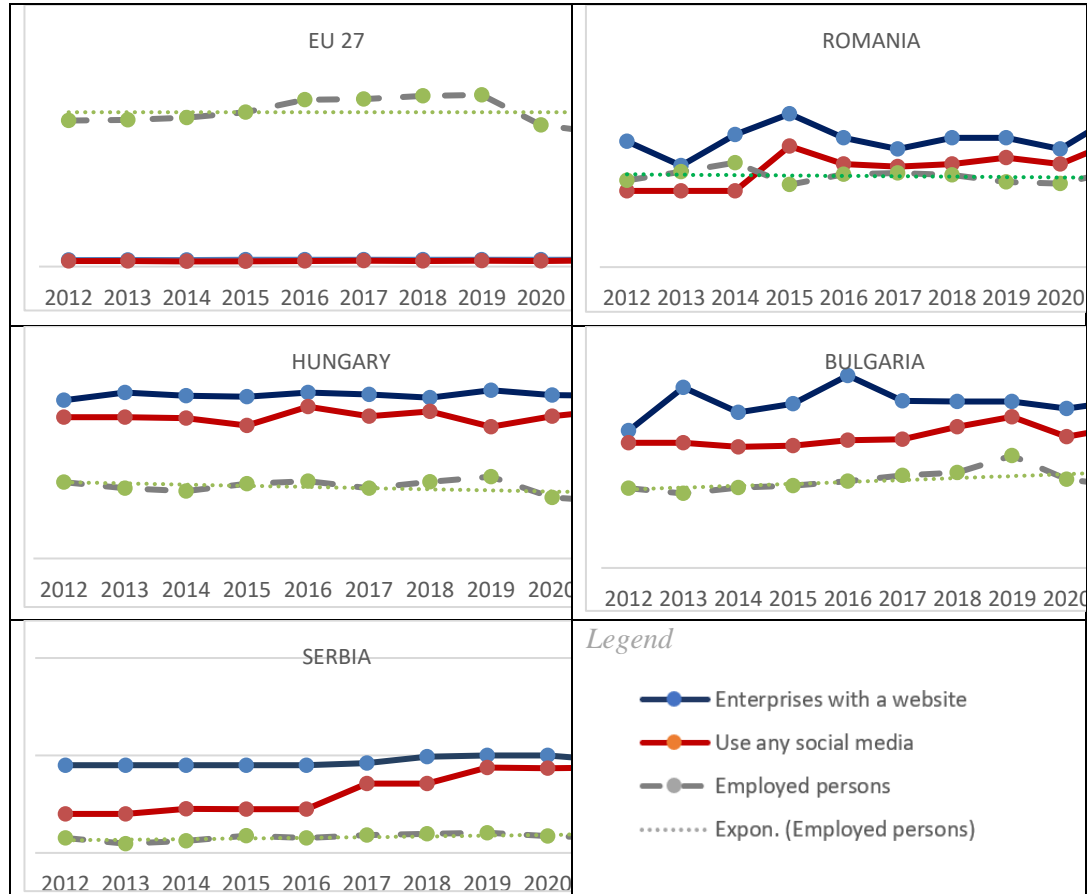
Percentage of enterprises	Very high digital intensity	High digital intensity	Low digital intensity	Very low digital intensity
Bulgaria	4.4	17.6	39	20
Croatia	11.8	29.8	38.1	20.3
Czechia	2.6	32.1	45.3	20.1
Estonia	7.8	44.8	32.2	15.2
European Union - 27 countries (from 2020)	6.3	34.7	39	20
Hungary	7.1	32.2	37	23.7
Latvia	7.3	26.2	44.8	21.7
Lithuania	10.1	48.9	24.5	16.5
Montenegro	19.6	28.3	17.5	34.7
North Macedonia	:	:	:	:
Poland	13.5	43.5	31.9	11.2
Romania	2.5	22	31.2	44.3
Serbia	8.5	40.1	44.7	6.7
Slovakia	1.4	19.7	39.2	39.7
Slovenia	13	46.1	19.8	21.2

Source: own elaboration

Since the main objective of the current research regard the effect of ICT on employment within the tourism sector of the selected economies, authors considered further as part of the ICT, the use of social media and enterprises with a website percentages, and performed an

analysis in order to emphasize their effect on employment specific to the accommodation industry, for the case of Romania and the neighboring countries.

Fig.9. Evolution of employed persons in accordance to the use of social media and organizational websites



Results show that in the case of EU 27, there is no visible connection in the case of number of accommodation industry employees and the two variables i.e. the use of digital media and companies that use websites, as part of the ICT, where there is no clear differentiation. The exponential trendline for the employed persons show an increase compared to registered data from 2020 and 2021 (see Fig.9).

When about Hungary, results show a decrease of employment parallel to an increase of the use of accommodation industry ICT, with an accentuated decrease exponential trendline in regard to persons employed.

Data in regard to Romania shows an abnormality if we were to consider the great decoupling theory of Bernstein (2013), since an increase of technology used in 2020 led to an increase in employment, thus surpassing the employment trendline.

In Bulgaria, starting with 2019, an increase in the use of social media was registered, resulting into a decrease of persons employed, thus confirming the above-mentioned theory.

However, the exponential employment trendline shows an increase of persons employed for the next timeframe.

In the case of Serbia, while the effective of employed persons decreased started with 2020, the accommodation industry registered an increase in the use of social media, and a decrease in the use of organizational websites; the exponential trendline for employment shows a slow increase for the following years.

5. CONCLUSION

The accommodation industry in European Union is subject to the evolution of ICT and automation that could result into a shift into the services industries performance, such as accommodation. The data available at the EU level is not sufficient to confirm whether technology development is replacing the employees activities in Eu and the selected countries (Chui et.al., 2015). According to Shaddev et.al. (2005), the offshoring cannot be applied as one of the causes of the snake jaws in accommodation industry specific to European Union and member states. Additionally, the use of social media and organizational websites does not coincide anymore only with the high-class accommodation facilities, therefore cannot reflect into the employees nor employed persons effectiveness.

The tradition according to which the accommodation industry increases their numbers of employed persons according to the increases in the demand is still valid. However, it is to be remarked the shift in the accommodation sector specific to the Covid-19 specific actions, that modified the increasing employment trendline, causing a major drop within all the analyzed economies.

It is remarkable that the digital intensity for the accommodation sector is high and very high in the case of economies that do not rely in high rates on the tourism and/or accommodation sector.

For Romania and the neighboring countries, the use of websites and social media within the accommodation sector has however caused visible damages to the specific employed persons rates; previous results show that for the accommodation industry, social media acts as a catalyst for the occupancy rates, which are far more productive than the websites specific activities.

Finally, even the current results tendency indicates that the accommodation industry decreased the human labor in respect with the pandemic evolution, following 2020, the evolutionary perspective sets back the normal alignment of accommodation industry that does not ultimately depend on automation of jobs, thus reducing the risk of definitively losing the employed persons effectiveness within the current sector.

According to Schumpeter (1942), the decrease of employment in one industry, results into an increase in other industries; this theory that regards employment destruction is not imminent to the accommodation sector, since the vast majority of the employed persons have low skills jobs, thus in the case of a personnel reduction, it will not be easy for them to find a job into another industry (Baum, 2015).

As for future developments of the current study, the hypothesis according to which ICT industry directly affects the employed persons and employees effectiveness specific to the accommodation industry could be tested through a set of indicators that rely on enterprises

class and employed persons degree of education and digitization. Anyhow, the policy makers should increase the attention in the direction of enhancing employability of the sectors affected by technological overlaps.

REFERENCES

Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *The Journal of Economic Perspectives*, 29(3), 3-30. <https://doi.org/10.1257/jep.29.3.3>.

Autor, D., & Salomons, A. (2018). Is automation labor share-displacing? Productivity growth, employment, and the labor share. *Brookings Papers on Economic Activity*, 1, 1-87. <https://doi.org/10.3386/w24871>, 138.

Baum, T. (2015). Human resources in tourism: Still waiting for change?-A 2015 reprise. *Tourism Management*, 50, 204-212. <https://doi.org/10.1016/j.tourman.2015.02.001>.

Bernstein, J. (2011, June 12). Another explanation for the productivity/employment split. Retrieved from <http://jaredbernsteinblog.com/another-explanation-for-the-productivityemployment-split/>.

Bernstein, J. (2013, June 14). I ask again: Is technology Blocking the Path to full employment?. Retrieved from <http://jaredbernsteinblog.com/i-ask-again-is-technology-blocking-the-path-to-full-employment/>.

Brynjolfsson, E., & McAfee, A. (2013). The great decoupling. *New Perspectives Quarterly*, 30(1), 61-63. <https://doi.org/10.1111/npqu.11362>.

Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the internet: The state of eTourism research. *Tourism Management*, 29(4), 609-623. <https://doi.org/10.1016/j.tourman.2008.01.005>.

Bulchand-Gidumal, J., & Melian-Gonzalez, S. (2015). Information technology (IT) in hotels: A full catalogue. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=42771059.

Campanella, F., Della Peruta, M. R., & Del Giudice, M. (2017). The effects of technological innovation on the banking sector. *Journal of the Knowledge Economy*, 8 (1), 356-368. <https://doi.org/10.1007/s13132-015-0326-8>.

Chui, M., Manyika, J., & Miremadi, M. (2015). Four fundamentals of workplace automation. *McKinsey Quarterly*, 29(3), 1-9.

De Vries, G. J., Gentile, E., Miroudot, S., & Wacker, K. M. (2020). The rise of robots and the fall of routine jobs. *Labour Economics*, 66, 101885.

Eurostat (2022) Accommodation Industry in Romania _ Digital Intensity. Accessed online at [Statistics | Eurostat (europa.eu)]

Eurostat (2022). Digital economy and intensity. Accessed online at [Database - Digital economy and society - Eurostat (europa.eu)].

Eurostat (2022). Tourism Accessed online at [Database - Tourism - Eurostat (europa.eu)]

- Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, 254-280. <https://doi.org/10.1016/j.techfore.2016.08.019>
- Gretzel, U., & Stankov, U. (2021). ICTs and well-being: challenges and opportunities for tourism. *Information Technology & Tourism*, 23, 1-4.
- Law, R., Leung, D. N., & Lee, A. (2013). Progress and development of information technology in the hospitality industry evidence from cornell hospitality quarterly. *Cornell Hospitality Quarterly*, 54(1), 10-24. <https://doi.org/10.1177/1938965512453199>.
- Marcolin, L., Miroudot, S., & Squicciarini, M. (2019). To be (routine) or not to be (routine), that is the question: A cross-country task-based answer. *Industrial and Corporate Change*, 28(3), 477-501. <https://doi.org/10.1093/icc/dty020>, 1-25.
- Morgenstern, M. (2016, Jun 23). Automation and anxiety. *The economist*. Retrieved from <https://www.economist.com/special-report/2016/06/23/automation-and-anxiety>.
- Morisi, T. L. (1996). Commercial banking transformed by computer technology. *Monthly Labor Review*, 119, 30-36.
- Morisi, T. L. (1996). Commercial banking transformed by computer technology. *Monthly Labor Review*, 119, 30-36.
- Oh, H., Jeong, M., & Baloglu, S. (2013). Tourists' adoption of self-service technologies at resort hotels. *Journal of Business Research*, 66(6), 692-699. <https://doi.org/10.1016/j.jbusres.2011.09.005>.
- Ou, C. S., Hung, S. Y., Yen, D. C., & Liu, F. C. (2009). Impact of ATM intensity on cost efficiency: An empirical evaluation in Taiwan. *Information*.
- Rynjolfsson, E., & McAfee, A. (2013). The great decoupling. *New Perspectives Quarterly*, 30(1), 61-63. <https://doi.org/10.1111/npqu.11362>.
- Sahadev, S., & Islam, N. (2005). Why hotels adopt ICTs: A study on the ICT adoption propensity of hotels in Thailand. *International Journal of Contemporary Hospitality Management*, 17(5), 391-401. <https://doi.org/10.1108/09596110510604814>.
- Schönherr, S., Eller, R., Kallmuenzer, A., & Peters, M. (2023). Organisational learning and sustainable tourism: the enabling role of digital transformation. *Journal of Knowledge Management*.
- Schumpeter, J. (1942). Creative destruction. *Capitalism, Socialism and Democracy*, 825, 82-85.
- Shanker, D. (2008). ICT and Tourism: challenges and opportunities.
- Tempo database. Tourism. Accessed online at [TEMPO Online (insse.ro)].
- World Economic Forum. (2016). The future of jobs. Employment, skills and workforce strategy for the fourth industrial revolution. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf.
- Zafar, S. Z., Zhilin, Q., Mabrouk, F., Ramirez-Asis, E., Alzoubi, H. M., Hishan, S. S., & Michel, M. (2022). Empirical linkages between ICT, tourism, and trade towards sustainable environment: evidence from BRICS countries. *Economic Research-Ekonomska Istraživanja*, 1-22.

The Perspectives of Applying the European Union Norms in the Constitutional Jurisprudence of the Republic of Moldova

Veaceslav Zaporojan¹, Corina Zaporojan²

Abstract

Introduction: The Constitutional Court of the Republic of Moldova in its jurisprudence applied both the jurisprudence of the European Court of Human Rights and the jurisprudence of the Court of Justice of the European Union. The process of accession to the European Union imposes new standards, aimed at the even more rigid harmonization of national legislation with the legislation of the European Union. EU law represents a primary right for the member states, which needs to be applied both by the national legislative and executive authorities, as well as by the judicial authorities. The application of a rule of European Union law in the interpretation not only of the EU authorities, but also of the Court of Justice of the European Union to the constitutionality control procedure imposes new tasks on the court of constitutional jurisdiction. The new tasks establish procedures for the interpretation and application of EU legislation in the sense of not creating contradictions between the national constitution and EU norms following the example of constitutional justice in Poland and the Czech Republic. The jurisprudence of the Court of Justice of the European Union established that the EU values established by art. 2 of the TEU are binding not only for the EU institutions, but also for the member states, where the basic role rests with the Courts of constitutional jurisdiction.

Aim: The aim of this study is to reach empirical evidence on the link between political and constitutional stability, within the EU accession procedure to the developing countries.

Method: In order to study the subject addressed in this article, the following research methods were used: constitutional comparison, comparative constitutional analysis, methodological challenge's opinion poll, analysis, synthesis, induction, deduction, comparison, etc.

Findings: The accession process of the RM to the EU is a complex one from a legal point of view, and the public authorities, especially the Parliament, have the authority, the possibility and the obligation to take into account some of the observations mentioned in this research regarding the constitutional framework when revising the Constitution of the RM because the accession of the RM to the EU without the revision of the Constitution and a referendum is impossible.

Originality and value: The study carried out reflects the procedures of the common law jurisdiction and the constitutional one exercised for the harmonization of the legislation of the Republic of Moldova with the Acquis of the European Union as a candidate country for accession to the European Union.

Key Words: Constitution, Constitutional Court, Constitutional Jurisprudence, EU Legislation, constitutionalism, national constitution

Jel Codes: K10

¹ PhD, Associate Professor, Academy of Economic Studies of Moldova, Dean of the Faculty of General Economic and Law, Department Law, Republic of Moldova

² PhD Student, State University of Moldova, Law Doctoral School, Republic of Moldova

For the Republic of Moldova (hereinafter – RM), the process of joining the European Union (hereinafter – EU) is of a major importance at the current stage. The exposed finding directs the RM to apply much more rigid and rapid measures to harmonize national legislation with the EU legislation.

In this aspect, it is important for the RM to consider the fact that after December 1st, 2009, within the framework of the EU, amendments to the Treaty on the European Union signed in Lisbon entered into force. Based on these amendments, the form of EU legislation has changed. The legislation of the EU was previously structured from three pillars: the first - the three European Communities, the second pillar - the Common Foreign and Security Policy and the third pillar - Justice and Home Affairs. Based on the Treaty of Lisbon, the Treaty on the European Community was renamed to the Treaty on the Functioning of the European Union (TFEU), which changed the legal personality from the title “European Community” to the title “European Union”, the latter obtaining legal personality.

Thus, after December 1st, 2009, we only talk about “EU legislation” or “EU acquis”, but not about the Community acquis. However, the acts adopted before December 1st, 2009 remain in force until they are repealed, canceled or modified. (MEDAK, 2022) In support of what was stated above, the authors also mentioned an important moment for the “initiators of draft legislative acts”, because acts adopted before November 1st, 1993 are marked “EEC” (European Economic Community), between November 1st, 1993 and 1 December 2009 they are marked “EC” (European Community), and after December 1st, 2009 acts are marked “EU” (European Union).

The EU acquis as a legal term, represents the legislative framework of the EU, which is mandatory for all member states, having as component parts the legal norms from the treaties by which the EU was established, the jurisprudence of the Court of Justice of the EU, the declarations and resolutions adopted by the EU, the acts adopted for the implementation of foreign policy, including the treaties adopted by the EU and between the states of this institution.

States that acquire the status of candidate for accession are obliged to respect the Acquis of the EU. The RM also assumed this obligation according to art. 432 of the Association Agreement between the EU and the European Atomic Energy Community and their member states, on the one hand, and the RM on the other (Association agreement between the European Union and the European Atomic Energy Community and their member states, on the one hand, and the Republic of Moldova.) (in continued – Association Agreement), signed in 2014, in force since 2016.

The acquis of the EU is made up of such sources as: primary EU legislation; secondary EU legislation; EU international treaties; and principles of EU law. (MEDAK, 2022)

The present research being in the field of constitutional law, the opinion of some authors is of interest, according to which “Primary legislation represents the

constitutional basis of the European Union and holds the supreme position in the hierarchy of the rules of the legal system of the European Union and holds the supreme position in the hierarchy of the rules of the legal system of the European Union, being equivalent to the constitution of a country”. (MEDAK, 2022, p. 23) The mentioned authors presented in their work 17 treaties adopted within the EU that are part of its primary legislation. (MEDAK, 2022, pg. 23-25)

Granting an equivalence to the national constitution of the states with the primary legislation of the EU and knowing that the rules guaranteeing fundamental rights and freedoms cannot be missing from the Constitution (with the exception of three states that have an unwritten Constitution), the spectrum of the primary legislation of the EU is included and the Charter of Fundamental Rights of the European Union (European Parliament of EU), adopted on December 7, 2000. The importance of the Charter for the Acquis of the EU and the placement of the Charter in the primary legislation of the EU is also enshrined in the Treaty on EU (European Parliament) from 1992, where art. 6 paragraph (1) establishes that “The Union recognizes the rights, freedoms and principles provided for in the Charter of Fundamental Rights of the European Union of December 7, 2000, as adapted on December 12, 2007, in Strasbourg, which has the same legal value as the one of the treaties.”

The perspectives of the application of European Union norms in the Republic of Moldova

The Republic of Moldova directed its political-legal development to correspond with the values of the EU prior to the 2014 adoption of the Association Agreement (Association agreement between the European Union and the European Atomic Energy Community and their member states, on the one hand, and the Republic of Moldova.) . This results from Decision No. 1345 of 24-11-2006 regarding the harmonization of the legislation of the RM with the Community legislation, establishing the procedure and obliging the Ministry of Justice to monitor the process of harmonization of the national and Community legislation. (Government)

The Republic of Moldova, subsequently acquiring in 2014 the status of a candidate state for EU accession, as I mentioned before, is obliged to respect the Acquis of the EU according to the Association Agreement (Association agreement between the European Union and the European Atomic Energy Community and their member states, on the one hand, and the Republic of Moldova.). The primary legislation of the Acquis of the EU establishes for the RM the need to widen the process of harmonizing national legislation with that of the EU, because the primary legislation is the object of orientation for the development of the state through the lens of the policy of the EU, towards which the RM is aiming as a candidate state. The exposed interpretation of the Acquis of the EU allows us to state that, the primary legislation of the Acquis can serve as a source for the elaboration and adoption of national legislation. The stated finding places the Acquis of the EU among the norms of the Constitution of the RM.

The Association Agreement with the EU (Association agreement between the European Union and the European Atomic Energy Community and their member states,

on the one hand, and the Republic of Moldova.) through the lens of compliance with the legislation began to be implemented after its entry into force in 2016. Initially, it was adopted into the National Action Plan for the implementation of the Association Agreement RM - EU in the period 2017-2019 (Government). The said decision was later amended in 2019 (Government Decision No. 559 of 11-19-2019 regarding the amendment of some Government decisions.).

Parliament, at a higher level, adopted Law no. 100 of 22.12.2017 regarding normative acts (Parlament). We believe that this law established the legislative bases for harmonizing the national legislation with the Acquis of the EU, *de jure* equating it with the norms of the Constitution. The stated conclusion results from the norm of article 3 paragraph (3) of Law 100/2017, which regulates “The normative act must correspond to the provisions of the Constitution of the Republic of Moldova, the international treaties to which the Republic of Moldova is a party, the principles and unanimously recognized norms of international law, as well as European Union legislation”. Thus, in 2017 the RM, not being a member state of the EU, granted the legislation of this international institution the status of documents equivalent to the Constitution and the international treaties ratified by the Parliament. Additionally, according to Law 100/2017 in art. 28 for determining the concept, category and establishing the structure of the normative act, it is necessary that “The concept and notions determined ... are compatible or similar to those used in the legislation of the European Union.” In the same aspect, other rules of this law establish that the Information Note for any project of the normative act must contain "the description of the degree of compatibility, for the projects that aim to harmonize the national legislation with the legislation of the European Union;" and “findings of the expertise of compatibility with the legislation of the European Union;”. Harmonization with the Acquis of the EU was regulated by this law (art. 31) through the legal requirements regarding the draft normative acts aimed at harmonizing the national legislation with the legislation of the EU (Parlament).

The European orientation in accordance with the legislation of the EU is also evident from art. 36 of Law 100/2017, which regulates the expertise of the compatibility of the draft normative act with the legislation of the EU and art. 76, which allows the re-examination of normative acts by analyzing their content for the evaluation compatibility not only with the Constitution, but also with the regulations of the EU legislation. (Parlament)

The harmonization of the national legislation of the RM with the Acquis of the EU, after institutional fluctuations, is granted to the State Chancellery of the Government, where the Center for Harmonization of Legislation was established (with the status of a general directorate), in which the Expertise Directorate for Compatibility with EU legislation (Government). The process of accession to the EU has currently directed the Directorate of Expertise for Compatibility with EU legislation to adopt Order no. 1 of 09.01.2023 (Government State Chancellery , 2023) which approved the Methodology for carrying out the compatibility expertise, the Methodology on the harmonization of the legislation of the RM with the legislation of the EU and the Manual

on the harmonization of the legislation with a key element for the success of the European integration process of the RM in the EU.

The term harmonization through the prism of the analysis of the correspondence of the national legislation with the Acquis of the EU can present some different interpretations, which is why this term was defined by the Expert Directorate for compatibility with the legislation of the EU by Order no. 1 of 09.01.2023 process of transposing EU legislation into the domestic legal system, thus incorporating EU norms and procedures into national legislation (Government State Chancellery , 2023). The harmonization procedure involves the application of the following procedural steps after the preparatory and analytical procedure: the process of drafting and adopting the normative act in accordance with the EU Acquis, the process of practical application through the interpretation of normative acts according to the EU Acquis and the application of EU legislation.

The constructive exercise of the stages of harmonization of the national legislation establishes that the transposition is “followed by the implementation of the national legislation (previously harmonized with the EU acquis) by the competent authorities and natural and legal persons from the RM and the implementation/ensure of its compliance by to national courts and law enforcement bodies.” (Government State Chancellery , 2023)

The perspectives of the application of EU norms in the jurisprudence of common law courts

Correspondence of national legislation with the acquis of the EU can be achieved at the highest level through trials in national courts, when national judges, when resolving disputes or applying sanctions have the obligation to apply EU legislation as a higher level in relation to national legislation. According to art. 47 of the Charter of Fundamental Rights of the EU, the protection of rights and freedoms allows any person whose rights are violated to have the right to an effective appeal before a court. The right to an appeal of the action by which the right is violated allows the injured person to benefit from the right to a fair trial, which is necessary to be conducted in public, by applying a reasonable time until resolution. The examination process must be carried out before a court established in advance by law with characteristics of independence and impartiality, being assisted by the defense (European Parliament of EU). The above forms the opinion that for national judges the acquis of the EU, especially the primary legislation, has superiority in relation to the national one apart from the Constitution, which is the Supreme Law. The conclusion in question is formed not only based on the rules of the Treaty on the EU (European Parliament), but also some national rules of the member states. The Romanian Civil Procedure Code in art.4 clearly regulates the way of priority application of EU law, when the mandatory rules of EU law are applied in a priority way, regardless of the quality or status of the parties (Parliament of Romania, 2010). Similar to the rule of art. 4 of the Romanian Civil Procedure Code is the rule of art. 1 paragraph (2) of the Romanian Criminal Procedure Code, which regulates the principles and limits of the application of the criminal procedural law, the status and

purpose of the criminal procedure rules that “The rules of criminal procedure aim ... to respect the provisions of the Constitution, of the constitutive treaties of the European Union, of the other regulations of the European Union in criminal procedural matters, as well as of the pacts and treaties regarding fundamental human rights to which Romania is a party.” (Parliament of Romania, 2010) The cited norm presents the situation when the ECHR norms are nominated in the hierarchy according to the Constitution and the Acquis of the EU.

In some cases, however, there is a significant overlap of rights regarding access to justice as regulated in the European Convention on Human Rights (hereinafter - ECHR) and in the Charter of Fundamental Rights of the European Union (hereinafter - the Charter). According to the Charter, when the rights in the Charter correspond to the rights provided for in the ECHR, these rules will have the same scope and meaning. Part of the jurisprudence of the European Court of Human Rights (hereafter – ECtHR) can be considered relevant when applying the Charter. In this way, EU legislation can be considered consistent with ECtHR jurisprudence, unless there are express provisions to the contrary. In this case, the national judges themselves have the right to refer the matter to the Court of Justice of the EU. The national judges of the member states also have the right to request from the CJEU the interpretation of the rules of the EU because the CJEU represents the judicial authority of the EU and, in collaboration with the courts of the member states, ensures the uniform application and interpretation of Union law:

- controls the legality of the acts of the institutions of the EU.
- ensure that the member states fulfill their obligations resulting from the treaties.
- interprets Union law at the request of national courts. (Court of Justice of the European Union, 2023)

National judges will refer to relevant CJEU jurisprudence, if available, providing alternative sources on the right of access to justice and, more importantly, demonstrating how the two legal orders operate in parallel. A good part of the judgments of the CJEU have been pronounced regarding the provisions of EU law relevant for the settlement of a pending dispute at the national level. In accordance with the preliminary ruling procedure, the CJEU has the role of interpreting EU legislation or ruling on its validity. Subsequently, the national court, in accordance with the interpretation provided by the CJEU, has the role of applying the law to the factual situation that is the subject of the main procedure. To avoid any confusion, in this manual, the reference to the Court of Justice of the European Union (CJEU) also includes the ECtHR. (Government State Chancellery , 2023)

The Statute of the CJEU establishes certain standards for national judges in relation to EU legislation. Ensuring the effective and uniform application of Union law, in order to avoid any divergent interpretation, national courts can and sometimes must turn to the Court of Justice asking it to clarify an aspect regarding the interpretation of Union law, in order to allow them, for example, to verify the compliance of national legislation with Union law. The request for a preliminary ruling may also have as its object the control of the validity of an act of Union law. The response of the Court of

Justice does not take the form of a simple opinion, but of a decision or a reasoned ordinance. The receiving national court is bound by the interpretation given when it resolves the dispute pending before it. The decision of the CJEU is equally binding for the other national courts referred to an identical issue. (Court of Justice of the European Union, 2023)

The area of general principles of EU law is defined by the constituent treaties of the EU (for example, the principles of subsidiarity and proportionality) and established by the jurisprudence of the CJEU.

The fact that the Court of Justice declared domestic law incompatible with EU law (Case 106/77, Simmenthal) does not provide grounds for invoking the nullity of these acts, but the state has the obligation to amend the problematic provisions of domestic law (Case 10 – 22/97 – Ministero della Finance vs In. Co. Ge.). In the meantime, national courts should apply the relevant legislation, i.e., they have an obligation to interpret domestic law in accordance with the letter and spirit of EU law provisions (Case 14/83 Von Colson). In the Simmenthal Case the ECJ also stated that: “Those provisions and measures of the Treaty not only by their entry into force automatically render inapplicable any provision incompatible with national law, but also prevent the adoption of new national acts in the extent to which they will be incompatible with the community provisions”. (Government State Chancellery , 2023)

The perspectives of the application of EU norms in constitutional jurisprudence

The application of the EU law system through the prism of national constitutional norms represents a much higher dilemma because of the character of the state Constitution as the supreme law. In this aspect, analyzing the rules of the consolidated version of the Treaty on the functioning of the EU, we will detect a general rule used multiple times (art. 25, 223, 262 etc.): “The respective provisions enter into force after they have been approved by the member states in accordance with their constitutional norms.” (European Parliament) The constitutional interpretation of the cited norm clearly directs us to the conclusion that EU norms have superiority in relation to the norms of national law, with the exception of constitutional norms. The Constitutional Courts of the member states of the European Union interpret the norms of the national Constitutions in relation to the primary legislation of the Acquis of the EU, but within the limits of the national Constitutional norms. That field has caused contradictory interpretations within the EU regarding the dilemma of supremacy: national Constitutional law or International law of the EU. The mentioned dilemma was the object of the decisional interpretations of the CJEU and the national Constitutional courts. Contradictory interpretations, which caused multifaceted disputes, known to the public, have already taken place in member states such as Poland and Romania.

The dilemma of the conflict between national and European Constitutional jurisdiction at the CJEU level in Romania was triggered after on December 21st, 2021, the CJEU adopted a decision by which it found that national judges can not apply, without the risk of being disciplinary investigated, the decisions of the Constitutional Courts, which contravene EU law (Court of Justice of the European Union (Grand

Chamber), 2022). However, the decision of the CJEU was contradicted by the Constitutional Court of Romania through a press release of December 23rd, 2021. According to this release, “The CJEU recognizes, in its Decision of December 21st, 2021, the binding character of the decisions of the Constitutional Court. However, the conclusions of the CJEU Judgment according to which the effects of the principle of the supremacy of EU law are imposed on all organs of a member state, without internal provisions, including those of a constitutional order, being able to prevent this, and according to which national courts are required to leave unapplied, ex officio, any regulation or national practice contrary to a provision of EU law, presupposes the revision of the Constitution in force. In practical terms, the effects of this Decision can be produced only after the revision of the Constitution in force, which, however, cannot be done by law, but exclusively at the initiative of certain legal subjects, with respect to the procedure and under the conditions provided for in the Romanian Constitution itself.” (Constitutional Court of Romania, 2021) Thus, the Constitutional Court of Romania essentially argued that CJEU judgments that contravene the Romanian Constitution (and the jurisprudence of the Constitutional Court) can only be applied after the revision of the Constitution. The Constitutional Court of Romania maintained its legal position that national judges must first respect Romanian legislation and not that of the EU with the risk of being disciplinary investigated, as the Judicial Inspection and the CSM are currently doing.

That report remains the subject of disputes among jurists, especially among Romanian constitutionalists. Contrary opinions are growing because of the fact that when the Romanian Constitution was revised in 2003, the new norm of art. 148 “Integration into the European Union” did not delimit a distinction between 2 legal relationships:

1. The norms of EU law and the norms of Romanian national law; and
2. The norms of EU law and the norms of the Romanian Constitution, which in relation to other norms of national law have supreme legal force.

Based on the last finding, the jurists of a high European publication opined that “Article 148, part 2 is very clear because it does not distinguish between internal laws, including the Constitution. In other words, the constitutional legislator did not distinguish between ordinary, organic and constitutional laws, so no interpretations can be made.” (PORA, 2022)

Romania has a rigid legislation regarding the procedures applied by judges when resolving cases, according to which “a judge who does not apply a decision of the Constitutional Court is subject to a disciplinary investigation by the Judicial Inspection and risks exclusion from the judiciary.

... The CJEU, gathered in the Grand Chamber, “confirmed its jurisprudence resulting from a previous decision, according to which the Cooperation and Verification Mechanism (CVM) is binding in all its elements for Romania. Thus, the acts adopted before accession by the institutions of the Union are binding for Romania from the date of its accession”. (PORA, 2022)

In the RM, although the mechanism of accession to the European Union started in 2014, until now the Constitutional Court very succinctly uses the EU norms in the interpretation of the Constitution for the resolution of constitutionality cases (in 26 decisions it referred to the European Union, but not in all EU legislation). Based on the aforementioned norms of the Association Agreement, as well as the acts and those that followed after March 3rd, 2022, the Constitutional Court, along with other public authorities, as I mentioned in this research, has the *de jure* - constitutional obligation to harmonize of the national legislation with the *acquis* of the EU equating it with the norms of the Constitution through the interpretation of the norms of the Constitution when exercising Constitutional jurisdiction.

CONCLUSION

The accession process of the RM to the EU is a complex one from a legal point of view, a procedure which from a constitutional point of view will greatly depend on the post-accession relations between the RM and the EU. As a result of the mentioned constitutional circumstances, the public authorities, especially the Parliament, have the authority, the possibility and the obligation to take into account some of the observations mentioned in this research regarding the constitutional framework of Romania when revising the Constitution of the RM.

The accession of the RM to the EU without the revision of the Constitution and a referendum is impossible. The exercise of the described procedures must be accompanied by the conclusion of the importance of a very careful analysis of the content of the constitutional amendments applied in this process.

REFERENCES

MEDAK Vladimir, PRIMOZ Vehar. *Harmonization of legislation as a key element for the success of the integration process of the Republic of Moldova in the European Union*. Chisinau: Arc, 2022, 167 p. ISBN 978-9975-0-0654-5

Association agreement between the European Union and the European Atomic Energy Community and their member states, on the one hand, and the Republic of Moldova. Available: <https://eur-lex.europa.eu/legal-content/RO/TXT/?uri=celex%3A22014A0830%2801%29>

The Charter of Fundamental Rights of the European Union. Available: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:0389:0403:ro:PDF>

The Treaty on the European Union. Available: https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0001.02/DOC_1&format=PDF

Government Decision No. 1472 of 30-12-2016 regarding the national action plan for the implementation of the Association Agreement between the Republic of Moldova

and the European Union in the period 2017-2019.
Available: https://www.legis.md/cautare/getResults?doc_id=119199&lang=ro

Government Decision No. 559 of 11-19-2019 regarding the amendment of some Government decisions.
Available: https://www.legis.md/cautare/getResults?doc_id=119036&lang=ro

Parliament Law no. 100 of 22.12.2017 regarding normative acts.
Available: https://www.legis.md/cautare/getResults?doc_id=105607&lang=ro

Government Decision No. 1345 of 11-24-2006 regarding the harmonization of the legislation of the Republic of Moldova with the Community legislation.
Available: https://www.legis.md/cautare/getResults?doc_id=23527&lang=ro

Government Decision No. 657 of 06-11-2009 for the approval of the Regulation on the organization and operation, structure and staff limit of the State Chancellery. Available: https://www.legis.md/cautare/getResults?doc_id=110167&lang=ro

Government State Chancellery. Order no. 1 of 09.01.2023 regarding the approval of the Methodology for carrying out compatibility expertise and the Manual on the harmonization of legislation with a key element for the success of the European integration process of the Republic of Moldova in the European Union. Available: https://cancelaria.gov.md/sites/default/files/ordin_cu_anexe_2023.pdf

Parliament of Romania. The Civil Procedure Code of Romania from July 1, 2010 (**republished**). Available: <https://legislatie.just.ro/Public/DetaliiDocument/140271>

Parliament of Romania. The Criminal Procedure Code of Romania from July 1, 2010 (Law no. 135/2010). Available: <https://legislatie.just.ro/Public/DetaliiDocument/120611>

Court of Justice of the European Union.
Available: https://curia.europa.eu/jcms/jcms/Jo2_6999/ro/

Judgment of the CJEU (Grand Chamber) of December 21, 2022 [Text directed by the Ordinance of March 15, 2022]. Available: <https://curia.europa.eu/juris/document/document.jsf?text=&docid=251504&pageIndex=0&doclang=RO&mode=lst&dir=&occ=first&part=1&cid=2513872>

Constitutional Court of Romania. Press release, December 23, 2021 of the Constitutional Court of Romania. Available: <https://www.ccr.ro/comunicat-de-presa-23-decembrie-2021/>

PORA, Andreea. Free Europe Romania. *CE warning / Romania risks sanctions due to the CCR and the Special Section. How Predoiu reacts*. January 15, 2022. Available: <https://romania.europalibera.org/a/avertisnet-justitie-comisia-europeana/31654560.html>

Roadmap to Encouraging Green Economy: An Nondisruptive Perspective for Corporate World

Kumar Shalender¹, Rajesh Kumar Yadav²

Abstract

Introduction: The need to conserve the environment in the backdrop of intensifying pollution couldn't be emphasized more with this research setting in the context of creating a balance between economic progress and environmental sustainability.

Aim: The purpose of the research is to develop a conceptual framework for facilitating the integration of nondisruptive innovation in businesses spreading across different industry verticals.

Method: With the help of real-world cases, this research identifies the important parameters of nondisruptive innovation and how these aspects can help companies contribute to the cause of environment preservation while not hurting their existing business models.

Findings: Deriving the insights from industry cases coupled with the understanding of the literature, the study offers a holistic framework for incorporating nondisruptive innovation in firms. The idea is to help all stakeholders in the ecosystem identify these parameters and collaborate to integrate all these dimensions to boost the green economy.

Originality and value: The research is unique in the sense that it approaches the green economy from a nondisruptive perspective while allowing stakeholders to capitalize on opportunities that are available within their current business model.

Key Words: Business Environment, Green Economy, Nondisruptive Innovation, Strategy,

Jel Codes: D81, E24, F63

1. INTRODUCTION

The issue of environmental sustainability is undoubtedly one of the most pressing topics of our times. The intensity of global climate change has really endangered the prospects of our future generations and this is high time that all stakeholders come together to push for a greener economy. From the automobile industry and FMCG segment to the retail sector and supply chain logistics, the need to push for sustainable and environmental practices in business couldn't be overemphasized today. Policymakers across the globe are making important decisions on environmental sustainability which in turn are having an impact on business practices in different product categories and service domains (Kuo 2003). It is also apparent from the important developments that have manifested in the last couple of years that the pace of

¹ Associate Professor, Chitkara Business School, Chitkara University, Punjab, India

² Associate Professor, Amity School of Business, Amity University, Uttar Pradesh, India

change in business practices is quite dramatic. Industries are making a comprehensive shift from their existing practices by venturing into completely new functional and operational mechanisms (Gaskell 2023). Although this transformative shift is good from the perspective of the environment, it has started showing its negative impact on the current job prospects and overall employment associated with industrial sectors across the global economy. A complete shift from conventional practices not only puts a substantial cost burden on firms but also mandates the upskilling and reskilling of the existing workforce. Fulfilling all these requirements in a relatively short period of transition is definitely an uphill task with most firms finding it difficult to cope with all these changes at both strategic and tactical levels (Kivimaa et al. 2021). In the background of this specific situation, this research deep dives into the nondisruptive perspective that the corporate world should adopt to strike a balance between their sustainability efforts and current business obligations. We contend that rather than taking a completely transformative approach to environmental sustainability, firms should adopt a nondisruptive approach wherein the existing business boundaries of the organizations must be expanded to new segments and categories (Kim and Renée 2023). The primary benefit of the approach is that all stakeholders in the existing value chains will not feel the enormous pressure to entirely replace their existing business practices. Rather they would have the choice to incrementally expand their business formats and adopt novel practices that are aligned with their existing business models and just prove as effective as the conventional processes are. This will help firms achieve a positive impact on reducing their carbon footprints without adversely impacting the economic aspects of conducting the business (Kaur et al. 2023). Such a philosophy is also likely to find more favor with the shareholders of the organizations as these people do have concern for the current returns of the company. It's very important to keep shareholders satisfied with the returns on investment as outflow of money even for environmental purposes promising positive returns in the future will not be taken generously by the stakeholders in the ecosystem (Ndekwa et al. 2023).

2. NON-DISRUPTIVE INNOVATION: FUNDAMENTAL PRINCIPLES

a) Scan existing Frameworks: By comprehensively revisiting functional procedures and operational mechanisms, businesses can find existing loopholes in their processes to devise strategies for reducing wastage and curbing emissions. Take, for example, the automobile industry where the pressure to integrate novel Technologies to reduce emissions is enormous. While disruptive innovation might mandate companies to make a complete switch from internal combustion engines (ICEs) to electric vehicles (EVs), the shift might prove detrimental to the current business prospects of companies as well as the GDP of many emerging countries. The complete switchover will leave thousands of workers jobless and might dampen the domestic demand and growth rate of the economy. The non-disruptive approach to innovation advocates utilizing the current technologies in a manner that will make them more efficient and less detrimental to the

environment. Nifty innovations such as particulate filters are helping companies significantly reduce their emissions without spending business dollars on the invention of new technologies. Indian Auto major Tata Motors has just done that. The company has been able to reduce its emissions to meet Euro 6 norms by adding ammonia to the hazardous NOX that leaves the exhaust without any treatment. By adding Ammonia, the NOX gets converted to nitrogen and water vapors which are completely unarmful. Tata Motors has been able to find such an unconventional idea by making a comprehensive assessment of its existing technology and then brainstorming the ways in which the challenging task of reducing emissions can be achieved without investing a fortune into the new technology. Rather than starting to invest rightly into new inventions, Tata Motors does a good job by encouraging the team to find the solution within the existing technological setup and successfully accomplish its goal. In fact, the idea become quite popular in the industry with many other players including the global ones adopting the same underlying philosophy as used by Tata Motors (Kotwal 2023).

b) Modify Existing Products: It is not necessarily a prerequisite that organizations must come up with groundbreaking, innovative products to power the idea of the green economy. The thoughtful alterations to the existing products can also help organisations meet their carbon footprints with the desired efficiency and effectiveness. Hindustan Unilever, a subsidiary of FMCG-major Unilever, has shown the way by making intuitive changes in its product lines to meet the challenge of sustainability while giving an impetus to the green economy. The company recently came with the Lifebuoy germ kill spray that it has invented as an alternative to the liquid disinfectants available in the market. The spray can be used on a variety of surfaces and unlike ordinary disinfectants that require wiping, the Lifebuoy spray saves water and paper by doing away with any such requirement. This new product has been developed after a careful study which specifically focuses on reducing the requirement of water and paper related to the use of the disinfectant on surfaces (McQuater 2023). HUL has shown that by making a slide modification in existing product lines, commendable results related to sustainability and green economy can be achieved without burdening the organization with a huge amount of investment and resources.

c) Incrementally Integrate Sustainability: Integrating the aspect of sustainability into the product portfolio is also an important measure to spur the green economy. It is important to differentiate between the incremental integration and the launch of a completely new product. Unlike the launch of innovative product lines that demand a large amount of investment, the integration of the sustainable philosophy in a measured manner won't burden the organization and its resources. Take, for instance, the leading consumer appliance company LG. LG has been at the forefront of the sustainable revolution as it has been consistently awarded top rankings on the various sustainable parameters by leading third-party accreditors across the globe. From pledging carbon neutrality to using more recycled material and clean technology, the holistic focus of LG

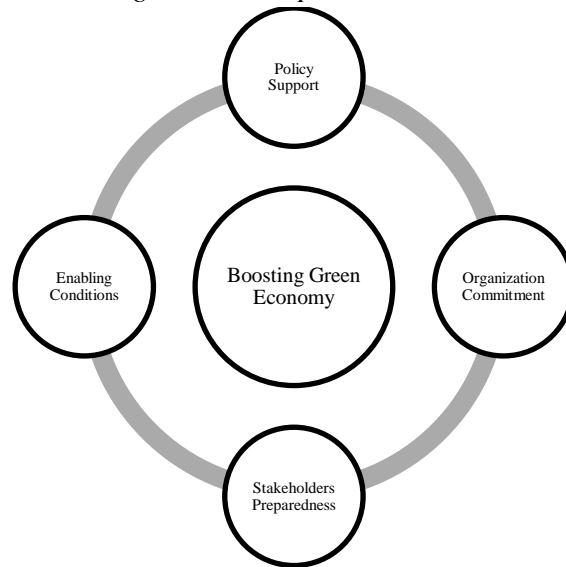
on sustainability sets it apart from the rest (McIntyre 2023). The company has incorporated incremental change in its product strategy and as a result, its OLED EVO range of TVs has reduced the plastic composition to 40%, thereby helping the organization to save up to 20,000 tons of plastic waste globally. Similarly, the LG sound bar is made out of polyester resin material that has been specifically fabricated from recycled water. In addition, its range of styler showcases and Aero furniture also boasts a high content of recycled plastic and waste.

d) Focus on Environment: While many companies choose to boost the green economy by incorporating sustainability in their product and services, there are others which emphasize the restoration of the environment to help society at large. The leading IT hardware manufacturer Hewlett Packard (HP) is the company which is pioneering this approach through a raft of initiatives focused on conserving the ecosystem, green areas, and intensifying plantation in critical pockets of the world (Murray and Steve 2023). The company has partnered with the World Wildlife Fund (WWF) and the association is helping in the reforestation of the Atlantic forests in Brazil. The company is estimated to have planted around 2 million trees through its association with various NGOs in addition to using 55% of its total energy consumption in 2022 from renewable sources. All these efforts have made a significant contribution to reducing CO₂ emissions as HP recorded an 18% drop in its emissions in 2022 compared to the levels of 2019.

3. DEVELOPMENT OF CONCEPTUAL FRAMEWORK

In order to develop a Framework for non-disruptive innovation, it is essential to focus on four important parameters: a) Organization Commitment, b) Stakeholder preparedness, c) Enabling Conditions, and d) Policy Support. All these parameters are very important in order to help organizations step towards sustainability and boost the green economy. First and foremost, the commitment on the part of the organization and top management is of paramount importance. As the necessary resources for the integration of sustainability will come from top management, organizations need to make a commitment to the cause. The steps to make subtle changes in the practice and processes of the organization to accommodate nondisruptive innovation will streamline if there is commitment and support on the part of the top management. The tricky task here is to convince the shareholders of the company and take them into confidence so that the organization's efforts can be aligned with sustainability goals. In addition to taking care of the internal environment of the company, the boost to the green economy can only be achieved when there is genuine preparedness across the stakeholders in the business ecosystem.

Figure 1. Conceptual Model



Source: Author's conceptualization

The second element of participation of stakeholder is essential as it will ensure that participants will take part in the efforts directed towards the launch of environmentally sustainable products to end consumers. This participation will also help firms to offer credible and quality-oriented sustainable products to the market. The specific condition of a particular industry, the third element of the framework, also plays an instrumental role in shaping sustainability efforts and boosting the prospects of the green economy. Especially in industries where environmental pollution is one of the pressing priorities, adopting the green economy should be grabbed as an opportunity rather than witnessing it as an upright cost. It is a fact that due to rising environmental concerns, people across the globe are now enthusiastically cheering for sustainability efforts which is definitely a positive step for establishing a green economy firmly in the minds of the consumers. The fourth important parameter is policy support which is arguably the most important parameter of consideration as far as the establishment of the green economy is concerned. In fact, green economists across the globe argue that policy support is the most important prerequisite for spurring the green economy and allocation of tax incentives and rewards for becoming a carbon-neutral organization can certainly make the entire concept of sustainability more appealing to the firms operating in different industrial verticals. It is only when the collaboration between all the stakeholders in the industrial ecosystems happens, that we will be able to see a desired boost in the green economy, thereby helping to ensure the sustainability of the environment in the coming years.

4. CONCLUSION

The conceptual framework developed by the research is a step in the direction of creating a holistic business ecosystem capable of furthering the economic prospects of the countries without degrading the environment and destroying our ecology. It is very important to understand that the future of our businesses as well as the society depends upon the sustainability of the environment and in the face of rampant exploitation of natural resources, it's going to present a very bleak picture. Hence the most pressing need of the hour is to come together and join forces to create a greener economy that will offer attractive opportunities for all the stakeholders in the value chain without compromising the integrity of the environment. The very concept of nondisruptive innovation is a way forward as it can help organisations integrate sustainability into their work culture without putting much pressure on the resources. The approach is also likely to be welcomed by the shareholders of the company who are usually concerned about the return on the investment rather than looking into the long-term prospects of achieving environmental prosperity. The role of policymakers is among the critical aspects of consideration for bringing green technology into the doorsteps of organisations offering different kinds of products and services to consumers. The rate of transition towards the green economy can certainly be enhanced by offering sops, tax incentives, or other benefits that will encourage more players to adopt environmentally sustainable practices in their business models. Society at large also has an important responsibility to encourage organizations that are seriously taking the cause of the environment by offering products which are friendly to the environment. This kind of encouragement will definitely spur the transition towards the green economy and inspire many more companies to come forward and take decisive steps in preserving our environment and sustaining ecology for years to come. In order to make a transition towards the green economy, it is also important to keep in mind that this transition will not become effective until there is a contribution of all stakeholders of the business ecosystem. Right from suppliers and logistics partners to manufacturers and retailers, every person needs to come together and strive for the creation of a green economy that will ultimately help in the conception of a greener future for our upcoming generations.

REFERENCES

- Gaskell, A. (2023), “Are the Best Innovations For Society Those That Are Non-Disruptive?”, <https://www.forbes.com/sites/adigaskell/2023/03/29/are-the-best-innovations-for-society-those-that-are-non-disruptive/?sh=4b34dd24bce5> (accessed 04.03.2023)
- Kaur, K., Sood, K. Grima, S. (2023), “Impact of climate-disruptive industries on the global insurance and risk management scenario”, *The Impact of Climate Change and Sustainability Standards on the Insurance Market*, 253–268

Kim, W.C. Renée M. (2023), “Nondisruptive Creation: An Alternative Path to Innovation and Growth?” <https://knowledge.insead.edu/strategy/nondisruptive-creation-alternative-path-innovation-and-growth> (accessed 06.03.2023)

Kivimaa, P., Laakso, S., Lonkila, A., Kaljonen, M. (2021), “Moving beyond disruptive innovation: A review of disruption in sustainability transitions”, *Environmental Innovation and Societal Transitions*, 38, 110-126.

Kotwal, S. (2023), “How Tata saved its 1.5 diesel without spending a fortune”, <https://www.autocarindia.com/auto-features/how-tata-saved-its-15-diesel-without-spending-a-fortune-428682> (accessed 04.07.2023)

Kuo, T. C. (2003), “Green Product Development in Quality Function Deployment by Using Fuzzy Logic Analysis”, 2003 IEEE International Symposium on Electronics and the Environment, USA, 88-93.

McIntyre, M. (2023), “LG Electronics Recognized for Environmental Sustainability Excellence by MindClick Sustainability Assessment Program”, <https://www.ravepubs.com/lg-electronics-recognized-for-environmental-sustainability-excellence-by-mindclick-sustainability-assessment-program/> (accessed 04.30.2023)

McQuater, K. (2023), “Unilever shifts sustainability focus and appoints growth and marketing chief”, <https://www.research-live.com/article/news/unilever-shifts-sustainability-focus-and-appoints-growth--marketing-chief/id/5118773> (accessed 10.30.2023)

Murray, Y. Steve, M. (2023), “Beyond Disruption’ challenges the conventional wisdom that businesses must disrupt to innovate”, <https://fortune.com/2023/05/01/beyond-disruption-challenges-conventional-wisdom-businesses-must-disrupt-to-innovate/> (accessed 06.04.2023)

Ndekwa, A.G., Kalugendo, E., Sood, K., Grima, S. (2023), "An Analysis of Agribusiness Digitalisation Transformation of the Sub-Saharan African Countries Small-Scale Farmers’ Production Distribution", *Research on World Agricultural Economy*, 4(3), 63–78

Balancing Inter-Generational Differences in Family Businesses: Challenges for HR Professionals

Mohammad Qais Rezvani¹, Nirmala Chaudhary², Utkarsh Mangal³, Ragif Huseynov⁴

Abstract

Introduction: Inter-generational differences among various generations of a family are quite common and may bring innovative solutions. Family members hold key leadership positions in the business. Sometimes due to individual differences in their experience and educational backgrounds, they may differ on certain key decisions and fail to arrive at a conclusion. When differences take the form of ugly conflicts, the interests of the business are bound to suffer. In such difficult situations, the interests of all the stakeholders need to be protected. The critical thinking of family members leads to evaluate any decision from multiple perspectives in a large number of family businesses.

Aim: To understand the issues and challenges of inter-generational family businesses and to analyses the role of HR Professionals in balancing the inter-generational differences in selected family businesses.

Method: This research paper is based on secondary data. The deep understanding of the literature will help to make strategies for balancing the inter-generational differences in family businesses.

Findings: Human resource professionals play the role of change agents. They cannot just be mute spectators and watch the different generations of the family destroying the business. It becomes their duty to maintain a balance not just between the generations but across the different perspectives that emerges from such scenarios.

Originality and value: In the book chapter, authors address challenges in the inter-generational differences in family business by offering solutions by HR professional along with the theoretical findings. Present study can contribute and give value for the future practice of researchers, and policy makers to the said subject-matter.

Key Words: Family Business, Balancing, Inter-Generational Differences

Jel Codes: L 21, O 15, E 24

¹ Research Scholar, University School of Management, Kurukshetra University, Kurukshetra, India

² Chairperson and Professor, University School of Management, Kurukshetra University, Kurukshetra, India

³ Assistant Professor, University School of Management, Kurukshetra University, Kurukshetra, India

⁴ Senior Lecturer, Department of Economics, Azerbaijan Technological University, Ganja, Azerbaijan

1. INTRODUCTION

Family businesses are among the most prosperous and enduring types of businesses. They have significantly aided industrialization whether in the east or west and are still a major force in the on-going development of numerous nations. A family-owned business is one in which the family holds the majority of the company's shares, often more than 20%. If the family is actively involved in managing the company, they typically devote a lot of time to doing so. Sadly, they don't spend as much time managing the family and how it interacts with the business. This frequently results in generational gaps especially during the transition phase when the power is handed over from one generation to another. The high failure rate of family-owned enterprises in terms of growth and continuity makes the generational change in family businesses a crucial turning point for their survival (Mura, 2020).

All families quarrel occasionally or frequently over trivial matters. The potential for disruptive family dispute is one of the most significant dangers in a family business. One of the primary reasons for conflict is the disagreement within the different generations of family over strategic decisions. Proeme (1991) argued the concept of intergenerational differences was first put forth by the German sociologist Karl Mannheim, who observed that groups from various eras would have varying ideas, attitudes, and behaviours because of their various birth years and varying conditions during which they were growing up. HRM is primarily concerned with how people are managed within organizations in Both the Family and Non-Family firms) focusing on policies and systems. Human resource managers in organizations are typically responsible for a number of activities, including employee recruitment, training and development, performance appraisal, rewarding and industrial relations (Rihan, 1998).

However, the research has found out that Overall, that family business practices within HRM are different than their non-family counterparts. Instead of experts with solid educational backgrounds and experience leading the HR function, the HR department may be made up of family members. Even though the family members have a lengthy history with the company, if they disregard HR functions, it could be disastrous for the company. Even when experts are employed, addressing intergenerational disagreements between two different business generations while defending corporate interests can be extremely difficult. This chapter focuses on some of the challenges faced by HR professionals with respect to the HR function. Few HR executives have received training in managing intergenerational disparities in leadership. However, by carefully balancing their IQ and EQ, they may equip both themselves and their team to meet these challenges. The following HRD interventions are used by HR professional to resolve inter-generational differences.

1.1. Generational Differences

Conflict among people of different generations is common at work. Baby Boomers, Gen Xers and Millennials working closely together sometimes have difficulty getting

along. Their conflicts can lower engagement and productivity. Tensions are often attributed to generational differences, but the latest research says this is not true.

Today, more people are choosing to work later in life, and as a result, employees with an age difference of 40 years or more may work closely together. We all notice some differences between younger and older co-workers immediately: the way they dress, the music they like, how they use technology, and how they communicate. People decades apart in age often find that they have different attitudes about the workplace and appropriate behavior sometimes because of the era during which they grew up, but also because of their different life stages and career stages. Often “generational difference” becomes a catch-all term for a variety of differences. For your organization to be successful, you need to address all these issues effectively while counteracting generational stereotypes that distract from the real sources of the conflict.

1.2. Consequence of Mismanagement Project

When starting a new project or expanding an existing one, the owner's willingness to take risks is crucial. Sometimes due to ambitious plans of the new leader the HR team may get ambiguous instructions from the leadership. More often than not one of them would ask to upgrade the technology while the other will order to continue with the old one. One would ask to start the manpower planning process and the other would order to halt all posts. This ambiguity in communication leads to unnecessary delay and disproportionate increase in the cost of the project. This communication ambiguity causes unneeded delays and disproportionate expense increases for the project. Due to this, project managers who want to use scientific project management techniques may be forced to abandon the project midway, which would raise the organization's attrition rate.

1.3. Talent Acquisition

Family businesses need to define clear talent management practices for members of the family. When the business is small the owner of the business excels by building personal relationships with a core group of employees but as the business grows the young and upcoming successors emphasize upon institutionalizing systems and processes. In certain families' enterprises, family members alone hold the highest positions. Professionals who believe that no matter how hard they work, they will never be able to advance beyond specific positions may find this to be demotivating. An organisation may have a list of employees who have served the organisation for longer periods and new joiners who have recently joined the organisation.

As the old guard may be obligated to the owner who founded the business and the new hires may not be aware of the problems initially encountered at the start of the business, integrating them into a unified work culture could be quite challenging. Managing talent during transition becomes a daunting task if the old guard has limited faith in the capabilities of the new leader (Bhalla and Bratton, 2015).

2. FAMILY CULTURE AND ORGANISATION CULTURE

Values serve as the connecting thread between an organisation, its family, and its employees in a family business. Family enterprises are meticulously preserved through the generations and highly affected by the founder's vision, style, and beliefs. Strong cultural ties can also be a disadvantage. Every family firm needs to assess if its culture is fit for purpose in today's constantly evolving business climate, where digital transformation and business model upheaval are unavoidable (Bekers et al., 2020). If and when the new leader demands a cultural change HR needs to examine previous practices with respect to Gender Equality and Uncertainty avoidance to decide the future direction. Knowledge management is very essential for family business organisations. Senior departing employees' expertise will be lost over time in organizations where HR is unable to develop a mechanism for knowledge storage and retrieval when necessary. It is important to realize that family organizations are founded on a set of values, and that when implementing new practices, organizations shouldn't give up those that have so far produced the desired results.

Inter-generational differences which are also known as cross generational biases may affect the tacit knowledge (also known as Experiential knowledge) transfer. HR needs to constantly work towards building cross generational networks for extensive personal contact, regular interaction and trust building. Cross-generational networks encourage diversity of thinking, which promotes innovation and enhanced creativity (Marcus, 2021).

3. TRAINING AND DEVELOPMENT

Human resource managers can play an active role in helping Families to find ways to pass on their rich knowledge and heritage to the next generation while motivating them to learn about business matters. This is not a one-way-exercise. It requires commitment from both the older and younger generations. While the members of every generation deserve to be introduced to the family business's history as well as its heritage and values, not all will naturally be inclined to study business matters. It takes serious effort on behalf of HR professionals to design practical, interactive and real-world learning opportunities that will stimulate the interest of young people. It takes an open mind, curiosity and commitment for them to get involve (Schwass and Glemser, 2016).

In a family-owned firm, it is just as important to train employees on pertinent family culture aspects as it is on any other training topic that will impact how well they perform at work. By interacting with their family and being "mentored" by parents and older siblings, family members learn these unwritten laws of communication. However, these unwritten golden rules are not known to professionals who come from outside. Small pieces of advice by HR department such staying away from heated discussions between Family members can make or mar the careers in a family managed organisation.

4. DEFINING GENERATIONS AT WORK

When studying generational differences in the workplace, it is important to remember that the generational traits are only a part of what affects individuals' preferences and attitudes to work and work-related processes. Previous, research shows that there are four generations present in today's workplace. The oldest generation in the workplace (Baby Boomers, born approximately 1945–1964) has been characterized as having a good work ethic, preferring to work in teams, communicating face-to-face, and wishing to be involved in decision-making (Haynes, 2011). The oldest generation also respects authority and hierarchy, is loyal, and works for promotion (Gursoy and Chi, 2008).

Gursoy and Chi (2008) and Haynes (2011) state that the Generation X (born approximately 1965–1984) has a strong sense of equality, prefers to be self-reliant, likes instant feedback, expects recognition, and likes to challenge facts and rules. The younger generation, Generation Y (born approximately 1985–2004), values the balance between work and family life, has a more participative approach to work than older generations, and is quite goal-oriented. They are also more technology-oriented and are seen to be skilled at multitasking (Haynes, 2011). Levenson and Deal (2016) discuss this briefing provides practical recommendations to help you separate fact from fiction and enhance the engagement and productivity of everyone in your workplace. How age and generations might influence employee's knowledge sharing practices in organizations?

The following interchangeable relation of generations at work, generational differences in relation to knowledge sharing practices, knowledge sharing attitudes, and the use of knowledge sharing technologies were found while reading the review of literature.

4.1. Generation at work

As different generations live and work together, the dynamics of generational diversity in the workplace are becoming more and more visible. Every generational group, including Baby Boomers, Millennials, Generation Z, and Generation X, brings distinct viewpoints, work styles, and values to the workplace. A rich tapestry of ideas, creativity, and invention can be fostered by this diversity. However, because various generations may have varied preferences for communication channels, feedback, and problem-solving techniques, it also presents issues with regard to management, collaboration, and communication.

Recognizing and utilizing the strengths of every generation and establishing an inclusive atmosphere that embraces diversity are key components of effective management methods. One possible approach to address this issue could be to introduce flexible work schedules, offer individualized professional development opportunities, and promote mentorship programs that bridge generations. In an ever-changing professional landscape, companies may foster a collaborative, understanding, and goal-oriented work environment by valuing the distinct contributions of every generation. This will ultimately lead to success.

4.2. Knowledge Sharing and Generation

Knowledge sharing is defined as the exchange of task-related information, advice and expertise to help others and to collaborate with others to carry out daily tasks, solve problems and develop new ideas (Ahmad, 2018). Besides, Cabrera et al. (2006) finding that “knowledge sharing is a complex behaviour that is affected by a variety of psychological and organizational factors, and it is only by appropriately managing those factors that knowledge will actually flow through the organization”. Widén-Wulff (2014) find that the organizational culture plays an important role in shaping knowledge sharing practices in the workplace affecting people’s attitudes to information and knowledge and how information is valued as a resource.

4.3. Knowledge Sharing Attitudes

There are clearly some generational traits and preferences affecting attitudes to work and work values, such as personality differences between generations, different views on work–family life balance and career patterns, as well as teamwork and leadership preferences (Gursoy et al., 2008). Gursoy et al. (2008) and Haynes (2011) identified that the Boomer generation respects authority and hierarchy more than the younger generations and the younger generations value the balance between work and family life more than the older generations. Motivation and attitudes to work are of course affected by much more than generational traits alone. Employees from both generations have a very positive knowledge-sharing attitude, and they actively contribute in the development of a knowledge-sharing culture.

4.4. Generational Differences and Knowledge Sharing Technology

The biggest generational differences would be expected in connection to Information and communication technology (ICT) since we know that younger generations have a different approach to technology than have the older generation (Connaway et al., 2008), and (Lippincott, 2010). However, these generational differences are not that clear in the workplace context and relatively little research is done in this area (Rizzuto, 2011). Studies on generational difference and Information Technology (IT), clearly shows that there are clear differences between generations’ ICT use in organisations. Haeger and Lingham (2014) says that the biggest differences are naturally between the oldest and the youngest generations, where the youngest generation is focusing on greater fusion of work and everyday life management.

Virtual space is important for them, whereas face-to-face communication is less important. On the other hand, the older generation also adapts to the behaviour of the so-called Google generation (Haeger and Lingham, 2014) and it means that we all learn the organization’s work and information practices Costanza et al. (2012) report regardless of generation. Studies have also shown that there is an advantaged with mixed age groups when implementing technology innovation. In a study by (Rizzuto, 2011). It was shown that older workers reacted more positively to implementation of IT initiatives

than their younger colleagues, contradicting conventional beliefs. However, younger employees were more positive towards IT initiatives in groups where there were older co-workers, showing the strength of group identity. Younger workers may also find satisfaction in demonstrating their IT expertise.

Studies focusing on generational differences in relation to the use of knowledge sharing technology are still scarce. Data show that both generations have similar behaviours regarding the use of technology for knowledge sharing. Even though variations in different generations' adoption and use of technology have been emphasized in the literature Blackburn (2011) and Deal et al. (2010), results indicate that, in the workplace context, dynamics and demands for efficient knowledge sharing rather than age dictate how and when employees use technology for knowledge sharing (Widen et al., 2020, December).

5. HOW TO MANAGE GENERATIONAL DIFFERENCES AT THE WORKPLACE

According to an article that was published by Lipman in the Forbes Magazine state that one of the most common management challenges involves how to effectively manage all kinds of different people, not just people who look and think as we do (Lippincott, 2010). Anything that encourages managers to think analytically and creatively about how to better understand their employees is constructive reading, concerned as differences in workplace.

5.1. Communication Style

Baby boomers were perceived as more "reserved," while generations y and z (often just called millennials) tend to favor more "collaborative" and "in-person" means of interacting. This is consistent with other studies showing that millennials, overall, relate far better to a coaching style of management than to a more traditional top-down authoritative approach.

5.2. Adapting to change

Generations x and y often view change "as a vehicle for new opportunities," according to the study, while gen z simply "is accustomed to change and expects it in the workplace." Though the study didn't comment on it, I'd expect boomers to be the most jaded and cynical about change, since many of them saw in the course of their own careers a transition from a relatively stable work environment to one where cost-cutting and frequent reorganizations became the norm rather than the exception.

5.3. Technical skills.

No surprise here. The research examined employee-development-related methods, and found, as one would expect, that boomers and gen x liked to learn via "traditional

instructor-led courses or self-learning tools," while millennials preferred "collaborative and technology-centric" vehicles. Exactly what would be expected given the current omnipresent relationship with technology and the value placed on personal coaching.

"For years employers complained about how the work styles of millennials were disrupting the workplace," the research noted. "We now know, however, they simply have different outlooks, and the resulting changes from employers, such as new communication methods and enhanced work-life balance offerings, have benefited companies and employees alike."

5.4. Mix and match project teams.

Use team make-up as an opportunity for team building. Think in terms of "complementary skills and diverse perspectives. This can prompt innovation and new problem-solving techniques." Let newer professionals take the lead. A good tactic. It can be a way of integrating newer/younger employees into the operation, and enabling them to share their own skill sets and background. "Invite team members from all generations to share their unique areas of expertise."

5.5. Go off-site.

Anything that shakes up usual patterns of behaviour and takes people away from their daily routines can be productive. It gives employees a chance to get to know each other better in a less formal setting.

5.6. Customize your style.

In successful management, one size doesn't fit all. "Staff possess common attributes, but they also have individual needs," the study noted. "Tailor your management for each person's strengths, personality and aspirations." Ultimately, it's this last point on customizing style that I feel is most important. While it's always helpful to gain awareness of broader workplace trends, such as insights from this generational research, at the end of the day all management is individual, and effective managers intuitively understand this. The micro-level employee-manager relationship is a difference maker. What matters most, regardless of generation or gender or ethnicity, is how well you understand your employees as individuals... what motivates them and what doesn't... what personal hopes and fears and dreams drive their attitudes and engagement.

6. STRATEGIES FOR SUCCESSION PLANNING IN INTER-GENERATIONAL DIFFERENCES

According to Levenson and Deal (2016) there are several proven strategies that will help your organization effectively address conflicts among generations that have been explained in the below:

6.1. Think more about life stage and individual career desires than about generations.

Take life and career stage into account when putting in place policies that address workplace flexibility and benefits plans in particular. What works for an employee at one life stage won't be as effective for another worker at a different stage. Offer flexibility tailored to employees' needs, and you'll be more likely to keep the best and the brightest.

6.2. Recognize that a worker's role in the organization is a better predictor of developmental needs than generation.

Employees with similar roles—whether they are hourly workers, technical staff or senior executives—have similar developmental needs, regardless of their generation. Organizations should focus an employee's development strategy more on his or her role in the organization and downplay the issue of generation.

6.3. Take advantage of early adopters of technology.

Younger people are more likely to embrace new technology, often adopting the latest trends that eliminate repetitive or boring tasks. They can help your organization figure out how to make good use of technology and help older workers learn new systems when they are in place.

6.4. Leverage experience.

Employees learn a lot over the course of their careers, including knowledge that comes only from experience and cannot be taught in school. Never forget that older workers have knowledge that can be used to help the organization as a whole and to help employees with less experience develop more quickly and efficiently.

6.5. Understand the role of power and control in creating conflict.

Employees who are a level higher than others in the same generation may criticize the "immaturity" of young employees, without recognizing that all that separates them from the younger workers is one promotion. Remember that the desire for and use of power is the central issue in most conflicts, not generation.

7. DISCUSSION

The following are the summary of research discussion to resolve inter-generational differences.

Within a family office, inter-generational differences in preferences can create tensions and challenges. As family offices adapt to the evolving investment landscape, they must confront inter-generational differences in preferences. The next generation, driven by a desire to explore innovative opportunities, may show interest in emerging sectors. Bridging the gap between generations is crucial for maintaining a harmonious family environment and capitalizing on trends. Inter-generational differences

preferences can arise due to varying risk appetites, values, and exposure to new technologies. The next generation often gravitates towards startups, fintech, artificial intelligence, machine learning, blockchain, and cryptocurrency, recognizing their potential for high growth and disruptive impact. In contrast, elders may lean towards more traditional investment vehicles.

Many conflicts within organizations are a result of differences in life stage, career stage and job level—not generational differences. Even if your employees want to frame issues in terms of generational differences, your efforts will be more productive if you focus on what drives motivation and behaviour across generations (Levenson and Deal, 2016). In another study Moreno-Gené and Gallizo (2021) reported that around 70% of the majority of family businesses last for only one generation. It is estimated that 80% of companies worldwide are family-owned, hence why the low survival rate has alarming consequences on the sustainability of the productive sector.

By providing unbiased advice through the role of third-party specialist such as HR Professional whom acting as catalysts for collaboration, these specialists bridge the divide between generations and help align investment strategies with the family's overarching goals. A key component in bridging the gap between generations within a family office is the involvement of a third-party family relationship communications specialist. These professionals play a crucial role in facilitating effective communication and fostering collaboration and consensus among family members. Through their expertise and guidance, they create an environment that encourages open dialogue, understanding, and respect. The specialist acts as a facilitator, providing a platform for constructive dialogue between the older and younger generations.

By facilitating dialogue, fostering collaboration, and leveraging the expertise of both generations, these specialists help create investment strategies that align with the goals and aspirations of the family. Their guidance and expertise contribute to the overall success and harmony of the family office, creating a solid foundation for long-term prosperity. Embracing the interplay between generations and capitalizing on their diverse perspectives pave the way for sustainable growth, successful investment outcomes, and the continued prosperity of the family office.

8. CONCLUSION AND POLICY IMPLICATION

It was concluded from the literature review got to know that there are not differences in terms of profitability between first-generation family businesses and later-generation family businesses, we can conclude that both groups of companies present their own management characteristics which have an impact on profitability. Knowing the strengths and weaknesses that have been revealed by this study.

This study, therefore, has practical implications, as it indicates some of the options that family businesses have in order to improve their profitability, while distinguishing the specific aspects in which first-generation managed companies and later-generation managed companies can act.

For future research, it would be better if it is run by the primary data and prepare a questionnaire to survey different inter-generational differences in family businesses to find different results contexts.

9. ACKNOWLEDGEMENTS

This chapter is dedicated to all HR Professionals and those who are running family businesses. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

10. CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Ahmad, F. (2018). Knowledge sharing in a non-native language context: Challenges and strategies. *Journal of Information Science*, 44(2), 248-264.
- Bekers, R., Boni, M., Fenton, S., Gil-Casares, J., & Vad, M. (2020). Culture in family business—Embracing change while retaining what matters.\
- Bhalla, V., & Bratton, J. (2015). *Managing Talent in a Family Business*. Boston Consulting Group. Available online: <https://www.bcg.com/publications/2015/leadership-talent-human-resources-managing-talent-familybusiness.aspx> (accessed on 10 September 2019).
- Blackburn, H. (2011). Millennials and the adoption of new technologies in libraries through the diffusion of innovations process. *Library hi tech*, 29(4), 663-677.
- Cabrera, A., Collins, W. C., & Salgado, J. F. (2006). Determinants of individual engagement in knowledge sharing. *The International Journal of Human Resource Management*, 17(2), 245-264.
- Connaway, L. S., Radford, M. L., Dickey, T. J., De Angelis Williams, J., & Confer, P. (2008). Sense-making and synchronicity: Information-seeking behaviors of Millennials and Baby Boomers.
- Costanza, D. P., Badger, J. M., Fraser, R. L., Severt, J. B., & Gade, P. A. (2012). Generational differences in work-related attitudes: A meta-analysis. *Journal of business and psychology*, 27, 375-394.
- Deal, J. J., Altman, D. G., & Rogelberg, S. G. (2010). Millennials at work: What we know and what we need to do (if anything). *Journal of business and psychology*, 25, 191-199.

- Gursoy, D., Maier, T. A., & Chi, C. G. (2008). Generational differences: An examination of work values and generational gaps in the hospitality workforce. *International journal of hospitality management*, 27(3), 448-458.
- Haeger, D. L., & Lingham, T. (2014). A trend toward Work–Life Fusion: A multi-generational shift in technology use at work. *Technological Forecasting and Social Change*, 89, 316-325.
- Haynes, B. P. (2011). The impact of generational differences on the workplace. *Journal of Corporate Real Estate*, 13(2), 98-108.
- Levenson, A., & Deal, J. J. (2016). *Generational Conflict at Work: Separating Fact from Fiction*. SHRM. Date Accessed April, 9, 11-15.
- Lippincott, J. K. (2010). Information commons: Meeting millennials' needs. *Journal of Library Administration*, 50(1), 27-37.
- Marcus, B. (2021). *Cross-Generational Networking is a Win-Win for Employees and Their Organization. So Why Don't We Do It?*. Published January, 11.
- Moreno-Gené, J., & Gallizo, J. L. (2021). Intergenerational differences in family business management and their influence on business profitability. *Sustainability*, 13(12), 6979.
- Mura, L. (2020). Succession and generational change in family business. *Proceedings of the RELIK2020 Reproduction of Human Capital—Mutual Links and Connections*, Prague, Czechia, 5-6.
- Proeme, H. (1991). On the compound future tense in Polish. *Studies in Slavic and General Linguistics*, 16, 181-271.
- Rihan, I. (1998). What is human resources management. Erişim Adresi: https://www.academia.edu/7775792/What_is_Human_Resources_Management_.
- Rizzuto, T. E. (2011). Age and technology innovation in the workplace: Does work context matter?. *Computers in Human Behavior*, 27(5), 1612-1620.
- Schwass, J., & Glemser, A. C. (2016). *Wise family business: Family identity steering brand success*. Springer.
- Widen, G., Ahmad, F., Siven, T., & Ivantsova, E. (2020, December). Understanding generational differences in knowledge sharing. In *Proceedings of the European Conference on Knowledge Management* (pp. 841-849). ACIL.
- Widén-Wulff, G. (2014). *The challenges of knowledge sharing in practice: a social approach*. Elsevier.

Williams, P. E. T. E. R., Fieldhouse, M., & Rowlands, I. (2008). The ‘Google generation’: myths and realities about young people’s digital information behaviour. *Digital Consumers: reshaping the information professions*, 159-192.

Earthquake Culture and Components of Earthquake Fighting in Türkiye in the Context of 2023 Kahramanmaraş Earthquakes

Mehmet Yazıcı¹

Abstract

Introduction: Earthquake culture refers to a society's learning to live with earthquakes as a result of the experiences gained from earthquakes. Societies with developed earthquake culture overcome earthquakes with the least damage, both before and after the earthquake, with planned and organised goals and efforts. On the other hand, in societies with less developed earthquake culture, the loss of life and property caused by earthquakes is high. Because in such societies, the necessary precautions are not taken before the earthquake occurs, and after the earthquake, coordination between the components of the fight against the earthquake cannot be achieved. Thus, the "chaos and turmoil" experienced causes losses to increase.

Aim: In this paper, the answer to the question "How does the underdevelopment of earthquake culture in Türkiye affect the fight against earthquakes?" was sought.

Method: For this purpose, the news, criticism, reports, and analyses in publicly accessible sources regarding the components involved in the fight against earthquakes, specifically (a) official institutions, (b) non-governmental organizations, (c) volunteers, (d) philanthropists, and (e) earthquake victims, after the occurrence of the Kahramanmaraş Earthquakes on February 6, 2023, were discussed.

Findings: It was revealed through the evaluations that after the 2023 Kahramanmaraş Earthquakes, a coordination problem among the earthquake response components led to "emotional reactions," resulting in chaos and turmoil that exacerbated the earthquake's damages.

Originality and value: Some basic characteristics of societies with developed and underdeveloped earthquake cultures are given in a table and the components (stakeholders) struggling to mitigate the damages of earthquakes in recent devastating earthquakes in Türkiye are evaluated together.

Keywords: Earthquake culture, 2023 Kahramanmaraş Earthquakes, chaos and turmoil, components of combating earthquakes.

Jel Codes: Q 54, Q 59

1. INTRODUCTION

Earthquakes are natural phenomena that occur when the energy, generated as a result of the Earth's crust fracture under the influence of tectonic forces or volcanic activities, spreads in the form of seismic waves, strongly shaking the environment and the Earth (<https://www.afad.gov.tr>). While earthquakes are absent in certain regions of the world, they occur frequently in active geological regions such as Japan and Kenya (Yıldırım, 2019: 79).

As a type of disaster, earthquakes have the potential to cause disasters (www.resmigazete.gov.tr) that cause physical, economic and social losses for all or certain segments of the society in the regions where they occur, stopping or interrupting normal life and human activities. Until today, societies have remained helpless in the face of this potential of earthquake causing multidimensional losses. However, today, developed countries like Japan have largely succeeded in implementing measures to

¹ Assoc. Dr., Bingöl University, Faculty of Arts and Sciences, Department of Social Work, , Bingöl/Türkiye

mitigate earthquake-related losses. These countries have achieved this success by developing a well-established earthquake culture.

Earthquakes, by shaking the existing order in society, gain sociological importance, leading sociologists to define the experience of living with earthquakes as a culture. In general sociological usage, since culture means the "social heritage" of a community, earthquake culture refers to the "learning to live with earthquakes" as a result of the "experiences" gained by a community at risk in the earthquake zone (Yıldırım, 2019: 184; Kasapoğlu & Ecevit, 2001: 7-9). Nevertheless, the ability to develop this earthquake culture is not uniform across societies that frequently encounter earthquakes. The emergence of this difference is related to the level of economic, social, political and scientific development of societies as well as the cultural mindset of the community. Consequently, an earthquake with a magnitude of 7.4 causes disasters of such enormous proportions in a society with underdeveloped earthquake culture that would not be seen in developed countries (Bozkurt, 1999: 37, 101). Therefore, to assess a society's preparedness for earthquakes and its ability to adapt to them, it is crucial to understand the fundamental distinctions between societies with advanced earthquake cultures and those with less developed ones. These differences are given in the table below:

Table: Differences Between Earthquake Culture Developed Societies and Earthquake Culture Less Developed Societies

	In societies with developed earthquake culture	Earthquake culture in underdeveloped societies
•The way society is structured	A network of equal and "horizontal" relations is essential.	"Vertical" and hierarchical political organisation is dominant.
•The state of political and civil society	Civil society and non-governmental organisations (NGOs) developed.	Powerful and decisive political society
•Prevailing values	Modern values	Traditional values
•Form of change	Modernised	Incomplete modernisation
•Individual and social responsibility	Developed.	Not developed.
•Perception of the state	Not sacred.	Sacred.
•Official organisations	<ul style="list-style-type: none"> • There is official and social control. • Transparent. 	<ul style="list-style-type: none"> •Official and social control is weak. •It is cumbersome and inefficient. •There are problems of planning, coordination and organisation.

•Earthquake related works and procedures	Complies with scientific standards.	Settlements and settlements and constructions that are not in compliance with scientific standards are condoned.
• In the fight against earthquake and its consequences	<ul style="list-style-type: none"> • There are planned and organised/coordinated goals and efforts. • Common sense has developed. 	<ul style="list-style-type: none"> • Insufficient planning and co-ordination • There are well-intentioned but not sustained endeavours based on faith and emotion. • Common sense has not developed.

When the table above is analysed, it is seen that the main differences between developed and underdeveloped societies in earthquake culture are not related to only one aspect of the society. On the contrary, it is understood that these differences are related to all aspects of society, including the way society is structured, the state of political and civil society, dominant values, the way of change, individual and social responsibility, the perception of the state, official institutions, earthquake-related works and procedures, and the understanding of combating earthquakes and their consequences.

When the characteristics of societies with developed earthquake culture are analysed, it will be seen that these societies deal with earthquakes with a holistic approach, and as a requirement of this approach, they plan the risks, works and activities to be carried out before, during and after the earthquake according to scientific standards; and when the earthquake occurs, they implement these plans with the common will and coordinated efforts of the components of the fight against earthquakes, without allowing chaos and disorder to occur in the earthquake area. Therefore, societies with developed earthquake culture survive earthquakes with the least damage.

On the other hand, in societies with underdeveloped earthquake culture, earthquakes are on the agenda of the rulers and the ruled after they occur. Since earthquakes and their consequences are generally evaluated in the context of beliefs in these societies, earthquake-related measures are ignored and settlements and constructions are condoned with works and procedures that are not in compliance with scientific standards on earthquake. When an earthquake occurs in such societies, since the common will is not developed, coordination cannot be ensured among the components of the fight against earthquakes, and chaos and chaos occur in the earthquake area. Since well-intentioned but not continuous efforts arising from faith and sentimentality are not sufficient, every earthquake causes a disaster in such societies.

In the following part of the study, earthquakes and earthquake culture in Türkiye will be discussed first. Then, the components of the fight against earthquakes will be identified and the activities of each of them after the 2023 Kahramanmaraş Earthquake will be evaluated. As a result, it will be determined how the underdeveloped earthquake culture in Türkiye affects the earthquake response.

2. Earthquakes and Earthquake Culture in Türkiye

Türkiye, located in the Alpine-Himalayan earthquake belt, is in a geography that can be characterised as "high risk" in terms of earthquakes. On an average scale, Türkiye contends with a seismic event every five years, resulting in extensive human and infrastructural losses. Although Türkiye's territory is only 0.5 per cent of the

world's landmass, Türkiye ranks fourth with 77 earthquakes in terms of major earthquakes that have occurred since 1900 (www.afad.gov.tr). Between 1900 and 1999, 131 damaging earthquakes occurred in Türkiye and these earthquakes caused 398,331 buildings to be destroyed or heavily damaged and 65,662 people to die (Özmen and Nurlu, 1999:1). The most destructive earthquakes that have occurred in Türkiye are the Kahramanmaraş Earthquakes that they occurred nine hours apart on February, 6, 2023, with the epicentres in Kahramanmaraş Pazarcık and Elbistan. These two devastating earthquakes of magnitude 7.5 and 7.8 caused 50,783 casualties and 41,791 buildings collapsed in Kahramanmaraş, Hatay, Adıyaman, Malatya, Diyarbakır, Adana, Osmaniye, Gaziantep, Kilis and Şanlıurfa. These two earthquakes caused 1.6 trillion material damages in the eleven provinces affected (www.csb.gov.tr; www.trthaber.com; www.hmb.gov.tr). As a result, these two devastating earthquakes left behind thousands of wounded, disabled and unidentified burial places in addition to the great loss of life and a pile of material debris.

Based on this information about the earthquakes that have occurred in Türkiye and the determinations about earthquake culture presented above, it comes to mind that Türkiye has gained "experiences" from the earthquakes that have occurred, and as a result of these experiences, Türkiye has "learnt to live with earthquakes", and therefore has a developed earthquake culture. However, in a previous study (Yazıcı, 2023), the findings related to the 1999 Marmara Earthquake and the 2023 Kahramanmaraş Earthquake were evaluated and it was concluded that the earthquake culture in Türkiye had not developed to a level that would make it possible to live with earthquakes in the 24 years between one earthquake and the next. In this study, the answer to the question "How does the underdevelopment of earthquake culture in Türkiye affect the fight against earthquakes?" is sought. For this purpose, after the 2023 Kahramanmaraş Earthquakes, news, criticism, some NGO reports and analyses in the press about (a) official organisations, (b) non-governmental organisations, (c) volunteers, (d) philanthropists and (e) earthquake victims, which are the components of the fight against earthquakes, will be discussed.

3. Components of Combating Earthquake

In this section, the above-named components (stakeholders) that are struggling to mitigate the damages of the 2023 Kahramanmaraş Earthquakes are assessed.

3.1. Official organisations

In Türkiye, AFAD stands as the sole authoritative public entity responsible for all disaster-related operations. In the law on the establishment of AFAD, it is defined as an official organisation under the Ministry of Interior and its duties are listed as follows:

- To take the necessary measures to effectively carry out services related to disasters and emergencies, including earthquakes, and civil defence at the national level, to make preparations before the events occur and to reduce the damage,
- Intervention and coordination during a crisis event and
- To ensure coordination between the institutions and organisations carrying out the improvement works to be carried out after the incident,
- To produce and implement policies on these issues (<https://www.resmigazete.gov.tr>).

The Red Crescent, another organisation, is defined on its website (www.kizilay.org.tr) as a voluntary social service organisation with legal personality,

subject to the provisions of private law, non-profit-making, providing aid and services gratuitously and working for public benefit. During times of disaster, the primary responsibilities of this organization include search and rescue, providing shelter, supplying blood and meeting the need for nutrition.

In the 2023 Kahramanmaraş Earthquakes, criticism was made that both of these organizations fell short of fulfilling their duties and responsibilities as mentioned above. AFAD and Red Crescent, which are the components of the fight against earthquakes, were found lacking in the first three days of the earthquakes (the initial 72 hours):

- In making quick and effective decisions,
- In ensuring coordination,
- In providing trained personnel and necessary technological equipment,
- Shortages of equipment such as construction machinery, cranes, generators, etc. were experienced in locations where teams were present,
- Some AFAD officials hindered the involvement of civil society in the relief efforts,
- Criticism was raised about the Red Crescent selling tents to aid organizations, including AHBAP,
- It was alleged that the Red Crescent did not fulfill its duties properly except for blood supply.

It is argued that these deficiencies listed above, which are subject to criticism, caused chaos in the earthquake zone, and that people trapped under the rubble were reached too late, which led to an incredible increase in deaths. In addition, it was claimed that some of the people trapped under the rubble died of hypothermia due to the lack of emergency intervention as the weather was very cold in many cities in the earthquake zone (<https://ankara.imo.org.tr>; Öztürk, 2023; <https://ihd.org.tr>; <https://istanbul.mazlumder.org>).

The failure of AFAD and the Red Crescent to provide sufficient number of vehicles and personnel with the necessary equipment in the first three days, as well as the failure to plan, organise and coordinate the activities in the earthquake zone was also mentioned by AFAD President Sezer and President Erdoğan. Sezer explained this failure on the grounds that the teams that were supposed to respond to the earthquake were also earthquake victims and the weather conditions were not favourable (www.demokrathaber.org). President Erdoğan, on the other hand, expressed this situation as follows: "Unfortunately, in the first few days, we could not work in Adıyaman as effectively as we would have liked. For this, I ask for your forgiveness" (www.ntv.com.tr).

These findings clearly reveal that AFAD and Red Crescent failed to carry out effective activities at the expected level, especially in the first days of the 2023 Kahramanmaraş Earthquakes. The failure of these organisations, which are directly related and authorised for earthquakes, and the losses caused by this failure can only be explained by the underdeveloped earthquake culture.

3.2. Volunteers

Volunteers, first and foremost, fulfil a social task of social value and importance without remuneration, as they are people with a high sense of responsibility (Seyyar and Genç, 2010: 276). Voluntary participation in civil society in Türkiye started with the 1999 Marmara earthquake and increased in the 2000s on the basis of increased

activities (TÜSEV, 2006: 48). The largest increase in the number of volunteers and volunteer work was observed during the 2023 Kahramanmaraş earthquakes. In official statements, it was stated that domestic and foreign volunteers were among the almost half a million people involved in the earthquake response after these two earthquakes (www.bbc.com).

In the 2023 Kahramanmaraş Earthquakes, civilian volunteers took responsibility for organising and directing the aid in the first days. Some AFAD warehouses were sorted by civilian volunteers in the first days. However, it was also witnessed that the volunteers who came to the region as AFAD volunteers in the first days of the earthquake could not participate in search and rescue or relief operations due to lack of coordination and planning and were sent back to the cities they came from. In addition, although there were many national or international civilian volunteer activities, these could not be coordinated sufficiently. Some foreign search and rescue volunteers were not provided with interpreters. Even volunteers and even earthquake victims who were not involved in any theft or looting, on the contrary, volunteers who came to help and even earthquake victims were beaten by angry people affected by this discourse (<https://istanbul.mazlumder.org>).

Despite various setbacks and some obstacles, it was stated in the evaluation meetings that the volunteers "acted with initiative, rushed to the region when the state was not there" and "helped to run to the region" in the 1999 Marmara Earthquake as well as in the 2023 Kahramanmaraş Earthquake (Edi. Kızılyaprak, 2000: 289).

The examples and determinations given above show that the labour and effort that volunteers are ready to put forth gratuitously are not sufficiently benefited from since the earthquake culture is underdeveloped in the 2023 Kahramanmaraş Earthquakes.

3.3. Civil Society Organisations

Civility and civil society have ancient origins and examples (Ritzer, 2010: 179). It is the social sphere consisting of organisations, clubs, businesses, voluntary organisations and networks established by citizens independent of the state (Giddens and Sutton, 2014: 373). Five common characteristics of civil society come to the fore. These characteristics are: social differentiation, social organisation, voluntary association, autonomy at the social level and pressure mechanism (Çaha, 1997: 31).

When NGOs are mentioned in Türkiye, foundations, artisan and craft organisations, guilds and local aid organisations come to mind first. It seems possible to explain the development of civil society in Türkiye in the 1980s and afterwards with neoliberal policies, the 1980 Military Coup and its effects, the development of cooperation between civil society organisations through the symposiums of the History Foundation, the 1999 Marmara earthquake, and the European Union accession and harmonisation process. As a result of these historical processes, it is seen that the most prominent civil society organisations in Türkiye today are associations and foundations (Namdar, et al., 2021: 22-31).

According to Duruel (2023: 7), NGOs contribute in making the society more resilient against disasters and realising effective interventions. Thus, NGOs are recognised as important stakeholders in disaster management processes and play an important role in protecting the welfare of the society. In the 2023 Kahramanmaraş Earthquakes, it was determined that AFAD was inadequate in providing coordination among the components of the earthquake, and therefore NGOs started to act on their own without waiting for AFAD, and thus chaos increased (Öztürk, 2023).

Akgüngör (2010: 7-14) evaluated the increase in the number of volunteers and the activities of NGOs as a reaction to the failure of official organisations. According to him:

"Another reason that makes the earthquakes of 1999 different is that citizens, both organised and unorganised, independently of public institutions, took action to bring aid to the earthquake-affected regions. In addition to the usual aid collection campaigns, thousands of people travelled to the earthquake zone themselves and participated in the work there. It should be noted that this participation sometimes compensated the absence or deficiency of public institutions to a significant extent. In addition, it must be acknowledged that such a large (spontaneous) "mobilisation" movement, the first of its kind in the history of the republic, was not only an act of relief, but also a protest against the political and administrative authorities who failed in their post-disaster management, rescue and relief organisation."

"In this context, we see that volunteers who work in the disaster area under a legal framework such as a foundation or "independently" are primarily presented in the press as "actors filling the gap arising from the inadequacy of the state".

When devastating earthquakes that cause loss of life and property occur in Türkiye, volunteers and non-governmental organisations come to the forefront in the activities carried out to reduce the damages of earthquakes. However, in this process, it is observed that civil society organisations do not act in coordination and cooperation both among themselves and with other components fighting against earthquakes. This situation shows that the people with political and administrative responsibility have failed to organise the components fighting against earthquakes, and it also shows that the earthquake culture is underdeveloped and the components fighting against earthquakes are negatively affected by this.

3.4. Philanthropists

The most significant innovation encountered after the 2023 Kahramanmaraş Earthquakes was the unprecedented active use of social media in a disaster situation. The appeals and cries for help from earthquake victims on social media attracted the attention of people from all segments of society, fostering a sense of compassion and a willingness to aid the earthquake victims. As a result of this innovation, a nationwide mobilization for assistance was initiated, and philanthropists became a crucial component of the earthquake response. Philanthropists, to the best of their abilities, participated in the relief efforts for earthquake victims through both official and non-governmental organizations, with some going beyond their means. AFAD acknowledged the contributions of philanthropists with the following statement: 'Our generous citizens have been actively conveying their requests to the AFAD Presidency to support response and recovery efforts. Our nation has expressed a multitude of requests for assistance to AFAD and desires to support the disaster victims' (www.afad.gov.tr)."

Among those who participated in the mobilization to help earthquake victims were Sarıgül Kaçan, a 70-year-old woman from Kars, who sold her cow for 13,000 TL and sent the money to earthquake victims (www.cumhuriyet.com). There was also a child from Sakarya who couldn't rest without sending his favorite toy and wrote a note, saying, 'I can't be at ease without sending my favorite to you. Let me introduce you to

my teddy bear named Hayal, but let it be your hope. You can sleep comfortably with it at night. We will heal your wounds together, I assure you' (www.trthaber.com). On the other hand, there were also those who sent dirty and worn-out clothes, evening gowns, dirty bathrobes, dirty socks, high-heeled shoes, fake eyelashes, old and tattered garments, lace underwear, summer clothes, and thin shoes to the earthquake-stricken region (www.sabah.com.tr). These examples show that philanthropists are one of the important components of earthquake response, but the underdeveloped earthquake culture has a negative impact on their efforts to combat earthquakes.

3.5. Earthquake victims

In earthquakes that have occurred in Türkiye, it has been determined that earthquake victims are an important component of earthquake response in reducing the damage caused by earthquakes. For example, a representative of a non-governmental organization (NGO) expressed the contributions of earthquake victims in the 1999 Marmara Earthquake as follows: "Many of our fellow citizens trapped under the rubble were rescued by their neighbors. Search and rescue teams only performed a small part of the work" (Ed. Kızılyaprak, 2000: 279).

In the 2023 Kahramanmaraş Earthquakes, it is also understood from the later posts that the earthquake victims acted much faster and took initiative compared to local and foreign volunteers, official and civil organisations (Hece Dergisi, Deprem Dosyası, 2023).

The most significant and novel contribution made by the earthquake survivors of the 2023 Kahramanmaraş Earthquakes to the fight against earthquake was sharing the current situation and urgent needs through social media. These findings reveal that earthquake survivors are a very important component of the earthquake response. Earthquake survivors are present in the earthquake site from the moment of the earthquake and before other components, and their possession of earthquake culture, that is, their knowledge of what, when and how to do, enables them to make important contributions to the process of combating earthquakes.

4. CONCLUSION

After the two most devastating earthquakes in Türkiye, the 2023 Kahramanmaraş Earthquakes, it was once again confirmed that Türkiye is in the category of "underdeveloped" countries in terms of earthquake culture and has the basic characteristics of these countries from the evaluation of the data related to the activities of the components fighting against earthquakes in order to reduce the damages of earthquakes.

If earthquake culture had been developed in Türkiye, the 2023 Kahramanmaraş Earthquakes would not have caused major disasters. First of all, the official institutions responsible for producing and implementing policies on the subject would not turn a blind eye to works and operations, settlements and constructions that did not comply with scientific standards, before the earthquake occurred, they would make the necessary preparations and take measures to reduce the damage. After the occurrence of earthquake, they would establish coordination among the components fighting to reduce the damages of the earthquake. In addition to fulfilling their own responsibilities, other components would also carry out their social monitoring duties. However, from the data presented above and the evaluations made, it is understood that in the earthquakes in question, both before, during, and after the earthquakes, the tasks and procedures were not conducted in this manner.

From the moment the 2023 Kahramanmaraş Earthquakes occurred, chaos and confusion were experienced due to the lack of coordination among the components of the fight against earthquakes, and this situation led to an increase in "casualties". In the chaos and confusion, search and rescue teams could not reach the earthquake victims trapped in the rubble on time. A significant portion of the clothing sent was left in the streets covered in mud, while some earthquake survivors waited for clothes during the cold days of February. Supplies such as stoves, tents, and blankets were in excess in some areas while taking weeks to reach others. Due to the lack of timely security, looters emerged, openly subjecting some individuals to various forms of torture. In short, Kahramanmaraş Earthquakes turned into a disaster because the components of the earthquake response failed to ensure the organisation and coordination to deliver goods and services to those in need on time.

As a result, due to the low level of earthquake culture in Türkiye, the efforts made by the components of earthquake response after earthquakes have been well-intentioned but driven more by faith and emotion rather than being based on rationality, scientific planning, organization, and coordination. Therefore, it is evident that the contribution of these efforts to both reducing the damage caused by earthquakes and developing earthquake culture is limited.

The results of the underdeveloped earthquake culture in Türkiye can be seen in the activities of all components struggling to reduce the damage of the earthquake in the 2023 Kahramanmaraş Earthquakes. In this case, it is understood that the earthquake culture of a society is related not to any specific component of the society involved in earthquake response, but rather to the general culture of the society as a whole. These results once again confirm the view that living with earthquake is a culture.

REFERENCES

- Akgüngör, A. *Çağlar* (2010), "Toplumbilim Perspektifinden Afeti Düşünmek", LAÜ Sosyal Bilimler Dergisi, 1 (1),3-22.
- Bozkurt, Veysel (1999), Deprem ve Toplum, İstanbul: Alfa Yayınları.
- Cumhuriyet (2023, 9 Şubat), "Sarıgül nine, depremzedelere destek olmak için ineğini sattı" <https://www.cumhuriyet.com.tr/turkiye/sarigul-nine-depremzedelere-destek-olmak-icin-inegini-satti-2049937> (Erişim Tarihi: 13.10.2023).
- Çaha, Ömer (1997), "1980 Sonrası Türkiye’de Sivil toplum Arayışları", Yeni Türkiye: Sivil Toplum Özel Sayısı, Sayı 18, Ankara, 28-64.
- Demokrat Haber (2023, 10 Şubat), AFAD Başkanı Sezer’den eleştirilere yanıt: İki nedenle erken müdahale edilmedi", <https://www.demokrathaber.org/afad-baskani-sezerden-elestirilere-yanit-iki-nedenle-erken-mudahale-edilemedi> (Erişim Tarihi: 19.10.2023).
- Duruel, Mehmet (2023), "Sivil Toplum Kuruluşlarının Afet Yönetimindeki Rolü", Uluslararası Politik Araştırmalar Dergisi, Cilt. 9 (2) 1-17.
- Giddens, Anthony ve Sutton, Philip, H. (2014), Sosyolojide Temel Kavramlar, Çev. Ali Esgin, Ankara: Hhoenix Yayınları.
- Hece Dergisi: Deprem Dosyası, sayı: 316/Nisan 2023, s. 80-81.
- İHD (İnsan Hakları Derneği) (2023), Maraş Merkezli 6 Şubat 2023 Depremleri İle İlgili Ön Gözlem, Tespit ve Öneri, Raporu (Erişim Tarihi: 15.10.2023).

Kasapoğlu, Aytül ve Ecevit, Mehmet (2001), Depremın Sosyolojik Araştırması, Ankara: Sosyoloji Derneği Yayınları.

Kızılyaprak, Zeynel Abidin (edi.) (2000), “17 Ağustos Depreminde STK’lar Olarak Neler Öğrendik” Sempozyumu, 12-13 Kasım 1999, Yıldız Teknik Üniversitesi Beyazıt Kampüsü Birinci Oturum, Deprem Sonrası Özet Deneyim Aktarımı, [içinde], Editör Zeynel Abidin Kızılyaprak, *Sivil Toplum Kuruluşları ve Yasalar / Etik / Deprem (3 Sempozyum 4, 5, 6)*, İstanbul: Türkiye Ekonomik ve Toplumsal Tarih Vakfı Yayınları.

MAZLUMDER (2023), 6 Şubat 2023 Depremleri Gözlem, Tespit, Değerlendirmeler ve Zarara Uğramış Kişilerin Hak Arama Süreçleri RAPORU, https://drive.google.com/file/d/1Ro4sG7yod8_SQTrh3mRpY6tvmo7RQuOi/view (Erişim Tarihi: 29.10.2023).

Mynet (2023, 9 Şubat), “Yoğunluk sevkiyatı yavaşlattı! İşte deprem bölgesine ulaşım hatlarında son durum” <https://finans.mynet.com/galeri/haber/detay/ekonomi/yogunluk-sevkiyatı-yavaslatte-iste-deprem-bolgesine-ulasim-hatlarinda-son-durum-9-subat-2023-persembe/460680/3> (Erişim Tarihi: 28.10.2023).

Namdar, Azize, vd. (2021), “Sivil Toplum ve Sivil Toplum Örgütleri: Türkiye’de ve Dünya’da Gelişimi”, [içinde], Buz, Sema ve Afyonoğlu, Meliha Funda (Editörler), *Sivil Toplum Örgütleri ve Sosyal Hizmet*, Ankara: Nobel Yayınları.

NTV Haber (2023, 27 Şubat), “Cumhurbaşkanı Erdoğan: Adıyaman'dan helallik istiyorum”, <https://www.ntv.com.tr/turkiye/cumhurbaskani-erdogan-adiyamandan-helallik-istiyorum,MC3AUBf88EijIGYS8zdzMA> (Erişim Tarihi: 25.10.2023).

Özmen, Bülent ve Nurlu, Murat (1999), “Deprem Bölgeleri Haritası İle İlgili Bazı Bilgiler”, TMMOB Jeoloji Mühendisleri Odası Haber Bülteni, Sayı: 99/2-3, sayfa 32-35, Ankara.

Öztürk, Kemal (2023, 28 Şubat), “İki Kurum İki Sorun”, <https://www.haberturk.com/yazarlar/kemal-ozturk/3569470-iki-kurum-ve-iki-sorun> (Erişim Tarihi: 30.10.2023).

Ritzer, George (2010), *Küresel Dünya*, çev. Melih Pakdemir, İstanbul: Ayrıntı Yayınları.

[Sabah](https://www.sabah.com.tr/galeri/yasam/kahramanmarasa-gonderilen-esyalar-pes-dedirtti) (2023, 10 Şubat), “Kahramanmaraş’a gönderilen eşyalar pes dedirtti!”, <https://www.sabah.com.tr/galeri/yasam/kahramanmarasa-gonderilen-esyalar-pes-dedirtti-dantelli-camasir-bile-var> (Erişim Tarihi: 06.11.2023).

Seyyar, Ali ve Genç, Yusuf (2010), *Sosyal Hizmet Terimleri*, Sakarya: Sakarya Yayıncılık.

TMMOB (2023), Kahramanmaraş Depremi Güncel Durum Tespiti -2-, <https://ankara.imo.org.tr/TR,146884/tmmob-kahramanmaras-depremi-guncel-durum-tespiti--2--14-subat-2023.html> (Erişim Tarihi: 05.11.2023).

TRT Haber (2023, 2 Şubat), “Deprem bölgelerine yardım seferberliği sürüyor”, <https://www.trthaber.com/haber/turkiye/deprem-bolgelerine-yarim-seferberligi-suruyor-746506.html> (Erişim Tarihi: 05.11.2023).

TRT Haber (2023, 22 Nisan), Depremde can kaybı 50 bin 783”, <https://www.trthaber.com/haber/gundem/depremde-can-kaybi-50-bin-783-762132.html> (Erişim Tarihi: 01.11.2023).

TÜSEV, (2006), Türkiye’de Sivil Toplum: Bir Değişim Süreci Uluslararası Sivil Toplum Endeksi projesi Türkiye Ülke Raporu, İstanbul: TÜSEV. <https://www.tusev.org.tr/userfiles/image/Uluslararası%20STEP%20Türkiye%20Ulke%20Raporu.pdf> (Erişim Tarihi: 29.10.2023)

www.afad.gov.tr/aciklamali-afet-yonetimi-terimleri-sozlugu (Erişim Tarihi: 19.10.2023).

www.afad.gov.tr/depremkampanyasi2 (Erişim Tarihi: 19.10.2023).

www.afad.gov.tr/kurumlar/afad.gov.tr/35429/xfiles/turkiye_de_afetler.pdf (Erişim Tarihi: 19.10.2023).

www.csb.gov.tr/bakan-kurum-10-ilde-41-bin-791-binanin-yikik-acil-yikilacak-ve-agir-hasarli-oldugunu-tespit-ettik-bakanlik-faaliyetleri-38426 (Erişim Tarihi: 21.10.2023)

www.hmb.gov.tr/haberler/2023-kahramanmaras-ve-hatay-depremleri-raporu (Erişim Tarihi: 19.07.2023)

www.ihd.org.tr/wpcontent/uploads/2023/03/%C4%B0HD_Maras_Depremleri_On_Raporu.pdf

(Erişim Tarihi: 29.10.2023).

www.kizilay.org.tr/kurumsal/tarihcemiz (Erişim tarihi: 19.07.2023).

www.resmigazete.gov.tr/eskiler/2009/06/20090617-1.htm Afet ve Acil Durum Yönetimi Başkanlığının Teşkilat ve Görevleri Hakkında Kanun, T.C. Resmî Gazete (27261). Ankara: T.C. Başbakanlık Mevzuatı Geliştirme ve Yayın Genel Müdürlüğü. 17 Haziran 2009. (Erişim tarihi: 17.07.2023).

Yazıcı, Mehmet (2023), "17 Ağustos 1999 Marmara Depremi’nden 6 Şubat 2023 Kahramanmaraş Depremlerine Türkiye’de Deprem Kültürü: Depremle Yaşamayı Öğrendik Mi?", SOCRATES 8th CONGRESS Dicle Üniversitesi, Türkiye.

Yıldırım, Selahattin (2019), “Deprem”, Ansiklopedik Kent Sözlüğü, İstanbul: Marmara Belediyeler Birliği Kültür Yayınları.

A Content analysis related to Thesis of Cyberchondria in Turkiye in New Media Age

Oğuz Han Öztay¹, Gökçe Öztürk²

Abstract

Introduction: People now have easy access to information thanks to the quick growth of information and communication technologies. People use the Internet as a resource to obtain information. The increasing internet use and new media tools has revealed digital diseases. The Internet has become an important source of health information that enables people to access most of the medical information. Cyberchondria is the term used to describe the internet search for health-related information. Nowadays, healthcare costs are rising steadily, but fortunately, the internet is inexpensive, easy to use, and accessible to everyone. However, individuals may increase in stress and anxiety levels as a result of the search for disease from the internet.

Aim: This study aims to examine the postgraduate theses on cyberchondria in Turkiye between 2016-2023 (November) in the database of the Council of Higher Education National Thesis Center.

Method: Descriptive content analysis was conducted on thesis in subject of cyberchondria, which are published in Turkiye. 42 thesis were analyzed regarding publication date, research type, sample, sample size, type of data collection instruments. Frequency and percentage values were calculated for data analysis.

Findings: The number of master's theses and medical thesis were same during 2016-2023 and the year in which the biggest number of studies were conducted was the year of 2022. In the examined theses, quantitative methods were mostly used. The most preferred sample was adult and sample size is 201-400. Scales were the most used data collection tool. The most studied topics were level of cyberchondria and the interaction between anxiety/internet addiction and cyberchondria.

Originality and value: The analysis suggests that the trend of the studies conducted on cyberchondria.

Key Words: New media, Cyberchondria, Content analysis, Qualitative research.

INTRODUCTION

The concept of cyberchondria has been a popular concept over 20 years. The term "cyberchondria" was emerged in the early days of the Internet, when there was a growing interest in the "negative side" of this new and innovative information and communication medium (Starcevic et al. 2020). Health -related data screening behavior includes all kinds of actions that people take to define and analyze health problems. People are

¹ Asist. Prof. Dr., Van Yuzuncu Yil University, Van Vocational School, Department of Audiovisual Techniques and Media Production, Communication Studies, Turkey

² M.Sc, Independent Researcher, Turkey.

looking for health -related information to understand risk factors and develop preventive measures. Doctors, health workers, social environment, medical encyclopedias and brochures, mass media can be identified as health -related sources. We conducted the present content analysis to get an overview on the cyberchondria concept in the theses in Turkiye.

1. LITERATURE REVIEW

Human beings have developed continuously and regularly since the day they existed. As with many different fields in these developments, it undeniably contributes to technological developments. In his book *Third Wave*, Alvin Toffler (1980) explained the revolutionary developments in three waves. Toffler mentions the industrial revolution in the second wave in the first wave. Toffler, who sets out new types of life by dividing the changes into three waves, mentions that the industrial society in the third wave is in the second wave. Toffler mentioned that humanity will make a leap forward and that social life will be upset and rearranged to the extent ever seen in its history. The changes stated by Toffler (1980) have taken place today and people's lifestyles are shaped accordingly.

On the other hand, Marshall McLuhan (1964), one of the leading communication theorists of the 20th century, continues the message that individuals will be connected daily through media and technology, and thus, the world will become metaphoric. McLuhan's theory of a global village has found its equivalent today, and people have become able to communicate with each other as if they were living in a village, regardless of time and space. As a result, with the advancement of technology, communication tools became a message and started to have serious effects on target audiences. Ulus Baker was one of the important names that expressed this effect on the target audience. Ulus Baker speaks of the transformation of sociology into the sociology of convictions and the sociology of created emotions. While explaining the thesis work under seven headings, Baker referred to the following statements about the formation of the opinion; “Social sciences are in the habit of manipulating texts today. Even if these strong vehicles cannot be opposed, they should be more careful” (Baker, 2010). Baker explained how it was convicted using communication tools, and domination was established on the thoughts and emotions of the masses. While communication tools are effective in the worlds of people's ideas and feelings, the accuracy and reliability of the information provided by those tools to the target audience are discussed. It is an undeniable fact that the disinformation of disinformation in the IT era has various bad effects on target audiences.

The invention of the computer and the Internet has been one of the developments that laid the foundations for the formation of the informatics age. As a result of the resulting information age, information has become much easier and more accessible. As a result of these innovations brought to humanity by the age of IT, different concepts have entered our lives. One of the concepts that are often encountered in the IT era is the

concept of cybernetics. The word “cyber” mentioned and the word “cybernetics” are the same. Cybernetic, one of the concepts of the Internet, which is accepted as a new communication environment, examines the effects of machines on living things; in other words, the complex relationship between the machine and the human. Under this general definition, there are sub-branches of cybernetics. A concept that arises as a result of cybernetics, which is a complex and versatile discipline, is cyberchondria. Cyberchondria has recently begun to be mentioned regarding illness transmitted from the Internet. Cyberchondria is the situation of trying to try to diagnose or treat information, documents, and treatment methods on the internet environment that the individual thinks that the individual exists (Tarhan, Tutgun-Umal, and Ekinici, 2021). As we mentioned at the beginning of the text, the quick and easily accessible information offered by the internet environment is gaining importance. However, the reliability of quick and easy information is the subject of discussion. Baker emphasizes how strong the vehicles are on their thoughts, decisions, and feelings of the masses of ‘convictions society,’ which Baker speaks about under the Sociology of opinion. Therefore, the information in the internet environment contradicts the epistemological system. In this environment where the reliability of knowledge is discussed, the concept of cyberchondria should be taken seriously. Measures and solutions that can be taken for cyberchondria accepted as a current problem of our age, should be produced.

2. RESEARCH METHODOLOGY

2.1. Research Design

This study is a content analysis and descriptive content analysis method, which is a type of content analysis, has been used. Descriptive Content Analysis; It is an approach that includes the determination of the tendencies of the qualitative and quantitative studies on a particular subject and the determination of their tendencies and evaluating the results in a defined way (Çalık and Sözbilir, 2014). Also, Patton (1990) defines content analysis as “a process of identifying, coding, and categorizing of the collected data and it is process of presentation of this data in terms of author aim” (p.381). With this method, the studies on cyberchondria, which was published between 2016-2023 between 2016-2023, were classified and classified in various aspects of the studies in various aspects of the studies and the data of the studies were brought together and presented to the reader within the framework of the themes created to answer the research questions.

2.2. Data Source and Data analysis

The research sample consists of theses published between 2016-2023 and made on cyberchondria in Türkiye. To reach these studies, the National Thesis Center databases were scanned. The "Cyberchondria" keyword was used when scanning in databases. To reach the relevant studies, the screening process was carried out until November 2023.

As a result of the screening, 42 studies were reached, and all of them were examined within the scope of the study.

In the study, the research examination form was used as a data collection tool based on previous content analysis studies (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2011; Sözbilir, Kutu and Yaşar, 2012; Devran, Öztay and Tarkın-Çelikkıran, 2021). In developing the form, a draft research examination form was created first. Then, the necessary corrections were made by taking opinions from one of the ones in the qualitative research field. After the corrections, the thesis examination form was finalized.

After the final version of the thesis examination form, which was used as a data collection tool, the three theses were coded by researchers together to agree on how to code. Afterward, the first author analyzed other studies within the scope of the research using the content analysis method. Finally, tables have been created from the data and will be answered to each research question.

3. RESULTS

Results of the study are presented in this section in tables. All of studies analyzed in the current study were in the form of theses.

Table 1: Number of thesis related to cyberchondria published over years

<i>Year</i>	<i>Master Thesis</i>	<i>Thesis for specialty in medicine</i>
2016	-	1
2017	-	-
2018	-	2
2019	2	1
2020	4	1
2021	3	2
2022	7	7
2023	5	7

Table 1 indicated that researchers' interest against cyberchondria was very poor until 2019. Studies showed an increasing trend from 2022. The number of thesis published for specialty in medicine also indicated a steady increase towards the recent years.

Table 2: Frequently used samplings in cyberchondria studies in Türkiye

Samples	Frequency (f)	Percent (%)
Teachers	2	4.7
Undergraduate Students	2	4.7
Adults (Parents)	20	46.5
Patients	18	41.9
Healthcare Stuff (Nurses)	1	2.3
Total	43	100

In Table 2 indicates that adults especially parents and patients are mostly studied sampling at thesis focused on cyberchondria *in Türkiye*. One study used two samples which are adults and undergraduate students so the total number of studies is 43. It is noticeable very few studies on cyberchondria in Türkiye collected data from teachers, undergraduate students and healthcare stuff.

Table 3: Frequently studied samples size

Sample Size	Frequency (f)	Percent (%)
<i>Between 1-100</i>	-	-
<i>Between 101-200</i>	3	7.1
<i>Between 201-400</i>	25	59.5
<i>Between 401-600</i>	8	19
<i>Between 601-800</i>	4	9.5
<i>Between 801-1000</i>	2	4.8
<i>Total</i>	<i>42</i>	<i>100</i>

Table 3, given above shows the frequently studied sample size at published thesis. Results indicated that most of the data were collected from sample size has participants among 201-400. There is no study with small sample sizes as 1-100.

Table 4: Frequently used research design in thesis

Research Design	Frequency (f)	Percent (%)
<i>Quantitative</i>	36	85.7
<i>Qualitative</i>	5	11.9
<i>Mixed</i>	-	-
<i>Not applicable</i>	1	2.38
<i>Total</i>	42	100

Table 4 summarizes the frequently used research designs in cyberchondria thesis conducted in Turkiye. Research designs are divided as quantitative, qualitative, and mixed as given in the table above. As can be seen from Table 4, the most utilized research design was quantitative (85.7 %). Compared to quantitative, the number of qualitative thesis was not so common (%11.9) and there was no thesis conducted with mixed method.

Table 5: General purposes in cyberchondria thesis in Turkiye

Purposes	Frequency (f)	Percent (%)
Effect of illness anxiety disorder/internet addiction on cyberchondria	13	30.95
Determining level of cyberchondria	13	30.95
The importance of cyberchondria	8	19.05
Health literacy and level of cyberchondria	1	2.38
Relationship between Covid-19 and cyberchondria	7	16.67
<i>Total</i>	42	100

Table 5 indicates that majority of the studies conducted on cyberchondria in Turkiye focuses on determining level of cyberchondria and effect of illness anxiety disorder/internet addiction on cyberchondria. Other subjects studied were the importance of cyberchondria (%19), Relationship between Covid-19 and cyberchondria (%17) and health literacy and level of cyberchondria (%2).

4. CONCLUSION & IMPLICATIONS

This content analysis study aimed to identify the status of the thesis conducted on cyberchondria in Türkiye. To achieve this aim an analysis of theses published between 2016-2023. As a result, the concept of cyberchondria is an important problem today. When the thesis studies in this field are examined, it is seen that more studies have been carried out in this field in recent years. It can be explained especially by the increase in health anxiety and cyberchondria, especially with the Pandemic period. The studies examined were mostly carried out using quantitative research methods. It may be due to the high number of samples in the studies and mostly studies to determine the level of cyberchondria.

The studies examined were mostly carried out with adults and patients with treatment, and it is seen that a sample between 200-400 was studied. The reason for this is usually the execution of studies by quantitative research method and mostly collected data with scales. Detailed studies can be carried out with different sample groups in this field. When we look at the thesis studies carried out in this field, it was seen that there were mostly studies examining the level of cyberchondria and determining the relationship between health anxiety/internet addiction and cyberchondria.

As an implication, cyberchondria should be accepted as a disease, and steps such as awareness and awareness training should be taken in this direction. Accelerating studies to prevent information pollution in internet environments that provide health information is important. Awareness campaigns can be organized, especially for distinguishing between reliable and unreliable sources of information. It is necessary to increase the programs related to health literacy within the scope of the ability to comprehend and evaluate health information, such as how to benefit from health services and the correct use of drugs. To analyze and question the information obtained from the internet, studies can be done to improve the media literacy skills of individuals. In the field of cyberchondria, studies should be carried out with qualitative and mixed research methods and different sample groups to obtain more detailed data about this disease of the new age and propose solutions. Based on existing studies, the execution of the studies that can be able to offer a solution to the rise in the level of cyberchondria and the execution of the underlying reasons will contribute to the field.

REFERENCES

- Baker, U. (2010). *Kanaatlerden imajlara: Duygular Sosyolojisine Doğru* [Çeviren Harun Abufloğlu]. İstanbul: Birikim Yayınları.
- Çalık, M. & Sözbilir, M. (2014). *İçerik analizinin parametreleri. Eğitim ve Bilim*, 39(174), 33-38.
- Mcluhan, M. (1964). *Understanding Media, The Extensions of Man*. London: Routledge.

- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications.
- Starcevic, V., Berle, D., & Arnáez, S. (2020). Recent insights into cyberchondria. *Current Psychiatry Reports*, 22, 1-8.
- Tarhan, N., Tutgun-Ünal, A., & Ekinci, Y. (2021). Yeni kuşak hastalığı siberkondri: Yeni medya çağında kuşakların siberkondri düzeyleri ile sağlık okuryazarlığı ilişkisi. *OPUS International Journal of Society Researches*, 17(37), 4253-4297.
- Toffler A. (1980). *Üçüncü Dalga*, [Çev. Selim Yeniçeri], İstanbul:Koridor Yayıncılık,

Digital Consumer Behavior: A Systematic Literature Review

İbrahim Halil Efendioğlu ¹

Abstract

Introduction: Digital consumer behavior is a field that examines the consumer behavior exhibited by consumers in online environments on digital platforms. It covers consumer decision-making processes in online environments, online shopping habits, brand interactions, advertising reactions, and social media usage. In this research, the digital consumer behavior literature was systematically discussed, research gaps were identified, and suggestions were made to academics working in this field on how to shape their future research.

Aim: This study examines the literature on digital consumer behavior and the research conducted in this field from a broad perspective.

Method: A systematic literature review methodology was employed in this study, which was carried out between October 5 and October 20, 2023. The WoS (Web of Science) database was the primary platform for the systematic literature review. The search focused on titles, abstracts, and keywords, utilizing the keywords "digital consumer behavior" and "digital consumer behaviour." The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were adhered to for the literature search process. Scientific peer-reviewed publications with full-text accessibility were exclusively included in the scope of the study. A total of 18 research studies were identified in the WoS databases. After applying inclusion and exclusion criteria, three studies were excluded, including 15 research studies for further analysis.

Findings: In the systematic literature review, the research's main findings, methodologies, and authors were categorized, and the research in digital consumer behavior was synthesized. Consumer behavior in the studies was examined from a digitalization perspective. According to the results obtained from the research, it was observed that empirical studies were more numerous than conceptual studies in terms of methodological approaches adopted in the articles examined. The gaps in the field were discussed, and it was observed that internet search habits, online shopping trends, mobile application usage, and online content consumption came to the fore.

Originality and value: It is a pioneering study that conducts a systematic literature review on digital consumer behavior.

Key Words: digital consumer behavior, digital consumer behaviour, digital consumer, systematic literature review

Jel Codes: M30, M31

1. INTRODUCTION

Consumer behavior refers to the field that examines the psychological, social, and cultural factors influencing individuals' processes of researching, purchasing, and using products and services (Madhavan & Kaliyaperumal, 2015). This concept plays a significant role in marketing and business domains, aiming to understand consumers'

¹ Lec.Dr, Gaziantep University, Turkey

preferences, shopping motivations, and purchase decisions. Digital consumer behavior is a specialized area focusing on consumers' processes of researching, purchasing, and using products and services in digital environments (Sağkaya Güngör & Ozansoy Çadircı, 2022). This behavior unfolds across various digital platforms such as the internet, mobile devices, social media, and other digital channels (Rogova & Matta, 2023). The goal is to guide marketing strategies by examining consumer interactions (Stephen, 2016).

In recent years, technological advancements and the widespread adoption of digital marketing have brought the concept of digital consumer behavior to the forefront of research. The increasing number of academic studies on digital consumer behavior in the literature highlights the significance of this topic (Baiuk, 2023; Kamkankaew et al., 2022; Linkiewicz & Bartosik-Purgat, 2022; Petkovski & Mulic, 2023; Qadir et al., 2023; Rogova & Matta, 2023). This study aims to provide a detailed explanation of digital consumer behavior and identify how the literature progresses. Accordingly, the paper presents gaps in the literature and provides recommendations for future research.

Elements such as research and information gathering, online purchasing, social media interaction, personalized experiences, and mobile usage are prominent in digital consumer behavior. Consumers utilize the internet to gather information about products and services, with online reviews, social media comments, and other online content shaping their decisions (Ebrahimi et al., 2023). A fundamental aspect of digital consumer behavior is purchasing products and services online. E-commerce platforms, online stores, and other digital channels complement or replace traditional retail shopping (Wagner et al., 2020). Social media platforms enable consumers to interact with brands, share their thoughts about products, and enhance brand loyalty (Aljuhmani et al., 2023). Digital consumers expect personalized content and recommendations on online platforms, enhancing brand loyalty by providing unique and engaging experiences (Felix & Rembulan, 2023). Mobile devices enable consumers to stay connected continuously, allowing them to shop and interact with brands from anywhere through mobile applications and websites (Luceri et al., 2022). Digital consumer behavior is a concept that helps marketers and businesses understand how consumers behave online, enabling them to optimize marketing strategies and enhance customer satisfaction (Shafiq et al., 2022).

Previous studies on digital consumer behavior have focused on trust, virtual communities, electronic word-of-mouth communication, and consumer issues in marketing strategy (Laroche, 2010).

The study aims to answer the following questions to elucidate the topic of digital consumer behavior:

RQ1: What is the distribution of research on digital consumer behavior by year and type?

RQ2: In research focusing on digital consumer behavior, how has the literature progressed, and what are the key topics?

RQ3: What are the gaps in the literature on digital consumer behavior, and what suggestions are made for future research?

There still needs to be more literature regarding how consumers interact, make decisions, and evaluate the new opportunities the digital world offers. To address this, a better understanding of digital consumer behavior requires focusing on ethnographic studies and online communities. Observing how consumers interact on digital platforms and how these interactions impact shopping decisions will shape future research more accurately.

2. CONCEPTUAL FRAMEWORK

Consumer behaviors in the digital economy have become a significant area of interest due to the development of digital technologies (Kalashnikova et al., 2023). Digital marketing has been shown to substantially impact consumer purchasing decisions (Qerimi & Qerimi, 2022). Furthermore, examining consumer behaviors in the digital age has been shaped by the impact of the COVID-19 pandemic, leading to changes in consumer behaviors in the digital environment (Rahmanov et al., 2021). Understanding the reasons for the changes in consumer behavior in the digital age has also become a crucial area of study (Zhou, 2021). The emergence of new consumer segments, such as the Zoomers generation, has been considered in the context of consumer behaviors in the digital space (Seleznova, 2022). Themes emerging in digital consumer behavior research include the Internet of Things, the sharing economy, and digital sensory marketing (Santos et al., 2020). Additionally, studies on digital consumer behavior explore digital consumer culture, responses to digital advertisements, the impact of digital environments on consumer behaviors, and habits in mobile environments (Stephen, 2016).

Understanding consumer behavior in the digital economy is essential for businesses as it influences consumer decision-making processes (Hamdani et al., 2022). The impact of digital technologies on consumers has led to the generation of data through devices and platforms, contributing to advancements in big data analytics and neuromarketing for understanding consumer trends (Kuş & Šević, 2021). Moreover, the digitization of retail has directly influenced consumer behavior by changing the use of digital technologies in retail practices (Hagberg et al., 2016).

In the last two decades, specific themes and topics have gained prominence in research on digital consumer behavior. First, interactive technologies affect consumer decision-making processes, such as augmented reality (AR) and virtual reality (VR) acceptance motivations, the impact of artificial intelligence (AI), AR, and VR on consumer journeys, and the use of interactive technologies for managing stronger customer relationships. Second, pandemic-related uncertainties concerning digital consumers, changes in consumer behaviors in digital channels during the COVID-19 process, and factors influencing the sustainability of digital pandemic consumer behaviors. Third, the impact of mobile technology adoption on digital consumer life, understanding the effects of mobile technologies on digital consumer behavior and

mobile marketing. Fourth, sustainable consumption and collaborative consumption encompass environmental issues, sustainability, welfare, and value creation. Additionally, studies focus on topics such as the impact of green advertising skepticism on consumer purchase intentions and consumer perceptions of online fashion rental behaviors based on ecological importance and cultural compatibility (Sağkaya Güngör & Ozansoy Çadırcı, 2022). These themes and topics reflect the increasing importance of understanding digital consumer behavior in research.

The concept of the savvy consumer in the digital age emphasizes the challenges and disruptions in the digitization process, noting that digitized savvy consumers only sometimes succeed in their efforts (Fuentes, 2019). Additionally, the impact of the virtual environment on consumer preferences and purchasing behavior has been explored, revealing that psychological distance influences consumer information processing and product preferences (Park, 2019).

Examining digital user behavior allows for a better understanding of consumers who engage in online shopping (San Miguel & Sádaba, 2020). In this context, the consumer choice process in the online environment becomes more apparent (Da Silva Neto, 2021). Saura et al. (2020) highlighted changes in consumer behavior resulting from digital developments. They emphasized the importance of strategies such as content marketing and user-generated content in engaging with customers online. Masouras & Papademetriou (2018) investigated reasons that encourage consumers to take digital steps and distinguished between internet consumers and digital users. Ghazie & Dolah (2018) focused on understanding consumer behavior in digital marketing and the effectiveness of digital marketing in creating brand awareness.

Intensive research on digital consumer behavior typically occurs in countries with advanced digital infrastructure, high technology usage, and widespread e-commerce, including the United States, the United Kingdom, and Australia (Sağkaya Güngör & Ozansoy Çadırcı, 2022). Additionally, research on digital consumer behavior is conducted using methods such as online consumer information processing in countries like China and Japan (Laroche, 2010). In Russia, studies have investigated qualitative changes requiring artificial intelligence tools, data processing, and multi-channel communication in marketing practices (Maltseva & Danilova, 2019).

The literature on digital consumer behavior has addressed various topics, including the increasing interest in financial needs, consumer independence, the shift from image advertising to product advertising, and the growing interest in the quality features of financial products (Korobov, 2020). Furthermore, studies on digital consumer behavior have explored trust in public authorities, media, and social networks, the transformation of consumer preferences, and the shift from long-term to short-term consumption (Pereverzieva & Hubar, 2021). Digital consumer behavior includes using advanced technology tools, conducting market research, communicating with other consumers, and guiding the overall process from product design to post-sales service (Musavi, 2021). Therefore, this behavior transforms power from marketers to consumers through demand, information, networks, and crowd-based resources in Internet and social media

contexts (Labrecque et al., 2013). This transformation encompasses the search, selection, and purchase of products and services by modern technology enthusiasts, leading to multi-channel marketing (Ovodenko et al., 2020).

3. RESEARCH METHODOLOGY

The study employed a systematic literature review method. The systematic literature review method is a popular research approach that critically examines and analyzes the literature on a specific topic (Yavuz, 2022). The systematic literature review approach is considered a scientific and highly informative method for systematically collecting, reviewing, and synthesizing research findings on a particular subject (Paul et al., 2021). This review method identifies, selects, critically evaluates, analyzes, interprets, and presents existing research. Therefore, the method is a repeatable, planned, and structured approach (Fisch & Block, 2018).

The literature review was conducted from October 5 to October 20, 2023. The WoS database was utilized to perform a systematic literature review, and the keywords "digital consumer behavior" and "digital consumer behavioru" were searched in titles, abstracts, and keywords. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standard was also followed for systematic screening. The inclusion and exclusion procedure was aligned with the study's research questions. Systematic literature reviews are carried out in three main stages: planning, execution, and reporting (Kitchenham & Charters, 2010; Xiao & Watson, 2019).

No retrospective time limit was set during the systematic literature review. Only scientific peer-reviewed publications with full texts accessible were included in the study scope. A total of 18 studies were found in the WoS databases. Three studies were excluded after applying inclusion and exclusion criteria, and 15 research studies were included in the analysis. Inclusion and Exclusion Criteria are shown in Table 1.

Table 1: Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria	Reason
Web of Science database	Other databases	Reliability of the database
SSCI, SCI, SCI-E, ESCI indexed studies	Studies scanned in indices other than SSCI, SCI, SCI-E, ESCI and SCI-E	Screening of qualified studies by SSCI, SCI, SCI-E, ESCI
Research focusing on Digital Consumer Behavior in the field of marketing	Research in the field of marketing that does not focus on "Digital Consumer Behavior"	Being outside the scope of work

Contain the keywords "Digital Consumer Behavior" and "Digital Consumer Behaviour" in the title, abstract and keywords	Not include the keywords "Digital Consumer Behavior" and "Digital Consumer Behaviour" in the title, abstract and keywords	Going beyond the purpose of the research
---	---	--

4. FINDINGS

Research frequently emphasizes the need for studies on digital consumer behavior, particularly highlighting the importance of social, situational, and cultural factors. Secondly, many studies have observed the impact of technological developments such as augmented reality and deep learning, demonstrating the importance of keeping up with technological trends in understanding and shaping consumer behaviors. Additionally, these studies underscore the importance of adapting marketing strategies to the evolution of the digital landscape, emphasizing the necessity of tailoring approaches, especially for specific sectors like sports marketing, gastronomy tourism, and online supermarkets. Cultural differences covering various countries are highlighted, showcasing the importance of context-specific information in forming marketing and advertising strategies. Moreover, the effects of external factors, such as the COVID-19 pandemic emphasized in various studies, underscore the dynamic nature of digital consumer behavior and the necessity for adaptation in response to external stimuli. Overall, these studies contribute to a comprehensive understanding of the multifaceted and continually evolving field of digital consumer behavior.

Within the scope of the research, essential findings based on a comprehensive review of the existing literature are presented. Table 2 presents the years in which the research was published, authors, publication titles, and sources.

Table 2: The Researches Included in the Study

Year	Authors	Publication Title	Source
2010	Williams, P; Nicholas, D; Rowlands, I	The Attitudes And Behaviours of Illegal Downloaders	Aslib Proceedings
2016	Onete, CB; Teodorescu, I; Vasile, V	Analysis Components of The Digital Consumer Behavior in Romania	Amfiteatru Economic
2017	Tang, AKY	Key Factors in The Triumph of Pokemon GO	Business Horizons
2018	Chivu, RG; Stoica, I;	New Trends in Marketing Mix Strategies For Digital Consumer Behaviour	Selected Papers of 7th World

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

	Orzan, MC; Radu, AV		Conference on Business, Economics And Management (Bem-2018)
2019	Ozturkcan, S; Kasap, N; Tanaltay, A; Ozdinc, M	Analysis of Tweets About Football: 2013 And 2018 Leagues In Turkiye	Behaviour & Information Technology
2019	Errmann, A; Seo, Y; Choi, YK; Yoon, S	Divergent Effects of Friend Recommendations on Disclosed Social Media Advertising in The United States and Korea	Journal of Advertising
2021	Hasan, MR; Abdunurova, A; Wang, WW; Zheng, JW; Shams, SMR	Using Deep Learning to Investigate Digital Behavior in Culinary Tourism	Journal of Place Management And Development
2021	Jílková, P; Králová, P	Digital Consumer Behaviour and Ecommerce Trends During The COVID-19 Crisis	International Advances in Economic Research
2021	Tupikovskaja- Omovie, Z; Tyler, D	Eye Tracking Technology to Audit Google Analytics: Analysing Digital Consumer Shopping Journey in Fashion M-Retail	International Journal of Information Management
2021	Rúa-Hidalgo, I; Galmes- Cerezo, M; Cristofol- Rodríguez, C; Aliagas, I	Understanding The Emotional Impact of Gifts on Instagram Through Consumer Neuroscience	Behavioral Sciences
2022	Morales- Solana, D; Esteban- Millat, I; Cotas, AA	Experiences in Consumer Flow in Online Supermarkets	Electronic Commerce Research
2022	Ivanova, N; Popelo, O; Avhustyn, R; Rusak, O; Proshchalykin a, A	Marketing Strategy of The Small Business Adaptation to Quarantine Limitations in The Sphere of Trade Entrepreneurship	International Journal of Computer Science And Network Security

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

2022	Sağkaya Güngör, A; Ozansoy Çadirci, T	Understanding Digital Consumer: A Review, Synthesis, and Future Research Agenda	International Journal of Consumer Studies
2022	Yoon, G; Li, C; Choi, JJ	In Search of Time To Bring The Message on Social Media: Effects of Temporal Targeting and Weather on Digital Consumers	Frontiers In Psychology
2023	Rangaswamy, E; Yong, WS; Joy, GV	The Evaluation of Challenges And Impact of Digitalisation On Consumers In Singapore	International Journal of System Assurance Engineering And Management

The studies discussed employ various research methodologies to explore digital consumer behavior. Williams et al. (2010) conducted a systematic review, synthesizing literature on digital consumer behavior and piracy, emphasizing the impact of social and situational factors. Onete et al. (2016) conducted research in Romania, correlating results with official data to identify the characteristics of digital consumers. Tang et al. (2017) investigate Pokémon GO's success factors using a three-stage method involving focus group discussions and surveys, applying telepresence and social capital theories. Chivu (2018) explores marketing mix trends using a survey method to identify practical elements in the online environment. Ozturkcan et al. (2019) analyze real-time streaming data in sports marketing, recommending post-match plans based on behavioral data. Ermann et al. (2019) compare friend recommendation effects in the U.S. and Korea, emphasizing cultural differences. Hasan et al. (2021) employ deep learning and image analysis in culinary tourism research. Jílková & Králová (2021) use survey data to explore COVID-19's impact on digital consumer behavior in the Czech Republic. Tupikovskaja-Omovie & Tyler (2021) combine eye-tracking and Google Analytics in studying digital consumer behavior in the fashion m-retail sector. Using biometric tools, Rúa-Hidalgo et al. (2021) analyze GIFs' emotional impact on social media. Morales-Solana et al. (2022) utilize qualitative and quantitative techniques to understand the flow of online supermarket purchases. Ivanova et al. (2022) propose a marketing strategy for small businesses using digitization and vending machines. Sağkaya Güngör & Ozansoy Çadircı (2022) examine digital consumer behavior through a bibliometric analysis of articles. Yoon et al. (2022) explore contextual factors' impact on mobile advertising effectiveness. Rangaswamy et al. (2023) critically evaluate retail consumer behavior post-digitization using various statistical analyses. The methodologies used in the research are shown in Table 3.

Table 3: Research Methods

Authors	Methodology or Research Methods
Williams et al. (2010)	Systematic review and synthesis study
Onete et al. (2016)	Survey method and comparison with official data
Tang et al. (2017)	Focus group discussions and extensive survey studies
Chivu (2018)	Survey method, identification of effective elements in the marketing mix
Ozturkcan et al. (2019)	Analysis of real-time streaming data, behavioral data analysis
Ermann et al. (2019)	Comparative study between the U.S. and South Korea, considering cultural differences
Hasan et al. (2021)	Deep learning and image analysis, survey involving 125 participants
Tupikovskaja-Omovie & Tyler (2021)	Eye-tracking technology and Google Analytics data
Rúa-Hidalgo et al. (2021)	Experimental study using automatic biometric analysis and analysis of emotions in Instagram comments
Morales-Solana et al. (2022)	Mixed methods approach, combining qualitative and quantitative techniques
Ivanova et al. (2022)	Literature review, proposal of a new business model
Sağkaya Güngör & Ozansoy Çadırcı (2022)	Bibliometric analysis
Yoon et al. (2022)	Focus groups and extensive survey studies
Rangaswamy et al. (2023)	Cross-sectional analysis and inductive approach

Studies collectively provide insights into various aspects of digital consumer behavior, ranging from the impact of piracy to the success factors of applications like Pokémon GO and the evolving landscape during the COVID-19 pandemic. Common themes include the significance of cultural nuances, the need for innovative business models, and the exploration of advanced technologies like deep learning and eye-tracking to understand and adapt to changing consumer behaviors. Additionally, these studies highlight the role of factors such as social context, emotional connections, and the effectiveness of advertising under different circumstances. Research Topics obtained as a result of the literature review are shown in Table 4.

Table 4: Research Topics

Year	Article Title	Research Topic
2010	The Attitudes and Behaviours of Illegal Downloaders	The research addresses digital piracy, emphasizing the impact of social and situational factors on illegal content acquisition. It questions the effectiveness of punishment and advocates for innovative business models to address changing assumptions about ownership, sharing, and content copying.
2016	Analysis Components of The Digital Consumer Behavior in Romania	The research investigates consumer behavior in the context of online shopping in Romania, highlighting Romanian consumers' preferences for foreign online markets. It reveals a higher representation of women in online orders, increased online shopping among young individuals, and preferences for locally unavailable products.
2017	Key Factors in The Triumph of Pokemon GO	The research examines the pivotal factors for achievement in Pokémon GO and offers perspectives into the conduct of players in mobile application games. Focused on the critical success factors of Pokémon GO, the study identifies the game's ability to evoke childhood memories and the use of augmented reality (AR) and global positioning systems (GPS) as key contributors to its success.
2018	New Trends in Marketing Mix Strategies For Digital Consumer Behaviour	The research explores new trends in marketing mix strategies for digital consumers, emphasizing the importance of understanding consumer needs, desires, and time-saving solutions in the online environment.
2019	Analysis of Tweets About Football: 2013 And 2018 Leagues In Turkiye	The research analyzes real-time streaming data in Turkish football leagues, providing insights for sports managers and marketers. It recommends considering the context of winning or losing in post-match marketing plans and the importance of weekdays in addition to weekends.
2019	Divergent Effects of Friend Recommendations on Disclosed Social Media	The research explores how friend recommendations affect social media advertising in the United States and South

VII. International Applied Social Sciences Congress - (C-IASOS – 2023)
Valletta –Malta, 13-15 November 2023

	Advertising in The United States and Korea	Korea, highlighting cultural differences in how Western and Asian consumers perceive friend recommendations and advertising disclosures.
2021	Using Deep Learning to Investigate Digital Behavior in Culinary Tourism	The research employs deep learning and image analysis to understand digital consumer behavior related to Chinese restaurants on the TripAdvisor platform. It introduces a new analytical methodology for examining visual content and keywords.
2021	Digital Consumer Behaviour and Ecommerce Trends During The COVID-19 Crisis	The research focuses on the impact of the COVID-19 crisis. It explores factors influencing digital consumer behavior, shifts in spending patterns, changes in devices used for online shopping, and alterations in payment preferences in the Czech Republic.
2021	Eye Tracking Technology to Audit Google Analytics: Analysing Digital Consumer Shopping Journey in Fashion M-Retail	The research utilizes eye-tracking technology and Google Analytics data to understand digital consumer behavior in the fashion m-retail sector, emphasizing the need for more sophisticated analytics to meet evolving consumer needs.
2021	Understanding The Emotional Impact of Gifs on Instagram Through Consumer Neuroscience	The research analyzes GIFs' ability to create emotional connections in social media marketing strategies, incorporating neuroscience research techniques to enhance the analysis of emotions on social networks.
2022	Experiences in Consumer Flow in Online Supermarkets	The research aims to understand the role of flow in online purchase processes for bulk consumption products in online supermarkets, identifying concentration and personalization as the primary direct precursors of flow.
2022	Marketing Strategy of The Small Business Adaptation to Quarantine Limitations in The Sphere of Trade Entrepreneurship	The research focuses on developing a marketing strategy for small businesses to adapt to quarantine restrictions, emphasizing the role of digitization in accelerating the adaptation process.
2022	Understanding Digital Consumer: A Review, Synthesis, and Future Research Agenda	The research discusses the transformation of consumer behavior due to digitization, identifying cultural, social, and economic factors that impact digital consumer behavior.
2022	In Search of Time To Bring The Message on	The research explores the impact of contextual factors like time and weather on the

	Social Media: Effects of Temporal Targeting and Weather on Digital Consumers	effectiveness of mobile advertising campaigns, particularly for meal delivery and food-order services.
2023	The Evaluation of Challenges And Impact of Digitalisation On Consumers In Singapore	The research critically evaluates the evolution of the retail consumer behavior model resulting from digitization in the Singapore market, emphasizing the positive impact of perceived risk, perceived values, and emotional elements on digital consumer behavior.

The publications examined in the literature review were examined in detail. Williams et al. (2010) systematically review and synthesize the literature on digital consumer behavior and digital piracy. The literature often emphasizes the limitations of current studies, which tend to focus on the behaviors and attitudes of young individuals and calls for further research on demographic differences and long-term effects. It suggests that social and situational factors impact the likelihood of obtaining digital content through illegal means more than ethical considerations. Anonymity in the digital world emerges as a powerful indicator that liberates individuals from traditional social constraints and promotes their "individualization." The article raises questions about the effectiveness of punishment in deterring digital piracy. It highlights the need for new and creative business models to address assumptions about changing ownership, sharing, and content copying. Laws prohibiting all unauthorized downloads could potentially label millions of people as offenders. The authors believe that this systematic review is the first in the literature since the emergence of the Pirate Bay case and the Government's Digital Britain report, addressing digital piracy behaviors and attitudes, demographic differences, and the need for further research on long-term effects.

Onete et al. (2016) researched consumer behavior in the context of online shopping in Romania. Their study aimed to identify the characteristics of the new type of consumer and understand the relationship between consumers in the Romanian electronic market and online stores. The research also provided insights into why consumers prefer products and services from foreign markets online. By correlating research results with official data, the study revealed the characteristics of digital consumers in Romania. It found that Romanian consumers are different from typical European consumers, showing interest in online shopping from abroad and being influenced by quality and price. The research indicated a nearly threefold higher representation of women in online orders in Romania, suggesting higher female participation in online shopping. Interest in online shopping is increasing among young individuals in Romania, with 95% of participants reporting online purchases in the last

12 months. Romanians order products or services both from Romanian websites (53% of participants) and European Union countries (38% of participants), with a minor percentage ordering from Asian countries (6% of participants). The main reasons Romanians purchase from foreign sellers online are the unavailability of the product in the country and price considerations. The most commonly purchased products online from foreign merchants by Romanians are clothing and shoes, electronics, watches and jewelry, and cosmetic products.

Tang et al. (2017) aim to explain the critical success factors of Pokémon GO and provide a valuable reference for practitioners in the application game market. The study investigates player behavior in mobile application games using a three-stage method involving focus group discussions and extensive survey studies. By discussing the social usage and structure of Pokémon GO, the article emphasizes the wide spread of the game in media and its high exposure in both online and offline environments. Using telepresence theory and social capital theory, the study seeks to understand the success factors of Pokémon GO. One identified vital success factor is the game's ability to evoke childhood memories for many young adults. Overall, the article offers insights into the success factors and consumer behaviors of Pokémon GO, providing valuable information for those interested in the application game market. The study identifies touching childhood memories as an essential success factor, resonating with young adults with nostalgic connections to the game. Another contributing factor to Pokémon GO's success is using augmented reality (AR) and global positioning systems (GPS), building on similar technologies applied in previous games.

Chivu (2018) explores new trends in marketing mix strategies for digital consumer behaviors. The article discusses the advantages of online stores, such as extensive product variety and personalized offers based on customer preferences. It emphasizes the importance of understanding consumer needs and desires to provide better service than competitors. Additionally, the article highlights the role of time in the consumer decision-making process and the need for time-saving solutions in the online environment. Conducting research with 100 participants through a survey method, the article aims to identify the most effective marketing mix elements in the online environment. It also addresses the emergence of a new consumer model, the digital consumer, with different needs and consumption behaviors compared to traditional consumers. Overall, the article contributes to understanding marketing strategies and consumer behavior in the digital environment.

Ozturkcan et al. (2019) contribute to the emerging field of sports marketing literature, social media analytics, and digital consumer behavior. They present an analysis of real-time streaming data through a long-term approach focusing on the 2013 and 2018 Turkish football leagues. The findings offer valuable insights for sports managers and marketers, recommending the inclusion of the context of winning or losing in post-match marketing plans, emphasizing the importance of weekdays in addition to weekends, and suggesting the use of after-work hours for social media interaction. The research analyzes behavioral data more accurately by collecting streaming data compared to

survey data, reflecting user behavior. The article also highlights the significance of Türkiye hosting valuable football clubs in Europe and the widespread use of Twitter.

Ermann et al. (2019) examine the impact of friend recommendations on social media advertising in the United States and South Korea, finding that friend recommendations decrease advertising effectiveness in the U.S. while increasing it in Korea. The study emphasizes differences in how Western and Asian consumers perceive friend recommendations and advertising disclosures. It contributes to understanding how friend recommendations influence social media advertising in different cultural contexts, specifically in the United States and Korea. The research underscores the importance of considering cultural differences in evaluating friend recommendations and advertising disclosures on social media. It suggests that social media advertisers must pay more attention to how different functions and combinations affect consumer perceptions and behaviors in various cultures. The study provides theoretical insights into the role of trust, reliability, and persuasive knowledge in the effectiveness of friend recommendations and disclosed social media advertisements. It also offers practical implications for managers and practitioners interested in social media advertising, highlighting the nuanced effects of friend recommendations and disclosures in different cultural contexts. The research suggests that trust in friend recommendations is an additional mechanism explaining cross-cultural differences in evaluating disclosed social media advertisements. It recommends caution for advertisers using friend recommendations in the United States, as combining them with disclosed advertisements decreases perceived reliability, brand attitude, and purchase intention. In Korea, however, incorporating friend recommendations in advertisements has been observed to increase advertising effectiveness. Advertisers are encouraged to leverage friend recommendations to enhance trust and reliability among Korean consumers.

Hasan et al. (2021) aim to understand digital consumer behaviors related to Chinese restaurants by analyzing visual content on the TripAdvisor platform. Deep learning and image analysis are used to examine user-generated online content and identify the most frequently repeated keywords. Image recognition, utilizing Inception V3 and Google's deep learning network, is employed to analyze 4,000 photos of nine Chinese restaurants, identifying 12 hierarchical image clusters. Additionally, a survey involving 125 Chinese participants investigates consumers' information needs before visiting a restaurant and their reasons for sharing experiences afterward. The study introduces a new analytical methodology using deep learning and image analysis to examine visual content and keywords related to Chinese restaurants on the TripAdvisor platform. The research provides insights into digital consumer behavior in culinary tourism by exploring various keywords and visual images published online. This analytical methodology contributes valuable information for image marketing management in the culinary tourism industry. It expands the literature on user-generated visual content in culinary tourism, enhances understanding consumer behavior, and guides future research. The combination of image analysis, clustering, and text mining in this research provides insights into digital

consumer behavior and contributes to developing marketing strategies in the culinary industry.

Jílková & Králová (2021) examine the impact of the COVID-19 crisis on digital consumer behavior and e-commerce trends in the Czech Republic, focusing on factors influencing digital consumer behavior and the latest trends in online shopping. The research utilizes data from two surveys conducted before and during the pandemic, involving 200 participants from different generations. The results indicate a significant increase in digital purchases and a shift in spending patterns, leading to higher online shopping frequency and changes in the types of products purchased. The study also highlights changes in devices used for online shopping and emphasizes shifts in consumer preferences for payment methods during the pandemic. Therefore, the research explores factors influencing digital consumer behavior that increase online transactions and changes in online searches, payments, and delivery methods due to fear of the pandemic and the desire for home security. Additionally, the study underscores changes in spending patterns, with a decrease in non-food categories and an increase in online food and non-alcoholic beverage consumption. The preference for personal computers over smartphones and tablets for online shopping is also investigated. Overall, the research contributes new insights into digital consumer behaviors and e-commerce trends during the COVID-19 crisis, enhancing understanding of the changing landscape of online shopping.

Tupikovskaja-Omovie & Tyler (2021) focus on understanding digital consumer behavior in the fashion m-retail sector, employing eye-tracking technology and Google Analytics data. Eye-tracking can complement Google Analytics data, capturing interactions with all website elements. In contrast, Google Analytics only monitors half of digital user activities. Integrating eye-tracking technology into research to improve marketing decisions and evaluate customers' shopping journeys expands the application of Google Analytics data. The research demonstrates how eye-tracking can provide a more comprehensive understanding of digital consumer interactions with a fashion retailer's website. It emphasizes that Google Analytics only captures half of digital user activities, while eye-tracking encompasses interactions with all website elements. Therefore, the study contributes to understanding digital consumer behavior in m-commerce and emphasizes retailers' need to innovate and develop more sophisticated analytics to meet evolving consumer needs.

Rúa-Hidalgo et al. (2021) analyze the ability of GIFs to create emotional connections in social media marketing strategies and demonstrate how neuroscience research techniques can enhance the analysis of emotions on social networks. The research consists of two stages: an experimental study using automatic biometric analysis in the first stage and an analysis of emotions declared in Instagram comments in the second stage. The results indicate that the explicit measure of emotional value is higher and more positive than implicit measures, influenced by engagement and the ratio of emojis in comments. The study underscores the importance of incorporating neuromarketing insights into measuring user emotion in social media campaigns. It suggests a

combination of emotion measurements (emotional value, basic emotions, and engagement) to evaluate the effectiveness of GIFs in creating emotional experiences on social networks. Integrating neuroscience research techniques, such as automatic biometric analysis, enhances the analysis of emotions in social media marketing strategies. Therefore, the research emphasizes the importance of including neuromarketing insights in measuring user emotion in social media campaigns. The explicit measure of emotional value is shown to be higher and more positive than implicit measures, influenced by engagement and the ratio of emojis in comments. In this regard, the research provides new insights into the emotional impact of GIFs on Instagram, analyzing declared emotions in user comments and utilizing biometric tools to determine and resolve perceived emotions by users. Moreover, it offers a more accurate analysis, extending beyond content analysis and traditional methods for measuring user emotion.

Morales-Solana et al. (2022) aim to understand the role of flow in the online purchase processes of bulk consumption products in online supermarkets using qualitative and quantitative techniques. The results reveal that concentration and personalization are the primary direct precursors of flow in online supermarkets. At the same time, factors such as perceived risk and perceived variety tend to hinder the flow state. Additionally, the flow has positive outcomes on purchase intention and e-loyalty. The article contributes to understanding digital consumer behavior in the context of bulk consumption products in Spain, shedding light on the role of flow in online purchase processes and defining concentration and personalization as the primary direct precursors of flow in this context. It also emphasizes inhibitory factors of flow, such as perceived risk and perceived variety. The study demonstrates the positive flow outcomes, including increased purchase intention and e-loyalty. Therefore, the article proposes a comprehensive flow model for mass consumption environments in online supermarkets, offering a theoretical framework for understanding and analyzing digital consumer behavior in this context. The model was validated using structural equation modeling by adding to the existing literature on flow in digital shopping environments.

Ivanova et al. (2022) aimed to develop a marketing strategy for small businesses to adapt to quarantine restrictions during the COVID-19 pandemic. Highlighting the need to reshape existing marketing strategies, the researchers emphasize the role of digitization in accelerating the adaptation process. The research analyzes the use of vending machines as a tool for automating sales processes and presents the potential business model of selling goods through vending machines. The article discusses the importance of digital media, particularly in promoting markets, to increase the activities and sales of small businesses. Emphasizing the increasing importance of small and medium-sized enterprises in national economies, the research highlights the need for appropriate support from the government to ensure their survival in the market. It also suggests addressing the need to adjust marketing strategies for small businesses in modern conditions to ensure their viability.

Sağkaya Güngör & Ozansoy Çadırcı (2022) discussed the transformation of consumer behavior due to digitization and the need for a comprehensive understanding

of digital consumers. By examining 5505 articles on digital consumers in 66 marketing journals, the authors derived 42 topics from current studies, applied theories, and methodologies to meet the need for bibliometric information on digital consumer research. The researchers primarily identified the impact of cultural, social, and economic factors on digital consumer behavior, emphasizing the significant role of recommendation systems in assisting consumers in their searches and making better choices. They observed that online brand communities' social identity and consumer engagement influence purchase intentions.

Yoon et al. (2022) explored the impact of contextual factors such as time and weather on the effectiveness of mobile advertising campaigns on social media, particularly in the context of meal delivery and food order services. They suggested that ads presented during the pre-decision stage (non-mealtime) increase consumer spending on meal services more effectively. Additionally, they found that adverse weather conditions (less sunlight) enhance the effectiveness of advertising on consumer spending in mobile app food delivery orders.

Rangaswamy et al. (2023) critically evaluated the evolution of the retail consumer behavior model resulting from digitization in the Singapore market using a cross-sectional and inductive analysis. Data were collected through a web-based survey with a sample size of 200. Various statistical analyses were employed, including Descriptive Analysis, ANOVA, Pearson correlation coefficient test, and simple linear regression test. Thus, the research methodology is grounded in critical realism, aiming to explore causal structures and understand the complexity of digital consumer behavior. The findings emphasize the positive impact of perceived risk, perceived values, and emotional elements on digital consumer behavior. The article also highlights the need for measures to protect consumers against threats posed by digitization.

4.1. Commonalities and Trends

The research covers various geographical contexts, including the United States, South Korea, Romania, Turkiye, Spain, the Czech Republic, and Singapore. The global nature of the studies indicates a comprehensive exploration of digital consumer behavior in various cultural and regional settings. Below are some common points and trends in these studies.

- The impact of cultural, social, and economic factors on digital consumer behavior is a recurring theme.
- Recommendation systems, Augmented Reality (AR), and Global Positioning Systems (GPS) significantly contribute to success in various contexts.
- Understanding consumer needs, desires, and time-saving solutions is crucial for effective marketing strategies.

- The influence of contextual factors, such as time and weather, on advertising effectiveness is explored.
- The role of technology, including eye-tracking and deep learning, in understanding digital consumer behavior is emphasized.

5. DISCUSSION AND CONCLUSION

Digital consumer behavior refers to the actions and decisions consumers make in the digital environment, such as online shopping, social media engagement, and other forms of digital interaction. Understanding digital consumer behavior has become increasingly crucial for marketers and researchers as consumers shift their consumption and social interactions to digital spaces.

Recent studies have focused on various aspects of digital consumer behavior. These include topics such as the impact of digital technologies on legal relationships with consumers, especially in the online domain, and the necessity to protect consumer rights reasonably. Additionally, these studies delve into the attitudes and behaviors of digital consumers, addressing issues like the transformation of traditional consumers into digital consumers and the influence of digital environmental factors on purchase decisions. Furthermore, the experiences and influences of consumers in the digital realm are examined.

Digital consumer behavior encompasses topics such as consumer digital culture, responses to digital advertising, and the effects of social media on consumer behavior. Moreover, studies explore the impact of digital marketing and digital payment on consumer purchasing behaviors. This involves examining factors influencing consumers' adoption of digital payment methods and contemplating the future trends of digital payment methods.

Several factors influence the scientific research process of digital consumer behavior. These factors can be decisive in the planning, execution, and interpretation stages of researchers' studies. Digital consumer behavior undergoes continuous evolution due to rapidly changing technological landscapes. New digital tools, platforms, and applications can influence consumer behaviors, necessitating researchers to stay abreast of these technological developments. A significant portion of consumers' online interactions occurs on social media platforms. These platforms can impact interactions among consumers and influence consumer behavior. Researchers must consider this factor to understand the role of social media platforms and examine interactions taking place on these platforms. Sensitivity to security and privacy issues in the digital realm is a crucial factor influencing digital consumer behavior. Researchers should address this topic to comprehend consumers' concerns and assess the impact of security measures on digital platforms. The increasing popularity of online shopping and mobile commerce affects consumers' purchasing behaviors. Researchers should strive to understand how consumers utilize e-commerce and mobile commerce platforms and how this usage influences digital consumer behavior by keeping track of e-commerce and mobile

commerce trends. Artificial intelligence and big data analytics have enhanced the ability to analyze large datasets related to consumers. Researchers can conduct more in-depth analyses and evaluate these data by employing these technologies to understand consumer behaviors better. Digital marketing strategies of businesses shape consumers' online interactions. Researchers should focus on these strategies to evaluate the impact of businesses' digital marketing tactics on consumer behaviors. Consumers' geographical locations can influence digital behaviors, especially with location-based services and applications shaping consumers' online interactions. The digital economy has significantly transformed consumer behavior, requiring a deeper understanding of the impact of digital technologies, marketing, and virtual experiences on consumer decision-making processes.

5.1. Research Gaps and Limitations

Another proposal (Rúa-Hidalgo et al., 2021) involves investigating whether stimulus types, such as stories, photos, or videos, can achieve a similar emotional impact on social media networks as GIFs.

Furthermore, Morales-Solana et al. (2022) suggest conducting additional research to investigate the impact of the number of products on the supermarket website on the consumer flow experience. This exploration will provide insights into how the abundance of choices can affect the flow state. Additionally, replicating the study using different sub-dimensions of risk perception would be valuable to provide empirical evidence on its effects on online shopping intentions and behaviors. This approach will contribute to a more comprehensive understanding of the role of risk perception in the flow experience. Exploring the relationship between flow and brand loyalty in online supermarkets is also significant for future studies. This will further enhance our understanding of the influence of flow on digital consumer behavior and its implications for retailers.

In a different study (Sağkaya Güngör & Ozonsoy Çadırcı, 2022), four directions for future research in the field of digital consumer studies are proposed. These include contextual, thematic, methodological, and theoretical directions. Contextual direction involves examining the influence of cultural, social, and economic factors on digital consumer behavior. Thematic directions encompass researching emerging topics such as social identity, emotional decision-making, and the role of influencers in digital consumer behavior. Methodological directions suggest using advanced techniques like topic modeling and bibliometric analysis to analyze and understand digital consumer research. Theoretical directions call for developing new theoretical models considering both benefits and costs in the digital environment.

Yoon et al. (2022) highlight the need for further research to understand nuanced differences in the impact of weather on advertising for future studies. Therefore, recognizing that subjective judgments of pleasant or unpleasant weather can vary, the importance of exploring nuanced differences in testing the impact of weather on advertising is emphasized. Future research should investigate these differences and

explore how weather conditions affect how individuals process advertising information. In another future research proposal (Rangaswamy et al., 2023), longitudinal studies are recommended to examine how characteristics related to digitization and consumer behavior change over time. Additionally, conducting survey research with representative sampling data to capture and analyze data related to digital phenomena from participants would be beneficial.

In future studies, developing new theoretical behavior models to measure digital consumption or evaluating the abilities of existing theories to measure digital consumer behavior in different aspects would be beneficial. On the other hand, research can be conducted on how technologies such as artificial intelligence and machine learning affect and shape digital consumer behavior. The impacts of personalized recommendations, chatbot interactions, and other artificial intelligence applications on consumer preferences can also be examined in this context. However, concerns about security and privacy are increasing in digital consumer behavior. Future research could explore how new security measures and privacy policies can be designed to ensure consumers feel secure in digital environments. Additionally, understanding the effects of VR and AR technologies on digital consumer experiences and researching their impacts in commerce, entertainment, and other sectors is expected to be a significant area of research in the future. With the development of social media platforms, studies can be conducted to understand better interactions among consumers and the influence of social media on consumer decisions. Lastly, consumers' sensitivity to environmental impact and sustainability issues is growing. In this context, focused studies can be conducted on how consumers assess sustainability criteria in their digital product and service choices. Research in these areas can provide crucial insights into understanding the future development of digital consumer behavior and how businesses can adapt to these changes.

Like any academic research, this systematic literature review has its limitations. For example, this study used only the WoS database, while others could have expanded it. The included studies cover only digital consumer behaviors associated with marketing; they do not encompass other related research areas.

REFERENCES

- Aljuhmani, H. Y., Elrehail, H., Bayram, P., & Samarah, T. (2023), "Linking social media marketing efforts with customer brand engagement in driving brand loyalty", *Asia Pacific Journal of Marketing and Logistics*, 35(7), 1719-1738.
- Baiuk, A. (2023), Digital marketing in social networks and digital consumer behavior in global markets (based on English Prime School case) [Doctoral dissertation, Private Higher Educational Establishment-Institute Ukrainian-American Concordia University].

Chivu, R. G., Stoica, I., Orzan, M. C., & Radu, A. V. (2018), “New trends in marketing mix strategies for digital consumer behaviour”, *New Trends and Issues Proceedings on Humanities and Social Sciences*, 5(2), 89-95.

Da Silva Neto, J. A. (2021), “Comportamento do Consumidor na Economia Digital: Uma Revisão da Literatura/Consumer Behavior in the Digital Economy: A Literature Review”, *ID on line. Revista de psicologia*, 15(55), 226-236.

Ebrahimi, P., Khajeheian, D., Soleimani, M., Gholampour, A., & Fekete-Farkas, M. (2023), “User engagement in social network platforms: what key strategic factors determine online consumer purchase behaviour?”, *Economic Research-Ekonomska Istraživanja*, 36(1), 2106264.

Errmann, A., Seo, Y., Choi, Y. K., & Yoon, S. (2019), “Divergent effects of friend recommendations on disclosed social media advertising in the United States and Korea”, *Journal of Advertising*, 48(5), 495-511.

Felix, A., & Rembulan, G. D. (2023), “Analysis of Key Factors for Improved Customer Experience, Engagement, and Loyalty in the E-Commerce Industry in Indonesia”, *Aptisi Transactions on Technopreneurship (ATT)*, 5(2sp), 196-208.

Fisch, C., & Block, J. (2018), “Six tips for your (systematic) literature review in business and management research”, *Management Review Quarterly*, 68, 103-106.

Fuentes, C. (2019), “Smart consumers come undone: breakdowns in the process of digital agencing”, *Journal of Marketing Management*, 35(15-16), 1542-1562.

Ghazie, D. A., & Dolah, J. (2018), How digital marketing affects consumer behavior”, In *3rd International Conference on Creative Media, Design and Technology (REKA 2018)* (pp. 214-217). Atlantis Press.

Hagberg, J., Sundström, M., & Egels-Zandén, N. (2016), The digitalization of retailing: an exploratory framework”, *International Journal of Retail & Distribution Management*, 44(7), 694-712.

Hamdani, N., Muladi, R., & Maulani, G. (2022), “Digital marketing impact on consumer decision-making process”, *Proceedings of the 6th Global Conference on Business, Management, and Entrepreneurship (GCBME 2021)*. 220.

Hasan, M. R., Abdunurova, A., Wang, W., Zheng, J., & Shams, S. R. (2021), “Using deep learning to investigate digital behavior in culinary tourism”, *Journal of Place Management and Development*, 14(1), 43-65.

Ivanova, N., Popelo, O., Avhustyn, R., Rusak, O., & Proshchalykina, A. (2022), “Marketing Strategy of the Small Business Adaptation to Quarantine Limitations in the Sphere of Trade Entrepreneurship”, *IJCSNS International Journal of Computer Science and Network Security*, 22(1), 149-160.

Jilková, P., & Králová, P. (2021), “Digital consumer behaviour and ecommerce trends during the COVID-19 crisis”, *International Advances in Economic Research*, 27(1), 83-85.

Kamkankaew, P., Sribenjachot, S., Wongmahatlek, J., Phattarowas, V., & Khumwongpin, S. (2022), “Reconsidering the Mystery of Digital Marketing Strategy in the Technological Environment: Opportunities and Challenges in Digital Consumer Behavior”, *International Journal of Sociologies and Anthropologies Science Reviews*, 2(4), 43-60.

Kalashnikova, T., Panchuk, A., Bezuhla, L., Vladyka, Y., & Kalaschnikov, A. (2023), “Global trends in the behavior of consumers of retail enterprises in the digital economy”, *Iop Conference Series Earth and Environmental Science*, 1150(1), 012023.

Kitchenham, B., Pretorius, R., Budgen, D., Brereton, O. P., Turner, M., Niazi, M., & Linkman, S. (2010), “Systematic literature reviews in software engineering—a tertiary study”, *Information and software technology*, 52(8), 792-805.

Korobov, Y. (2020), “Impact of digitalization on consumer behaviour and marketing activity in financial markets”, In *SHS Web of Conferences* (Vol. 73, p. 01013). EDP Sciences.

Kuş, O. & Šević, N. (2021), “Theoretical approach to big data analytics and neuromarketing: advances in understanding consumer trends”, *Digital Siege*, 279-295.

Labrecque, L., Esche, J., Mathwick, C., Novak, T., & Hofacker, C. (2013), “Consumer Power: Evolution in the Digital Age”, *Journal of Interactive Marketing*, 27, 257-269.

Laroche, M. (2010), “New developments in modeling Internet consumer behavior: Introduction to the special issue”, *Journal of Business Research*, 63, 915-918.

Linkiewicz, A., & Bartosik-Purgat, M. (2022), *9 Changes in consumer behaviour in the digital age. European Consumers in the Digital Era: Implications of Technology, Media and Culture on Consumer Behavior*. Routledge

Luceri, B., Bijmolt, T. T., Bellini, S., & Aiolfi, S. (2022), “What drives consumers to shop on mobile devices? Insights from a Meta-Analysis”, *Journal of Retailing*, 98(1), 178-196.

Madhavan, M., & Kaliyaperumal, C. (2015), “Consumer buying behavior-an overview of theory and models”, *St. Theresa Journal of Humanities and Social Sciences*, 1(1), 74-112.

Maltseva, Y., & Danilova, K. (2019), “Comparative analysis of trends in Russian, Chinese and American consumer behavior in the digital environment”, *Proceedings of the International Scientific and Practical Conference on Digital Economy (ISCDE 2019)*.

- Masouras, A., & Papademetriou, C. (2018), “Digital consumer behaviour in Cyprus: from uses and gratifications theory to 4c’s online shopping approach”, *Journal of Advertising and Public Relations*, 1(1). 32-42
- Morales-Solana, D., Esteban-Millat, I., & Alegret Cotas, A. (2022), “Experiences in consumer flow in online supermarkets”, *Electronic Commerce Research*, 1-32.
- Musavi, S. (2021), “The Digital Consumer Profile in 5.0 Societs In Strategic Marketing Management”, *European Proceedings of Social and Behavioural Sciences*. European Publisher
- Onete, C. B., Teodorescu, I., & Vasile, V. (2016), “Analysis Componentsof the Digital Consumer Behavior in Romania”, *Amfiteatru Economic Journal*, 18(43), 654-662.
- Ovodenko, A., Peshkova, G., & Zlobina, O. (2020), “Digital Evolution of Consumer Behavior and its Impact on Digital Transformation of Small and Medium Business Sustained Development Strategy”, *Proceedings of the 2nd International Scientific and Practical Conference on Digital Economy (ISCDE 2020)*.
- Ozturkcan, S., Kasap, N., Tanaltay, A., & Ozdinc, M. (2019), “Analysis of tweets about football: 2013 and 2018 leagues in Turkiye”, *Behaviour & Information Technology*, 38(9), 887-899.
- Park, D. (2019), “Virtuality changes consumer preference: the effect of transaction virtuality as psychological distance on consumer purchase behavior”, *Sustainability*, 11(23), 6618
- Paul, J., Lim, W. M., O’Cass, A., Hao, A. W., & Bresciani, S. (2021), “Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR)”, *International Journal of Consumer Studies*, 45(4), 1-16.
- Pereverzieva, A., & Hubar, O. (2021), “Microeconomic Analysis of Consumer Behavior From The Point of View of Generation Theory In The Mind of Digitalization”, *Scientific Notes of Taurida National V.I. Vernadsky University*.
- Petkovski V, Mulic A. (2023), *Impact of COVID-19 on Digital Consumer Behavior in the Western Balkans Proceedings*, 85(1):28.
- Qadir, A. M. A., Arab, H. R., & Nuri, B. H. (2023), “Digital Consumer Behavior and Ecommerce Tendencies During the New War Crisis”, *Journal of Survey in Fisheries Sciences*, 10(3S), 5875-5881.
- Qerimi, F. & Qerimi, A. (2022), “The impact of digital marketing vs. traditional marketing on consumer buying behavior,” *Hightech and Innovation Journal*, 3(3), 326-340.
- Rahmanov, F., Mursalov, M., & Rosokhata, A. (2021), “Consumer behavior in digital era: Impact of Covid 19”, *Marketing and Management of Innovations*, 5(2), 243-251.

Rangaswamy, E., Yong, W. S., & Joy, G. V. (2023), “The evaluation of challenges and impact of digitalisation on consumers in Singapore”, *International Journal of System Assurance Engineering and Management*, 1-13.

Rogova, N., & Matta, S. (2023), “The role of identity in digital consumer behavior: a conceptual model and research propositions based on gender”, *AMS Review*, 13(1-2), 55-70.

Rúa-Hidalgo, I., Galmes-Cerezo, M., Cristofol-Rodríguez, C., & Aliagas, I. (2021), “Understanding the emotional impact of gifs on instagram through consumer neuroscience”, *Behavioral Sciences*, 11(8), 108.

Sağkaya Güngör, A., & Ozansoy Çadırcı, T. (2022), “Understanding digital consumer: A review, synthesis, and future research agenda”, *International Journal of Consumer Studies*, 46(5), 1829-1858.

SanMiguel, P., Sádaba, T. (2020), “Digital User Behavior in Fashion E-Commerce. A Business Model Comparative Study. In: Nah, FH., Siau, K. (eds) *HCI in Business, Government and Organizations*”, *HCI 2020. Lecture Notes in Computer Science*, 12204. Springer, Cham.

Santos, W., Petroll, M., Júnior, J., & Rocha, R. (2020), “Marketing Digital e o Comportamento de Compra do Consumidor: Um Panorama das Publicações e Proposição de Agenda de Pesquisa”, *Navus: Revista de Gestão e Tecnologia*, 10, 01-17.

Saura, J. R., Reyes-Menendez, A., Matos, N., Correia, M. B., & Palos-Sanchez, P. (2020), “Consumer behavior in the digital age”, *Journal of Spatial and Organizational Dynamics*, 8(3), 190-196.

Seleznova, V. (2022), “Consumer behavior in the new media landscape”, *Bulletin of Taras Shevchenko National University of Kyiv Economics*, (219), 42-48.

Shafiq, M. A., Arshad, H. M. A., Mehmood, S., & Hayyat, A. (2022), “Does Impulse Buying Behavior mediate the relationship between Social Network Marketing and Customer Satisfaction? Evidence from Pakistan”, *Journal of Business & Economics (JBE)*, 14(2), 96-107.

Stephen, A. T. (2016), “The role of digital and social media marketing in consumer behavior”, *Current opinion in Psychology*, 10, 17-21.

Tang, A. K. (2017), “Key factors in the triumph of Pokémon GO”, *Business Horizons*, 60(5), 725-728.

Tupikovskaja-Omovie, Z., & Tyler, D. (2021), “Eye tracking technology to audit google analytics: Analysing digital consumer shopping journey in fashion m-retail”, *International Journal of Information Management*, 59, 102294.

Wagner, G., Schramm-Klein, H., & Steinmann, S. (2020), “Online retailing across e-channels and e-channel touchpoints: Empirical studies of consumer behavior in the multichannel e-commerce environment”, *Journal of Business Research*, 107, 256-270.

Williams, P., Nicholas, D. and Rowlands, I. (2010), “The attitudes and behaviours of illegal downloaders”, *Aslib Proceedings*, 62(3), 283-301.

Xiao, Y., & Watson, M. (2019), “Guidance on conducting a systematic literature review”, *Journal of Planning Education and Research*, 39(1), 93-112.

Yavuz, N. (2022), “Sosyal Bilimlerde Sistematik Literatür Analizi”, *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (51), 347-360.

Yoon, G., Li, C., & Choi, J. J. (2022), “In search of time to bring the message on social media: Effects of temporal targeting and weather on digital consumers”, *Frontiers in Psychology*, 13, 1042714.

Zhou, J. (2021), “How Consumer Behaviors Shape Digital Marketing”. In 2021 3rd International Conference on Economic Management and Cultural Industry (ICEMCI 2021) 712-716. Atlantis Press.

The Performance Analyses of the Regional Development Agencies in Türkiye¹

Ufuk Selen² Ebru Sipahi³

Abstract

Introduction: It can be said that two main policies are followed in Türkiye to eliminate regional development differences: Priority Regional Practices in Development, Regional Development Approach. Regional development efforts, which were followed at a limited and inadequate level from 1923 to the 1960s, were systematically implemented with "Priority Regions for Development" practices. In the 2000s, these policies based on central planning were abandoned and the Regional Development Agencies (RDA) model was adopted.

Aim and Scope: The scope of the study is aimed at analyzing the policies followed in the economic development process in Türkiye and their consequences. In this context, the aim of the study is to evaluate RDA's performance. The study aims to answer the following questions: To what extent has the system change aimed at reducing development differences affected regional development? Are RDA's performances at a level that will ensure regional development?

Method: The study is based on performance analysis. The following five indicators were used for performance measurement in the study: 1) "Technical Support indicator", 2) "Financial

¹ This study was prepared using Ebru Sipahi's MBA thesis titled Evaluation of the Performance of Development Agencies in Ensuring Regional Development in Türkiye.

² Prof. PhD. Bursa Uludag University, Türkiye

³ Science Expert, Bursa Uludag University, Türkiye

Support indicator", 3) "Budget Possibilities Indicator", 4) "Investment Support indicator" and, 5) "Agency Organization and Cooperation Indicator"

Indices created using formulas developed for each indicator were used to determine RDA's performance. RDA's activity reports and the General Directorate of Development Agencies' activity reports were used as data sources in creating the indexes.

Findings: As a result of the analysis, although RDA's were organizationally sufficient in terms of quantity, it was seen that they were inadequate and unsuccessful in terms of the evaluation parameters used in the study.

Key Words: Economic Development, Local development, Performance Analyses.

Jel Codes: O18, O20, O21

1. INTRODUCTION

1.1. Turkiye's Development Adventure

Differences in economic, social and cultural development, which are common features of developing countries, also pose a problem for Turkiye. Development problems may occur throughout the country or between regions within the country. It is aimed to ensure national and regional development through policies that include state intervention.

Regional development policies in Turkiye have been implemented in three ways: Priority Regional Approach to Development, Regional Development Projects and Development Agencies. Development policies of the 1934-1950 period were shaped around industrial plans. With the industrial plans followed, it was aimed to ensure regional development and spread the industry throughout the country (BBSP 1934-1938: p.27). At the end of the plan period, plan targets were not achieved. Industrialization is concentrated in the west of the country and the population is concentrated in this region (Dinler . 2010:53-54).

The most important initiative in regional planning in Turkiye was the establishment of the Ministry of Construction and Settlement in 1958. With the establishment of this ministry, regional development plans were made for Köycegiz-Dalaman, Eastern Marmara, Zonguldak, Antalya, Çukurova and Eastern Anatolian regions (Akpınar, Taşcı and Özsan. 2011:108). Trying to base economic growth and development on the plan, Turkiye decided to establish SPO in 1960.

After 1960, with the transition to the planned development period, the determination and implementation of development plans and policies were left to the SPO organization. Thus, more systematic policies for development purposes were implemented. In the following period, five-year development plans were created, and regional development was tried to be directed in this way. However, during the planned development period, since resource allocation was made according to decisions where political interests were at the forefront, the difference in development between regions increased even more.

Since investments could not be directed to areas that needed development, the development of the eastern region of the country was unsuccessful (Dinler. 2010:54-55).

After the 1929 economic crisis and World War II, the differences between countries became more evident and the development problem became the common denominator of the world economy (DPT, 2000: 210). During this period, development economics approaches were decisive in economic policies. Starting from the 1950s, efforts to establish development agencies were concentrated in Western European countries, especially the USA (Engin, 2021:67). The establishment of SPO in Türkiye also coincides with this period.

Regional development efforts carried out under the central authority until the early 2000s have changed as Türkiye entered the EU harmonization process. A paradigm that aims to determine development policies based on local dynamics has been adopted. In addition to the central authority in ensuring development, a step has been taken into a system that will activate the potential of local elements such as chambers of commerce and industry, non-governmental organizations, professional groups and universities, based on the regional dynamics based on the understanding of participation.

As a product of this paradigm change, 26 development agencies started their activities in 2009. The main question of this study is how regional development agencies have performed over thirteen years. The framework and results of the analyzes carried out to answer this question are as follows.

1.2. Structure and Functioning of Regional Development Agencies

1.2.1. General Information About Regional Development Agencies

Regional development agency; It is defined as an organization established to contribute to economic development by developing and revitalizing the entrepreneurial potential of a bordered region, with an administrative structure independent from the central governments, and whose activities are financed by the public or private sector (DPT . 2000:174).

Attempts to establish development agencies in Türkiye started with the harmonization efforts with the EU acquis during the EU membership process. In the context of the obligations of the Accession Partnership Document signed with the EU, the first national program was prepared in 2001. and the other national programs were prepared in 2003 and 2008 and presented to the European Commission [https://www.ab.gov.tr/turkiye-ab-iliskilerini-tarihcesi_111.html. (10.04.2022)]. To give agencies a corporate identity and to base their establishment, objectives, budgets and activities on a legal basis, the "Law on the Establishment, Coordination and Duties of Development Agencies" dated 25.1.2006 and numbered 5449 came into force. To serve the purpose of establishing the RDA's, 26 regional development agencies covering 81 provinces have been established and they are listed in Table 1.

1.2.2. Tasks of Development Agencies

The duties and powers of development agencies are listed in the establishment law. The most basic of these duties and abilities have been determined as directing investors to these areas to close the investment gap in the Agency's field of activity and informing investors about the region. In addition to this main task; To provide technical support to the planning studies of local governments, to support activities and projects that will ensure the implementation of regional plans and programs, to contribute to the development of the region's capacity regarding rural and local development to develop cooperation between the public sector, private sector and non-governmental organizations in line with regional development goals. It also has duties such as using or having others use the funds allocated to the agency in accordance with regional plans and programs and conducting and/or supporting research aimed at increasing regional development.

Table 1: Regional Development Agencies in Türkiye

AGENCY	AGENCY CENTER	AGENCY	AGENCY CENTER
Cukurova Development Agency (CKA)	Adana	East Blacksea Development Agency (DOKA)	Trabzon
Istanbul Development Agency (ISTKA)	İzmir	Trakya Development Agency (TRAKYAKA)	Tekirdag
Izmir Development Agency (IZKA)	İstanbul	South Aegean Development Agency (GEKA)	Denizli
Central Mediterranean Development Agency (OKA)	Samsun	Zafer Development Agency (ZEKA)	Kütahya
Karacadag Development Agency (KARACADAG)	Diyarbakır	Eastern Marmara Development Agency (MARKA)	Kocaeli
Mevlana Development Agency (MEVLANA)	Konya	West Mediterranean Development Agency (BAKA)	Isparta
Northeast Anatolia Development Agency (KUDAKA)	Erzurum	Eastern Mediterranean Development Agency (DOGAKA)	Hatay
Ipekyolu Development Agency (IKA)	Gaziantep	Ahiler Development Agency (AHİKA)	Nevşehir

VII. Congress of International Applied Social Sciences
C-iasoS 2023 – Valletta –Malta
13-15 November 2023

Dicle Development Agency (DIKA)	Mardin	Central Development (ORAN)	Anatolia Agency	Kayseri
Eastern Anatolia Development Agency (DAKA)	Van	Western Development (BAKKA)	Blacksea Agency	Zonguldak
Bursa- Bilecik- Eskişehir Development Agency (BEBKA)	Bursa	North Development (KUZKA)	Anatolian Agency	Kastamonu
Ankara Development Agency (ANKARAKA)	Ankara	Serhat Development Agency (SERKA)		Kars
South Marmara Development Agency (GMKA)	Balıkesir	Fırat Development Agency (FKA)		Malatya
Kaynak: 06.07.2006 tarih ve 26220 Resmi Gazete . 22.11.2008 tarih 27062 sayılı Resmi Gazete ve 25.07.2009 tarih ve 27299 sayılı Resmi Gazete’de yayımlanan Bakanlar Kurulu Kararları				

1.2.3. Support Elements of Development Agencies

RDA's aims to ensure regional development by minimizing regional and sectoral development differences within the country and establishing connections between the public sector, private sector, chambers of commerce and industry and non-governmental organizations. Support mechanisms for these goals are divided into three: financial support, technical support and other support. The support mechanism of the agencies is shown in Figure 1.

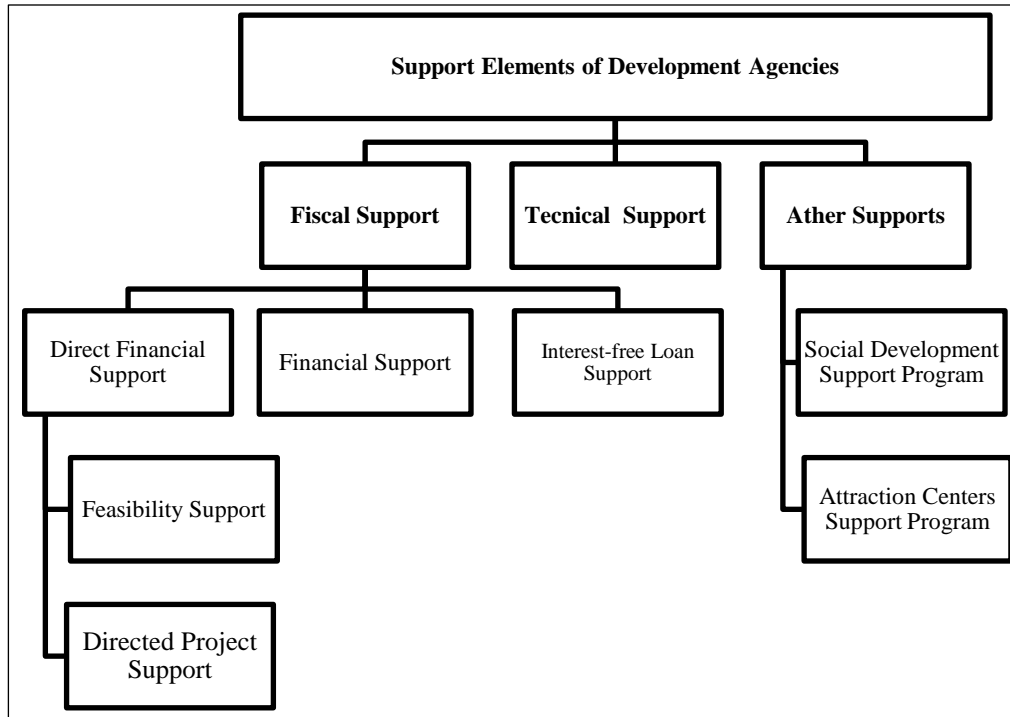


Figure 1. Support Elements of Development Agencies

2. METHOD OF THE STUDY

The process of producing outputs for measuring and measuring the effectiveness and efficiency of a situation, project or idea for a predetermined purpose is called evaluation. Because of the evaluation process, an idea is obtained about the degree to which the project or idea achieves its set goals and objectives. Because of the evaluation process, comparisons can be made with other projects or ideas within the same scope or information can be produced about its temporal development. In this context, the performance scale produced from data collected from primary sources was used to analyze the performance of regional development agencies.

The activities of development agencies, their budgets, the activities they carried out to increase the recognition and visibility of the region, the collaborations developed with their stakeholders, the number of investors attracted to the region and how many individuals who decided to invest used the Investment Support Office channel were examined. The data set in Table 2 was created to measure the 11 year performance of the agencies and to monitor the change in the process. Since we wanted to classify the criteria according to their level of importance (Table 3), the results obtained were

multiplied by the determined level of importance and the performance result of the development agencies was reached. It can be seen at the Table 4.

Table 2: Development Agencies Activity Indicators and Formulas

INDICATOR	OPERATIONAL RESULTS INDICATORS	FORMULA
G1	Number of Technical Supports Provided	Total Technical Support / Total Number of Public Institutions and Non-Governmental Organizations
G2	Number of Participants Attending Information and Training Meetings (PAITM)	$\log(\text{PAITM} / \text{Number of Program}) / \log(\text{Total Regional Population Over 20 Years of Age})$
G3	Number of Project to Financial Support Program (NP to FSP)	$\log(\text{NP to FSP}) / \log(\text{Total Number of Public Institutions and Non-Governmental Organizations})$
G4	Number of Project Financially Supported (NPFS)	Number of Project Financially Supported / Number of Project to Financial Support Program
G5	Number of Project to Direct Financial Support Program (NP to DFSP)	NP to DFSP / Total Number of Public Institutions and Non-Governmental Organizations
G6	Number of Project to Direct Financial Support Program (NP to DFSP)	NP to DFSP / Number of Project Financially Directly Supported
G7	Number of Supported Guided Projects (NSGP)	NSGP / NP to DFSP
G8	Amount of Resources Transferred from The Region to The Agency Budget (ARTR)	ARTR / Total Amount of Resources to be Transferred
G9	The Ratio of The Resources Transferred from The Region to The Agency Budget in The Total Budget (RTAB)	RTAB / Total Agency Budget
G10	Amount of Provided Financial Support (APFS)	APFS / Total Agency Budget
G11	Number of Investors Brought into The Region	Number of Investors Brought Into The Region
G12	Annual Number of Applications to The Investment Support Office (NA to ISO)	$\log(\text{NA to ISO}) / \log(\text{Total Number of Public Institutions . Non-Governmental Organizations and Firms})$
G13	The Number of Attended Organization of Agency (NAO)	NAO/12

G14	The Number of Organizations to Agency's Organized in The Region	The Number of Organizations to Agency's Organized in The Region / 12
G15	Number of Collaborations Made by The Agency	Number of Collaborations Made by The Agency / 12

Table 3: Formulation Table

G1= Technical Support Score* 0.6 = K1
G2+ G3+ G4+ G5+ G6+ G7= Financial Support Program Results*0 .8 = K2
G8+ G9+ G10= Budget Possibilities Results *0 .2 = K3
G11+ G12 = Investment Support Activities Results*0 .4 =K4
G13+ G14+ G15= Agency Organization and Cooperation Results*1 = K5
K1+ K2+ K3+ K4+K5= Agency Performance

3. DATA SOURCE AND STRUCTURE OF THE STUDY

The data set of the study is based on the indexes created by us. While creating the indexes, the study titled "Analysis of the Performance Status of Development Agencies" by Baş (2012) was taken as a reference.

Data were tried to be obtained from activity reports published by development agencies. Because of the investigations, standard data regarding the same indicators could not be obtained from all agencies. Therefore, it was decided to benefit from the activity reports published by the ministry. In line with the information obtained from both groups of reports, common data was determined and made ready for analysis. RDA's activity reports between 2010 and 2020 were examined. To access missing data, agencies were contacted via e-mail and data could be obtained from some agencies. Briefly, the data source of the study; Activity reports and websites published by agencies and ministries, which we can call secondary data sources, constitute. In addition, while collecting data, agency websites and e-mails sent to benefit from the right to information were used.

Unlike other indicators, the data on agency cooperation is only available for 2014 and 2020, the number of investors attracted to the region is between 2014 and 2019, and the number of organizations attended/organized is between 2014 and 2020, so the evaluations were made under these restrictions. All indicators other than these were prepared based on data between 2010 and 2020 and were subject to analysis.

4. EVALUATION and RESULTS

This study used five indicators. These are 1) "Technical Support indicator", 2) "Financial Support indicator", 3) "Budget Possibilities Indicator", 4) "Investment Support indicator" and 5) "Agency Organization and Cooperation Indicator. Five indicators were used in the study: "Technical Support Indicator (TDG)", "Financial Support Indicator (MDG)", Budget Possibilities Indicator (BPI), "Investment Support Indicator", and "Agency Organization and Cooperation Indicator". Indices created based on the formulas used for each indicator were used to evaluate the performance of the agencies. These indexes are included in Table 5.

In general evaluation, SERKA is the most successful agency in providing technical support, OKA is the most successful agency in providing financial support, BEBKA is the most powerful agency in terms of budget possibilities, ZEKA is the most successful agency in studies on investment support activities, and ZEKA is the most successful agency in organization and cooperation program applications. It has been determined that it is MEVKA (Table 4).

The performance levels of development agencies between 2010 and 2020 are shown in the map in Figure 2, from lowest to highest. According to the evaluation, the performances of the agencies operating in the Mediterranean and Central Anatolian, Eastern and Southeastern Anatolian Regions are lower than the performances of the agencies operating in the Black Sea Region. The performance of agencies operating in the Aegean Region is higher than the average performance of agencies operating in the Marmara Region. These results can be seen in Table 5, too.

When the performance evaluation of development agencies was made between 2010-2020, the agency with the highest performance value with 72.77 was ZEKA; It was determined that the agency with the lowest performance value was KUDAKA with 29.740.

Development agencies were established in 2010 and started their activities in 2011. Therefore, performance levels in these two years were found to be quite low. It was determined that the number of newly opened programs within the scope of MDP in 2017 was very low, and the number of supports provided within the scope of direct financial support decreased. When the general evaluations were done, we can say that some agencies used separate support mechanisms effectively, but the same agency could not use more than one support mechanism.

Table 4: Data Set on Agency Activities

AGANCIES	FINANCIAL SUPPORT PROGRAM			DIRECT ACTIONS SUPPORT			DIRECTED PROJECT	TECNICAL SUPPORT
	Proposed Project	Supported Project	(1/2)	Proposed Project	Supported Project	1/2	Supported Project	Given Support

VII. Congress of International Applied Social Sciences
C-iasoS 2023 – Valletta –Malta
13-15 November 2023

	(1)	(2)		(1)	(2)			
ISTKA	4003	818	0.20	228	50	0.21	8	0
TRAKYAKA	2112	465	0.22	187	62	0.33	3	357
GMKA	2038	517	0.25	144	51	0.35	3	242
IZKA	1661	487	0.27	110	43	0.39	5	0
GEKA	2020	490	0.24	345	121	0.35	0	457
ZEKA	2110	602	0.28	229	118	0.51	2	809
BEBKA	1539	427	0.27	175	63	0.36	2	455
MARKA	2083	543	0.26	582	154	0.20	13	572
ANKARAKA	2341	537	0.22	558	114	0.20	2	448
MEVKA	2846	712	0.25	169	83	0.49	7	669
WMDA	2002	474	0.23	268	98	0.36	7	72
CKA	3530	767	0.21	209	79	0.37	2	197
DOGAKA	2328	537	0.23	487	90	0.18	2	526
AHIHA	1887	395	0.20	94	46	0.48	6	418
ORAN	2348	530	0.22	222	70	0.31	6	261
BAKKA	1209	364	0.30	68	31	0.45	5	260
KUZKA	853	278	0.32	95	25	0.26	3	117
OKA	2015	568	0.28	266	103	0.38	9	354
DOKA	1715	592	0.34	432	183	0.42	4	474
KUDAKA	1950	494	0.25	271	91	0.33	6	232
SERKA	1590	470	0.29	155	72	0.46	11	416
FKA	1724	455	0.26	389	124	0.31	6	292
DAKA	2000	423	0.21	238	85	0.30	11	495
IKA	2256	607	0.26	289	127	0.43	7	505
KARACADAG	2436	754	0.30	268	219	0.81	2	394
DIKA	1289	388	0.30	271	179	0.29	9	233

Source: Created by the author.

Table 5: General Evaluation Table of Development Agencies Between 2010 and 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
ISTKA	0.17	1.57	1.64	1.60	9.45	3.81	4.48	7.80	5.92	3.94	1.86	42.23
TRAKYAKA	0.45	1.59	1.98	1.61	3.51	4.75	4.83	2.38	4.33	6.89	3.44	35.77

VII. Congress of International Applied Social Sciences
C-iasoS 2023 – Valletta –Malta
13-15 November 2023

GMKA	0.14	1.57	1.87	1.39	5.73	3.92	5.29	8.39	5.55	5.55	1.89	41.31
IZKA	1.37	1.65	2.62	2.30	9.70	6.04	6.94	6.33	5.66	7.06	2.40	52.07
GEKA	0.54	1.46	0.99	1.97	11.45	2.00	7.56	7.98	5.81	5.00	4.89	49.66
ZEKA	0.53	2.29	1.83	1.85	20.16	3.98	6.83	3.77	15.20	13.14	3.17	72.77
BEBKA	0.63	1.53	1.88	1.67	5.94	2.95	2.97	2.90	8.57	4.34	3.34	36.67
MARKA	0.74	1.76	1.75	2.46	14.57	6.55	3.51	4.04	4.62	7.22	4.51	51.74
ANKARAKA	0.83	1.63	1.44	1.47	3.32	1.45	5.28	5.09	3.48	2.94	2.87	29.80
MEVKA	1.27	3.60	1.37	3.66	5.82	5.98	4.26	7.25	5.15	6.97	4.02	49.37
WMDA	0.14	1.15	1.74	2.36	9.13	3.22	3.65	6.39	4.32	4.34	4.47	40.90
ÇKA	1.21	1.05	1.46	1.94	6.40	2.88	3.06	3.83	4.23	4.48	2.85	33.37
DOGAKA	1.70	1.80	1.59	1.69	5.24	3.11	4.17	2.02	3.00	2.61	3.37	30.29
AHIKA	0.29	0.99	1.46	3.84	6.22	2.78	2.44	4.29	10.29	2.79	4.85	40.24
ORAN	0.48	1.66	1.51	1.66	7.25	2.02	3.07	3.61	7.02	9.18	3.51	40.98
BAKKA	0.65	1.89	1.79	1.80	9.12	1.47	2.55	3.16	2.22	4.04	4.97	33.65
KUZKA	0.38	1.71	0.85	1.09	8.49	4.69	4.99	10.86	5.21	8.37	1.46	48.10
OKA	2.17	2.56	2.41	0.61	13.97	4.09	2.65	8.55	6.13	9.49	4.06	56.68
DOKA	0.01	1.69	1.81	2.98	23.54	5.15	2.78	2.43	4.24	3.62	2.29	50.56
KUDAKA	1.26	1.81	1.87	2.06	3.43	1.91	3.19	2.74	4.04	5.68	1.75	29.74
SERKA	0.46	1.38	2.12	4.24	9.87	9.63	5.53	7.62	3.01	4.55	2.17	50.39
FKA	1.01	2.51	0.61	1.48	8.58	3.79	3.80	6.40	6.54	8.44	5.65	48.79
DAKA	0.59	0.98	1.75	2.07	4.59	3.92	3.81	10.63	5.93	4.89	5.49	44.65
IKA	0.44	1.50	2.31	2.50	9.04	2.74	5.64	3.4	2.89	4.98	6.96	42.74
KARACADAG	1.94	1.90	1.71	2.09	8.49	3.73	1.75	4.66	8.76	5.27	3.08	43.39
DIKA	1.91	1.84	1.09	1.79	5.17	5.01	3.09	3.91	7.47	4.16	3.73	39.17

Source: Created by the author.

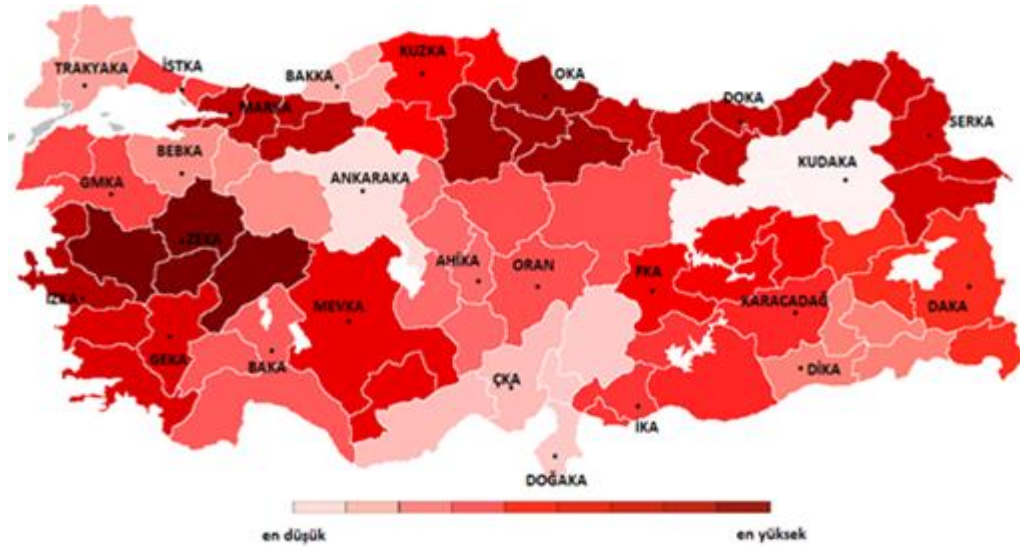


Figure 2. Performance Map of Development Agencies

Source: Created by the author.

It has been observed that agencies actively use financial support and technical support programs but remain passive in direct activity support and guided project support (Table 4). In project proposal calls opened by agencies to provide financial support, they must act by considering all provinces serving within the scope of the agency. Programs should be opened, and project proposals should be received by evaluating each province within its own dynamics.

Unlike the current structure, changing the agency support structure can positively help the development of the region. A gradual support chain should be established, especially when creating financial support programs. When the supports provided are examined, it is seen that almost all agencies open calls for project proposals to support Small and Medium-Sized Enterprises every year. Agencies follow the beneficiaries throughout the project process but stop following them after the project is completed. It will be useful for agencies to develop and implement follow-up and guidance programs that will enable supported companies to move to the next growth stage in the post-project period. Providing guidance to companies in the development of value-added production processes that will increase productivity and therefore profitability will increase the effectiveness of the support provided.

Industrialization supports should not be given to industrially advanced regions, especially the Marmara Region. It would be appropriate to develop and implement service sector-oriented support programs aimed at developing more technological infrastructure in these regions. When the current support programs of the agencies are examined, it is seen that there is no separation in this direction (Table 4).

Development agencies must firstly increase the country's entrepreneurship capacity at the SME scale, then prepare the infrastructure for improving innovation capacity, and develop and implement programs that will keep up with the changing and developing world system. In fact, it can be said that existing support programs are suitable for use in this direction. However, it can be said that the working styles and management structures of the agencies do not allow the active use of these programs. It is necessary to establish a structure that will ensure that support programs are implemented sensitively to regional and provincial dynamics, free from bureaucratic and political engagement.

The examinations showed that most resources were allocated to financial support programs and continuity in agency activities was not ensured. It has been determined that studies on guided project supports are carried out by agencies, but they are used less than other types of support. The number of guided projects prepared and developed jointly by agencies and their stakeholders is high, but the number of successful and supported projects is low. It is seen that the projects submitted to financial support programs are rejected by the ministry as unsuitable. Based on the activity reports, the reasons for not being deemed suitable can be listed as follows: investment locations not being found suitable after feasibility studies, not meeting the needs, and high cost rates. Studies should be carried out on the reasons why projects cannot be supported by agencies. In addition, the reasons for not being supported should be shared with the beneficiaries regularly and those who want to receive support should pay attention to these points.

The number of individuals attending information and training meetings organized by the agency varies between 32.5% and 48% of the population over the age of 20 living in the agency area. The agency with the highest number of individuals attending information and training meetings is GEKA with 48.2%, and the lowest is İSTKA with 32.5%. It has been observed that agencies mostly organize trainings for foreign trade (Sipahi, 2022:180).

The financing of the agencies is mainly covered by the central government budget. In the evaluation made regarding the budget possibilities indicator, it is observed that the shares transferred from the local budget to the agencies are low and their ratio within the agency budget is low. It has been determined that these rates were high in the first years when the agencies started their operations, but they decreased and did not show continuity in the following years. The average ratio of resources allocated to financial support program within the total budget was found to be the highest agency, GMKA, and the lowest, KARACADAG. It is seen that agencies serving in metropolitan cities allocate more resources from the total budget of financial support program (Sipahi, 2022:180).

Within the scope of the research, it was seen that there were many companies that contacted agencies and the Investment Support Office and received information. However, it is seen that some agencies do not keep statistical data on how many investors who contacted the institution and received information about the investment

opportunities of the region invested in the region. The existence of such problems shows that agencies are insufficient to manage follow-up and monitoring processes well (Sipahi, 2022:194).

It appears that there are differences between the activity reports published by development agencies and the Ministry. Activity reports prepared by agencies are irregular and lack standards, making it impossible to collect data, analyze and compare. The carelessness of development agencies with young and dynamic staff in this regard can be interpreted as resulting from managerial deficiencies and indiscipline in all agencies. It was quite difficult to collect statistical data in existing reports during the study period. For example; The agency provides information such as "there have been organizations attended or organized", but numerical data on how many organizations have been organized or attended where, with how many people, on which topics, or have participated are either not included in the reports or are not included irregularly. Similarly, although the agency stated "the project has been prepared" in the relevant activity report period, there is no concrete numerical data. Standards should be brought to the activity reports of development agencies and each agency should take care to prepare reports in accordance with these standards. Otherwise, operations such as performance auditing and transparency analysis become very difficult.

As a final word, although regional development agencies are organizationally enough in terms of quantity, it has been observed that they are inadequate and unsuccessful in terms of the evaluation parameters used in the study. In their current form, regional development agencies produce no results beyond creating bureaucratic cumbersomeness and unnecessary waste of country resources. The inadequacies of the agencies can be eliminated to a certain extent by deciding in their institutional functioning, and their functionality can be further improved by increasing their financial sufficiency. It can be said that if the EU funds are mainly relied upon, it will not be possible to increase the functionality of the agencies and the result will be nothing more than a waste of resources.

REFERENCES

- Akpınar, Rasim, Kamil Taşci and Mehmet Emin Özsan (2011). *Teoride ve Uygulamada Bölgesel Kalkınma Politikaları*. Bursa: Ekin Yayınevi.
- Bakir Hasan. Cem Okan Tuncel (2010). "Avrupa Birliğine Üyelik Sürecinde Türkiye'nin Bölgesel Politikalarında Yaşanan Değişim: Kalkınma Ajansları". *Kalkınma Ajansları Üzerine Seçme Yazılar*. (Ed. Birol Akgül . Nispet Uzay). Bursa: Ekin Yayınevi.
- Baş. Ahmet (2012). *Kalkınma Ajanslarının Performans Durumlarının İncelenmesi İstanbul Teknik Üniversitesi Fen Bilimleri Enstitüsü Şehir Ve Bölge Planlaması Anabilim Dalı Bölge Planlama Programı. Yayımlanmamış Yüksek Lisans Tezi*.
- Birinci Beş Yıllık Sanayi Planı. (1934- 1938) (https://www.emo.org.tr/ekler/364a8ddae9aadd_ek.pdf) (12.04.2022).

Çarıkçı. Emin (1983). Yarı Gelişmiş Ülkelerde ve Türkiye’de Sanayileşme Politikaları . Ankara: Turhan Kitabevi.

Cem, Engin (2021). “Kalkınma Ajansları: Türkiye ve İngiltere Ülke Örnekleri”. Sosyal ve Beşeri Bilimler Dergisi . Cilt:3. No:2.

Çetinkaya, Özhan (2012). Türkiye’de Kamu İşletmeciliği ve Özelleştirme. 3. Baskı. Bursa: Ekin Yayınevi.

Dinler, Zeynel (2014). Bölgesel İktisat. Yenilenmiş 10. Baskı. Bursa: Ekin Kitabevi.

DPT (2001). Kamu Yatırımlarının Planlanması ve Uygulanmasında Etkinlik Özel İhtisas Komisyonu Raporu. Yayın No: 2557.

Sipahi, Ebru (2022) Evaluation of the Performance of Development Agencies in Ensuring Regional Development in Türkiye. Unpunlished MBA thesis. Institute of Social Science. Public Finance Departmant. Bursa Uludag University

Gündüz. Ali Yılmaz (2006). Bölgesel Kalkınma Politikası. Bursa: Ekin Yayınevi.

İldirar, Mustafa (2004). Bölgesel Kalkınma ve Gelişme Stratejileri. Ankara: Nobel Yayınları.

Resmi Gazete. <https://www.resmigazete.gov.tr/arsiv/10621.pdf> (12.04.2022).

Dinler, Zeynel (2010). “Cumhuriyetimizin Kuruluşundan Günümüze İzlenen Bölgesel Kalkınma Politikaları ve Kalkınma Ajansları”. Kalkınma Ajansları Üzerine Seçme Yazılar. (Ed. Birol Akgül. Nıfset Uzay). Bursa: Ekin Yayınevi. s.53- 54.

Selen, Ufuk (2011). Maliye Politikası Aracı Olarak Teşvik Uygulamaları. 1. Baskı. Bursa: Ekin Yayınevi.

T.C. Başbakanlık Devlet Planlama Teşkilatı (1963). Birinci Beş Yıl Kalkınma Planı (1963- 1967).

T.C. Başbakanlık Devlet Planlama Teşkilatı (2000). Sekizinci Beş Yıllık Kalkınma Planı. Bölgesel Gelişme Özel İhtisas Komisyonu Raporu.

Türkiye AB İlişkilerinin Tarihçesi. https://www.ab.gov.tr/turkiye-ab-iliskilerinin-tarihcesi_111.html. (10.04.2022).

Yavuz, Tiftikçigil Burcu (2012). Türkiye’de Bölgesel Kalkınma Politikalarında Yaşanan Dönüşüm ve Kalkınma Ajansları. Ankara: Der Yayınları.

Yıldızak Gizem Buket (2018). “Almanya’nın Bölgesel Kalkınma Politikaları ve Bölgesel Kalkınma Ajansları Üzerine Bir İnceleme”. Management and Political Sciences Review ss. 195- 218. (<https://dergipark.org.tr/tr/download/article-file/1201028>).

Valuable Findings About the Ancient History of Nakhchivan

Togrul Khalilov¹

Abstract

Human figures are one of the archaeological materials of scientific importance for the study of our ancient history. In the territory of the Nakhchivan Autonomous Republic, such a material-cultural example was previously recorded only in the Qızılburun monument. This archaeological material belonged to the Middle Bronze Age. During our recent research in this area, several new clay human figures were recorded and included in the study. One of them is currently kept in the Nakhchivan State History Museum, and the other one is kept in the Sharur Region History and Local History Museum. Both human figures date to the Late Bronze-Early Iron Age. These archaeological materials are of great scientific importance for the study of the ancient history of Nakhchivan. If we look at the sources to justify our opinion, we will see that such human figures have been discovered in different parts of the world in addition to Azerbaijan. They were made of stone, bone, and clay. The oldest human figure belonged to a woman. Female statues have become a symbol of the "Mother-Goddess". Male figures symbolized "Father-God". Female figures symbolizing "Mother-Goddess" and male figures symbolizing "Father-God" were associated with the "Cult of Ancestors". Traces of the "Cult of Ancestors" have been recorded in various parts of the world. It has taken an important place in the religious-ideological meetings and spiritual culture of the Turks. Traces of the "Cult of Ancestors" can be found in "Oguz Khagan", "Genesis" and other ancient Turkish epics before and after Islam. As in different parts of the world, the human figures found in the monuments of Nakhchivan are related to the "Cult of the Ancestors". In this direction, they are of great scientific importance in terms of a deeper study of our spiritual culture.

Introduction: Human figures are archeological materials that provide science for the study of the ancient history of Nakhchivan

Aim: The goal is to study the ancient history of Nakhchivan on the basis of human figures.

Method: The subject comparative study was examined during scientific analysis.

Findings: Human figures found in archaeological monuments in Nakhchivan were studied

Originality and value: The archaeological materials used in the article were included in the published scientific circulation for the first time

Key Words: Nakhchivan , human figure , ancestor cult

Jel Codes: M31, M39

¹ Ph.D.Assoc. Prof. Dr. Nakhchivan Section of the National Academy of Sciences of Azerbaijan, Azerbaijan

1. INTRODUCTION

Nakhchivan Autonomous Republic is an autonomous state within the Republic of Azerbaijan. It borders with the Republic of Armenia in the north and east (the length of the border line is 246 km), the Republic of Turkey in the west (the length of the border line is 15 km), and the Islamic Republic of Iran in the south (the length of the border line is 204 km).

There are more than 1200 monuments in the territory of Nakhchivan Autonomous Republic. Every archeological material discovered from these monuments is of great scientific importance for the study of our history. Nakhchivan Autonomous Republic has a rich history and ancient culture. Since Nakhchivan has favorable natural and geographical conditions, people have lived in this area since the Paleolithic period and created many material culture examples. They are made of tools, ornaments, weapons, animal figures, clay pots, etc. consists of. Among such archaeological materials, human figures occupy an important place. This archaeological material has not been systematically studied so far, so it was studied by us. During the research, a comparative scientific study was conducted using museum materials and literature materials.

2. HUMAN FIGURES

In the territory of the Nakhchivan Autonomous Republic, such a material-cultural example was previously recorded only in the Qızılburun monuments (Əliyev, 1977: 62; İsmayılzadə, İbrahimli, 2013: 49) (Figure 1). It belonged to the Middle Bronze Age. In recent times, during our research in this field, several new clay human figures have been recorded and included in the study. The figure of Qızılburun was found to be a handsome man. The figure's head, legs, and lining of the upper garment (charkha or back) are red, the outer garment (charkha or back) itself is white, and the upper part of the upper garment above the waist is painted in black and brown. While researching the semantics of the colors on it, it is known that white, black and red colors have occupied a special place in the religious-ideological meetings of people since the ancient stone and were used in the performance of certain rituals. Black color is the symbol of night, white color is day, purity, coldness, paleness of death, wisdom, kindness, holiness, red color is considered to be the symbol of life, energy, sun, fire. The gray color was considered the symbol of the east, the white color of the west, the red color of the south, and the black color of the north. Among the Uighurs, red is a symbol of joy and happiness, white is a symbol of purity and happiness, yellow is a symbol of mourning, grief, blue is a symbol of happiness and happiness, black is a symbol of care and tranquility (Rahman, 1996: 57, 58). In the religious-ideological meetings of the Yakut, the white color indicated holiness (Ögel, 2010: 110). In the Anatolian folk belief, white has become a symbol of birth and death, purity and cleanliness, black is a symbol of evil, fear, distress, blue eyes, protection from the eye (Alp, 2009: 34).



Figure 1. *A clay human figure found in Qızılburu (1-Əliyev, 1977; 2-İsmayilzadə, İbrahimli, 2013).*

One of them is currently kept in the Nakhchivan State History Museum, and the other one is kept in the Sharur Region History and Local History Museum (Figure 2). Both human figures date to the Late Bronze-Early Iron Age. Not every one of them was made by accident. Used for a specific purpose.

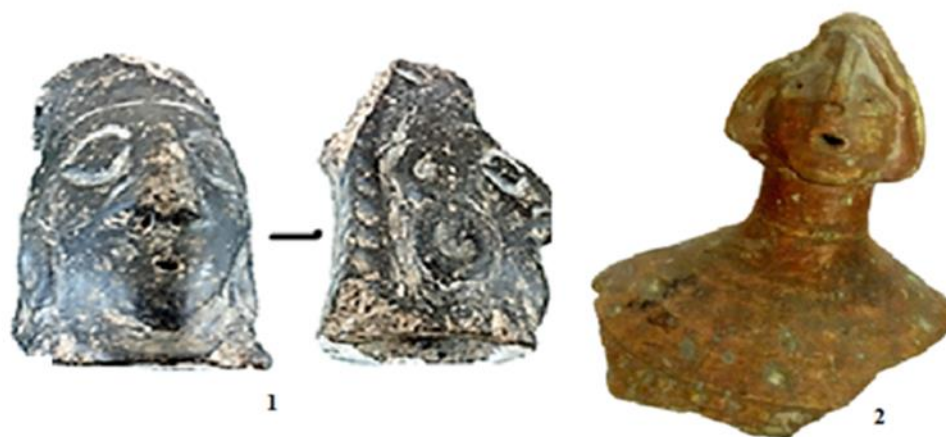


Figure 2. *Clay human figures from the Late Bronze-Early Iron Age (1-Sharur District History Museum, AA-inv.101; 2- Nakhchivan State History Museum, NDTM-DK 328, A-308)*

When conducting research on the purpose of this archaeological material, it is necessary to first pay attention to the distribution area of such artifacts. During the research conducted by us in this direction, it is known that examples of such statues made of stone, bone and clay are spread in the area from the Priney Peninsula to Siberia. Because human statues made of stone differ from each other in terms of shape and characteristics, they are called "venus", "balbal", "dashbaba", "dashnana", "bangudash", "bediz", "toz" and so on. names are given. . The oldest human statue found in the world belonged to a woman. It was recorded in the Willendorf monument of the Paleolithic era in Australia. This stone human statue was named "Venus of Willendorf" after the place where it was found (İbrahimov, 2013: 6). Among the archaeological monuments in Azerbaijan, the oldest human statue was discovered in the Kanza settlement of the Mesolithic period in Gobustan (Мырадова, 1979: 41). In addition to the Paleolithic and Mesolithic periods, such artifacts are also common in other periods. In the monuments of Halef, Anau, Samara, Kormo, Khatun culture (Махмудов, 2008: 101), Somutape in Gazakh region, Gargaltapesi, İlanlitape in Karabakh, Tepe-Sarab in South Azerbaijan (İbrahimov, 2013: 12), Çatalhöyük, Dundartepe, Hacilar in Eastern Anatolia (Oral, 2014: 154-160) such archaeological materials were found in the monuments and other places. Among the Bronze Age monuments of the Nakhchivan region, it has been recorded so far only in the Qızılburun monument. From there, a 20 cm tall clay human figure from the Middle Bronze Age was discovered. Although there is some similarity between the human figure discovered from the Qızılburun monument and the human figure discovered from Sahriyar village, they are different from each other due to the structure of their faces. One of the main reasons why they differ from each other is that they did not belong to the same period, but were made by different artists.

During our research on the designation of human figures, it is known that the oldest human statues belong to women, they were spread during the mother khanate. During the mother khanate (matriarchy) era, such sculptures symbolized the "Mother-Goddess" because she was considered the creator of the female generation, the protector of the tribal hearth, the source of divine power, blessing, security, prosperity, purity, and holiness. In the female figures of the statue, their hands, feet, and face are conventionally schematic, and other features are slightly prominent. In the Bronze Age, the maternal khanate (matriarchy) was replaced by the paternal khanate (patriarchy). During the patriarchy, the man took the main place in the economy and management of the tribe. During the period of patriarchy, as in all fields, there were changes in people's religious-ideological views, along with female figures, male figures were also made. They represented "Father-Goddess" (Male-Goddess), symbolized inflexibility, pride, strength, and power. Accepting a woman as a "Mother-Goddess" (Female-Goddess) and a man as a "Father-Goddess" (Male-Goddess) was part of the "Cult of Ancestors". The existence of the cult of ancestors has shown itself in different ways in different parts of the world. R. Alizadeh, N.N. Yefimenko, S.A. Tokarev, A. Şükurov, K. Huseynoglu and others expressed different opinions about this. S.A. Tokarev considered the cult of ancestors to be a special form of religion and noted that it occupies an important place in the

religious-ideological views and spiritual culture of Turks (Tokarev,1990: 255, 261). He considered that the female statue found around the hearth symbolized that the woman was the protector of the hearth. N.N. Yefimenko, like S.A. Tokarev, stated that female statues were not placed around the hearth by chance. He considered that they symbolized the fact that the woman was the head of the tribe, the executor of tribal rituals. R. Alizade showed several epics ("Oguz Khagan", "Genesis", etc.) as examples and noted that the "Cult of Ancestors" occupies a special place in the religious-ideological meetings of Turks both before and after Islamization (Alizade, 2008: 99-105). According to A. Shukurova and S. Rzasoy, the image of Oghuz Khagan, which occupies a special place in Turkish mythological thought, was directly related to the "Cult of Ancestors" (Şükürov, 2005 p. 45; Rzasoy,2007: 183). L.N. Gumilyov noted that the "Cult of Ancestors" among the Altai Turks is widespread mainly among nobles and the wealthy class of the population (Qumilyev, 1993: 76).

3. CONCLUSION

In the end, the conducted research gives a reason to note that, like any archaeological material, our ancient and ancient craft products occupy an important place in the field of studying our national-spiritual values, material and spiritual culture. Each of them reflects our ancient history. It proves that Azerbaijan has an ancient history and a rich culture. The fact that the female figures symbolize the "Mother-Goddess" (Female-Goddess), and the male figures symbolize the "Father-Goddess" (Male-Goddess) finally gives reason to note that these types of figures are related to people's religious and ideological views. Like the human figures discovered in different parts of the world, they were used in certain religious rituals related to the "Cult of the Ancestors". "Cult of the ancestors" occupied a special place in the religious-ideological meetings of the Turks both before and after Islamization. The discovery of such archeological materials related to the "Cult of the Ancestors" in Nakhchivan, as well as the close similarities of many ornaments on clay pots in the ancient Turkic culture, gives reason to note that the Nakhchivan Autonomous Republic, like all regions of Azerbaijan, is an ancient Turkic homeland.

REFERENCES

- Alp Ö.K .(2009) Orta Asya'dan Anadolu'ya kültürel sembollere giriş. Ankara, Eflatun Yayın Evi.
- Əliyev V.H. (1977) Azərbaycanca tunc dövrünün boyalı qablar mədəniyyəti. Bakı, Elm.
- Əlizadə R. (2008) Türk epos ənənəsində əcdad kultu // *Türk Dünyası İncelemeleri Dergisi*, c. 8, s. 95-105, İzmir.
- İsmayilzadə Q., İbrahimli B.İ.(2013) Qızılburun nekropolu. Bakı, Elm və Təhsil.
- İbrahimov T. (2013) Azərbaycanın qədim heykəltəraşlığı. Bakı, Şərq-Qərb.

- Гумилев Л.Н. (1993) Древние тюрки. Москва, Клышников.
- Мурадова Ф.М. (1979) Гобустан в эпоху бронзы. Баку, Элм.
- Махмудов Ф.Р. (2008) Культура юго-восточного Азербайджана в эпоху бронзы и раннего железа. Баку, Нафта-Пресс.
- Rahman A. (1996) Uygur Folkloru / çev. Y. Soner ve E.Erkin. Ankara, Kültür Bakanlığı Yayınları.
- Oral E. (2014) Anadolu’da ana tanrıça kültü // *Akademik Sosyal Araştırmalar Dergisi*, 2014. yıl 2, sayı 8, s. 154-164.
- Ögel B. (2010) Türk Mitolojisi, baskı 5 Ankara, TTK Basımevi.
- Rzasoy S. (2007) Oğuz mifi və Oğuznamə eposu. Bakı, Nurlan.
- Şükürov A. (2005) Azərbaycan mifologiyası. Bakı, Çıraq.
- Токарев С.А. (1990) Ранние формы религии. Москва, Политиздат.

VII. Congress of International Applied Social Sciences - C-iasoS 2023
Valletta –Malta, 13-15 November 2023