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01 / ECONOMICS STUDIES



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THE CARBON BORDER ADJUSTMENT MECHANISM: TURKEY'S PERSPECTIVE AND STRATEGIC RESPONSE*

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* This work is derived from the study titled "Analysis of the Carbon Tax in the Context of Environmental Rights and Property Rights and Examination of the Status of Germany and Türkiye in the Face of the Carbon Border Adjustment Mechanism," supported by the Max Planck Institute for Tax Law and Public Finance.

Abstract

The goal of the paper is to reveal the positive and negative aspects of Carbon Border Adjustment Mechanism for Türkiye and to discuss Turkey's strategic response. This paper uses a document analysis method to achieve the objectives of the study. The main subject of the research, the Carbon Border Adjustment Mechanism, is excluded from the application results due to being a relatively new practice and gradually coming into effect. Additionally, another limitation of the study is that its scope is limited to Türkiye. The Carbon Border Adjustment Mechanism, which came into effect on October 1, 2023, brings about certain advantages in terms of environmental protection and effectively addressing global warming. However, it also raises some concerns. It is believed that this process could have an impact on national economies and may lead to disadvantages for developing countries like Türkiye, which may not have the resources to sustain stable climate policies in the global market. Turkish businesses exporting to the EU would be required to pay indirectly the carbon tax imposed by the EU if carbon pricing is not implemented in Türkiye. Therefore, it would be in Turkey's favor to accept carbon pricing through domestic regulations. Since the paper focuses on a current debate, so academic studies on this subject are limited. Although there are studies discussing the Carbon Border Adjustment Mechanism, this project differs from others in that it focuses on Türkiye. Additionally, this paper is important in that it focuses on one of the most important problems facing countries. The fact that the step taken by the European Commission to solve this problem will entirely come into force very soon makes it even more important to discuss its positive and negative effects comprehensively.

Keywords: carbon pricing, carbon tax, carbon border adjustment mechanism, carbon emission

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1. INTRODUCTION

Following the European Green Deal, which was adopted by the European Commission on December 11, 2019, and aims to make Europe the world's first climate-neutral continent by 2050 with net-zero greenhouse gas emissions, EU member states have implemented stringent measures to reduce carbon emissions. However, this has led to the issue of carbon leakage, as firms have shifted their activities to countries without carbon pricing.

The European Commission has adopted the Carbon Border Adjustment Mechanism to prevent the shift of production from the EU to countries with lower emission reduction targets, thereby protecting Europe's competitiveness, as well as to ensure more effective environmental protection. The transition period for the implementation began on October 1, 2023, while the financial obligations are planned to be enforced starting in 2026.

Although this new regulation is an effective method for environmental protection, it poses certain risks, particularly for developing countries like Türkiye. In this context, the study examines what Türkiye needs to do to avoid negative impacts from this regulation.

The study is divided into three main parts. The first part provides information on the scope of environmental issues and the Carbon Border Adjustment Mechanism. The second part analyzes Türkiye's environmental performance by detailing the methods it employs to protect the environment and its emission levels. The final part evaluates potential risks for Türkiye, ongoing efforts, and necessary actions.

2. ENVIRONMENTAL ISSUES AND THE CARBON BORDER ADJUSTMENT MECHANISM

The National Aeronautics and Space Administration (NASA) reveals that the last ten years were the 10 warmest years out of 143 years due to temperature measurements made since 1880 when record-keeping began. This means that in 2023 the Earth is about 1.4 degrees Celsius warmer than the late 19th-century average (NASA, 2024).

According to NASA scientists, “The reason for the warming trend is that human activities continue to pump enormous amounts of greenhouse gases into the atmosphere, and the long-term planetary impacts will also continue” (NASA, 2023). Intergovernmental Panel on Climate Change also reveals that greenhouse gas emissions from human activities have contributed to an average global temperature increase of 1.1°C between 1850 and 1900. Over the next 20 years, this increase is predicted to reach or exceed 1.5°C. (IPCC, 2021).

Carbon dioxide gas, which causes the temperature to increase by controlling the world's climate, comes out with the burning of fossil fuels for energy production. Recently, NASA scientists and international scientists determined that carbon dioxide emissions were the highest recorded in 2022 (NASA, 2023).

This ominous image demonstrates that nations bear a heavy burden in the fight against environmental issues, particularly global warming. Taxes are one of the most useful tools that nations have in their fight against environmental issues. The "double dividend hypothesis" suggests that it may be possible to use the revenue generated by a tax on pollution emissions to finance reductions in other taxes elsewhere in the economy, even though it is generally agreed that the priority of environmental taxes is not a fiscal goal but rather an effective fight against environmental problems (McKittrick, 1997). In this sense, it can also help achieve the goal of a more equitable tax system.

The European Commission, which aims to reduce carbon emissions by 55% by 2030 and to zero it completely by 2050, draws attention to the fact that climate change is a global problem that requires global solutions. For this reason, the European Commission has introduced the Carbon Border Adjustment Mechanism (CBAM) to combat "carbon leakage" (European Commission, n.d.).

The Carbon Border Adjustment Mechanism is an EU mechanism to promote cleaner industrial output in non-EU nations and to set a fair price on carbon emissions from the production of items that are carbon intensive and entering the EU (European Commission, n.d.).

The primary reason for the EU implementing this mechanism is that climate change is a global issue requiring global solutions. Although the EU raises its climate targets and implements stringent policies to achieve them, many non-EU countries have less strict climate policies, leading to carbon leakage and so less successful outcomes. Carbon leakage becomes inevitable when EU-based companies shift their carbon-intensive production to countries with less stringent climate policies or when EU products are replaced by more carbon-intensive imports (European Commission, n.d.).

The CBAM will guarantee that the carbon price of imports is equal to the carbon price of domestic production and that the EU's climate objectives are not compromised by verifying that a price has been paid for the embedded carbon emissions generated in the production of specific goods imported into the EU (European Commission, n.d.).

The first products and precursors whose manufacturing is carbon intensive and has the highest risk of carbon leakage are cement, iron and steel, aluminum, fertilizers, power, and hydrogen. These imports will be subject to the CBAM (European Commission, n.d.).

The transitional phase of the CBAM went into effect on October 1, 2023, and importers' first reporting period ended on January 31, 2024. The present transitional period runs from 2023 to 2025, after which CBAM will implement its final regime in 2026. In order to assist the decarbonization of EU industry, the CBAM is being gradually introduced in coherent with the phase-out of free allowance allocation under the EU Emissions Trading System (ETS) (European Commission, n.d.).

3. TURKEY'S ENVIRONMENTAL REPORT CARD

To understand how ready Türkiye is for CBAM, it would be useful to look at environmental taxes and CO₂ emissions in Türkiye.

As part of the global fight against climate change, Türkiye is a party to the Montreal Protocol, the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement. Under the Paris Agreement, Türkiye initially committed to reducing its greenhouse gas emissions by 21% by 2030, later updating this target to 41%. Türkiye also has a net-zero emission target for 2053 (Republic of Türkiye Ministry of Foreign Affairs, 2022a; Republic of Türkiye Ministry of Foreign Affairs, 2022b; Republic of Türkiye Ministry of Foreign Affairs, 2022c; Republic of Türkiye Ministry of Foreign Affairs, 2022d).

There is no carbon tax implemented in Türkiye. The only tax directly applied to protect the environment is the Environmental Cleaning Tax. Additionally, since 2019, the Recycling Contribution Fee, commonly known as the plastic bag tax, has been in place, which imposes a fee of no less than 0.25 TL per plastic bag. Furthermore, there are taxes in Türkiye that primarily aim to generate revenue but indirectly contribute to environmental protection, such as the Motor Vehicle Tax and the Special Consumption Tax, particularly on petroleum products. In Türkiye, although there is no direct carbon tax application in the field of carbon tax, it ranks first among OECD countries in terms of the tax rate applied indirectly to petroleum (Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, 2018).

On the other hand, Türkiye is a country that uses taxes, especially through tax incentives, as a tool to protect the environment and promote renewable energy. However, looking at Türkiye's carbon emission figures, it is clear that the incentives for the use of sustainable and clean energy sources are insufficient, and significant steps need to be taken to reduce carbon emissions (Artun, 2024).

The overall greenhouse gas emissions in Türkiye rose by 7.7% in 2021 compared to the year before, according to figures from the Turkish Statistical Institute, and were estimated to total 564.4 million tons. Emissions of greenhouse gases per person increased from 4 tons in 1990 to 6.3 tons in 2020 to 6.7 tons in 2021 (TurkStat, 2023). On the other hand, the total greenhouse gas emissions for 2022 decreased by 2.4% compared to the previous year, amounting to 558.3 million tons of CO₂ equivalent (TurkStat, 2024).

Table 1 reveals the Greenhouse gas emissions (CO₂ equivalent), between 1990 and 2022 in Türkiye.

Table 1. Greenhouse gas emissions (CO₂ equivalent), 1990 – 2022 Türkiye

Year	Total Emissions	CO ₂	Year	Total Emissions	CO ₂	Year	Total Emissions	CO ₂
1990	228,0	154,1	2001	287,6	216,3	2012	455,2	357,4
1991	235,4	160,6	2002	292,5	223,7	2013	447,3	349,2
1992	241,8	166,7	2003	312,1	239,2	2014	466,4	365,7
1993	249,1	173,8	2004	321,7	247,2	2015	480,1	386,3
1994	242,8	170,1	2005	344,8	267,0	2016	504,1	404,6
1995	256,5	184,1	2006	365,2	284,6	2017	531,1	429,4
1996	275,9	202,5	2007	399,0	315,6	2018	528,1	422,1
1997	286,7	214,9	2008	394,9	311,7	2019	515,6	404,3
1998	288,1	215,0	2009	401,3	317,5	2020	530,2	414,4
1999	285,6	210,7	2010	405,3	317,6	2021	572,0	455,2
2000	306,4	232,4	2011	434,8	343,0	2022	558,3	441,4

Source: TurkStat, 2024

As seen in Table 1, Turkey's total emissions and CO₂ emissions have more than doubled compared to the 1990s. Looking at Turkey's position globally and among OECD countries, it is clear that in 2021, Türkiye was one of the countries with the highest CO₂ emissions within the OECD, with approximately 422 million tons, following the USA, Japan, Germany, South Korea, the UK, Mexico, Canada, and Italy. The countries with the highest CO₂ emissions in the world are China, the USA, and India, respectively (Ritchie et al., 2023).

Considering Turkey's goals to reduce greenhouse gas emissions by 41% by 2030 and achieve net zero emissions by 2053, it is inevitable that some measures need to be taken. Additionally, the CBAM implemented by the European Commission serves as a significant pressure for Türkiye to act without delay, as a large share of Turkey's foreign trade is with European Union member countries.

4. TURKIYE IN VIEW OF CBAM: POTENTIAL RISKS, EXISTING REGULATIONS, AND NECESSARY ACTIONS

CBAM, which came into effect on October 1, 2023, is advantageous for safeguarding environmental rights and effectively addressing global warming, but it also raises some issues. It is thought that this process may have an impact on national economies and result in disadvantages for emerging and southern nations that lack the resources to maintain stable climate policies on the global market (Ergün, 2023). Türkiye is one of these countries.

When looking at the situation from the perspective of Türkiye, it is crucial to note that EU-27 Countries and Germany from these countries are the states that Türkiye exports the most goods (Republic of Türkiye Ministry of Trade, 2023). Turkish businesses exporting to the EU will be required to pay the carbon tax that the EU would impose if there is no carbon pricing in Türkiye.

Carbon pricing is the fundamental policy tool in the fight against climate change (Çelikkaya, 2023). Carbon pricing tools are mechanisms that internalize negative environmental externalities by pricing the environmental costs of greenhouse gas emissions. The revenues

generated from pricing are used for environmental purposes and create significant opportunities for green transformation (Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change, 2024a). The two main options used for this purpose are carbon tax and emissions trading systems (Çelikkaya, 2023).

In 2023, global revenues from carbon pricing mechanisms saw a significant increase, reaching 104 billion US dollars. Approximately three-quarters of these revenues were generated by emissions trading systems operating worldwide, and most of the revenues were used in climate and environmental areas, contributing to global decarbonization efforts (World Bank Group, 2024).

Since the introduction of the ETS in the EU in 2005 to limit greenhouse gas emissions, the number of ETSs has significantly increased (Republic of Türkiye Ministry of Environment, 2019).

In Türkiye, the most significant work on carbon pricing mechanisms has been carried out under the Partnership for Market Readiness (PMR) led by the World Bank. The aim of the partnership program is to support the reduction of greenhouse gas emissions and to facilitate the assessment of market-based mechanisms for countries. The technical assistance project, which started in 2013 and concluded in 2021, examined the impact of carbon pricing mechanisms on the economy, budget, and sectors. Based on analytical evaluations, it was suggested that, considering Turkey's policy priorities and local context, an ETS would be the most suitable market-based mechanism for Türkiye. (Deniz, 2023).

The process of establishing an ETS in Türkiye began in 2015 with the establishment of a Monitoring, Reporting, and Verification (MRV) system (Aşıcı, 2024). Under the "Regulation on Monitoring Greenhouse Gas Emissions," published in the Official Gazette on May 17, 2014, and effective from 2015, greenhouse gas emissions from facilities operating in the electricity generation, cement, iron and steel, refinery, ceramics, lime, paper, chemicals, and glass sectors are monitored at the facility level (Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change, 2022).

Since 2015, the Republic of Türkiye Ministry of Environment has been maintaining this system, which currently ensures regular monitoring of greenhouse gas emission data from approximately 750 facilities. Additionally, the quality of verified greenhouse gas emission reports from facilities covered by the "Regulation on Monitoring Greenhouse Gas Emissions" is emphasized as being of great importance for the establishment of the "National Emissions Trading System" (Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change, 2024b).

The drafting of a Climate Law in Türkiye has been underway since 2019. This law is expected to be presented to the Grand National Assembly of Türkiye in 2024 (Yeşil Ekonomi, 2024). The Climate Law aims to establish an Emissions Trading System and implement a voluntary

carbon market in line with green development and the 2053 Net Zero Emission Target. It also facilitates the expansion of climate finance and the use of climate change incentives. The Emissions Trading System is expected to include at least a two-year pilot phase. Specifically, the period from October 15, 2024, to October 15, 2026, is designed as the pilot phase, with the period from October 15, 2026, to June 30, 2035, planned as the first implementation phase (Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change, 2024c).

With the enactment of the Climate Law in Türkiye, the aim is to establish a national emissions trading system aligned with the European Green Deal, preventing the diversion of resources to Europe and allowing Türkiye to use its own resources for its green transformation needs (Yeşil Ekonomi, 2024). Since Article 46 of the Regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism allows importers in the EU to reduce the final payment if they can prove, based on verified information from third-country producers, that they have already paid a carbon price during the production of the imported goods (Regulation (EU) 2023/956 of the European Parliament and of the Council, 2023).

For the ETS to be successful when implemented in Türkiye, it must be well-designed. For example, an excess of free allocations could drive carbon prices to zero and render the ETS ineffective (Aşıcı, 2024). Civil society organizations point out that poor design of the ETS could not only result in Türkiye bearing the financial cost of the CBAM but also lead to some companies gaining unfair profits through pollution allowances (Uğurtaş, 2024).

Another measure Türkiye can take in response to the CBAM, which will significantly impact its economy due to intense external trade with EU countries, is the implementation of a carbon tax. It is suggested that supporting the carbon border adjustment mechanism with a carbon tax in our domestic legislation could have positive outcomes for our economy. Since there will already be a requirement for carbon certification and reporting in the sectors covered, the amount of carbon emissions identified will also provide a basis for determining the carbon tax base (Artun, 2024).

5. CONCLUSION

The Carbon Border Adjustment Mechanism, implemented by the European Commission and set to become financially binding by 2026, directly impacts Türkiye. This is because Türkiye conducts a significant portion of its foreign trade with EU member countries, particularly Germany and Italy.

In Türkiye, which has a carbon-neutral target by 2053, efforts to protect the environment began long ago. The project conducted with the World Bank indicated that the most effective carbon pricing method for Türkiye is an ETS. Work on the Climate Law, expected to come into effect in Türkiye in 2024, is ongoing. This law is also anticipated to establish a national ETS. Additionally, the process of setting up an ETS in Türkiye began in 2015 with the establishment

- National Aeronautics and Space Administration- NASA. (2024, January 12). *NASA analysis confirms 2023 as warmest year on record*. NASA. <https://www.nasa.gov/news-release/nasa-analysis-confirms-2023-as-warmest-year-on-record/#:~:text=2023%20was%20Earth's%20warmest%20year,Earth's%20temperature%20on%20the%20ground%3F>
- Regulation (EU) 2023/956 of the European Parliament and of the Council. (2023, May 16). *Official Journal of the European Union*. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R0956>
- Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. (2018). *İklimi korumanın bedeli*. Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. <https://csb.gov.tr/iklimi-korumanin-bedeli-makale>
- Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change. (2022, June 8). *AB emisyon ticaret sistemi'nin Türkiye versiyonunun uygulamasını destekleme yolunda 'Grandfathering' eğitimi gerçekleştirildi*. Republic of Türkiye Ministry of Environment. <https://iklim.gov.tr/ab-emisyon-ticaret-sistemi-nin-turkiye-versiyonunun-uygulamasini-destekleme-yolunda-grandfathering-egitimi-gerceklestirildi-haber-9>
- Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change. (2024a, May 22). *Karbon fiyatlandırmada mevcut durum ve trendler 2024 Raporu*. Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. <https://iklim.gov.tr/karbon-fiyatlandirmada-mevcut-durum-ve-trendler-2024-raporu-haber-4278>
- Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change. (2024b, June 27). *Yeşil dönüşüm ve sınırda karbon düzenleme mekanizması bilgilendirme ve istişare toplantıları Uşak Ticaret ve Sanayi Odası'nda gerçekleştirildi*. Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. <https://iklim.gov.tr/yesil-donusum-ve-sinirda-karbon-duzenleme-mekanizmasi-bilgilendirme-ve-istisare-toplantilari-usak-ticaret-ve-sanayi-odasi-nda-gerceklestirildi-haber-4291>
- Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, Directorate of Climate Change. (2024c, February 23). *Emisyon ticaret sistemi ve SKDM ilişkisi*. Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. https://ticaret.gov.tr/data/65dc9d3113b8762768385d66/%C4%B0DB%20SKDM%20S-unum-%20ETS-SKDM%20%C4%B0li%C5%9Fkisi_23022024.pdf

- Republic of Türkiye Ministry of Environment. (2019). *Emisyon ticaret sistemi nedir? Nasıl çalışır?*. Republic of Türkiye Ministry of Environment. https://webdosya.csb.gov.tr/db/destek/icerikler/full_taslak-20191127113907.pdf
- Republic of Türkiye Ministry of Foreign Affairs. (2022a). *Viyana Sözleşmesi ve Montreal Protokolü*. Republic of Türkiye Ministry of Foreign Affairs. <https://www.mfa.gov.tr/viyana-sozlesmesi-ve-montreal-protokolu.tr.mfa>
- Republic of Türkiye Ministry of Foreign Affairs. (2022b). *BM İklim Değişikliği Çerçeve Sözleşmesi*. Republic of Türkiye Ministry of Foreign Affairs. <https://www.mfa.gov.tr/bm-iklim-degisikligi-cerceve-sozlesmesi.tr.mfa>
- Republic of Türkiye Ministry of Foreign Affairs. (2022c). *Kyoto Protokolü*. Republic of Türkiye Ministry of Foreign Affairs. <https://www.mfa.gov.tr/kyoto-protokolu.tr.mfa>
- Republic of Türkiye Ministry of Foreign Affairs. (2022d). *Paris Anlaşması*. Republic of Türkiye Ministry of Foreign Affairs. <https://www.mfa.gov.tr/paris-anlasmasi.tr.mfa>
- Republic of Türkiye Ministry of Trade, (2024). *Dış ticaret veri bülteni Temmuz 2024*. Republic of Türkiye Ministry of Trade. https://ticaret.gov.tr/data/66ab872f13b87634b8ce3451/Ayl%C4%B1k%20D%C4%B1%C5%9F%20Ticaret%20Veri%20B%C3%BClteni_Temmuz.pdf
- Ritchie, H., Rosado, P., Roser, M. (2023). *Consumption-Based CO₂ emissions*. OurWorldInData. <https://ourworldindata.org/co2-and-greenhouse-gas-emissions>
- TurkStat. (2023, March 29). *Sera gazı emisyon istatistikleri, 1990-2021*. TurkStat. <https://data.tuik.gov.tr/Bulten/Index?p=Sera-Gazi-Emisyon-Istatistikleri-1990-2021-49672&dil=1>
- TurkStat. (2024, June 5). *Sera gazı emisyon istatistikleri, 1990-2022*. TurkStat. <https://data.tuik.gov.tr/Bulten/Index?p=Sera-Gazi-Emisyon-Istatistikleri-1990-2022-53701>
- Uğurtaş, S. (2024, June 25). *İklim Kanunu nedir?*. Teyit.org. <https://teyit.org/dosya/iklim-kanunu-nedir>
- World Bank Group. (2024). *State and trends of carbon pricing*. <https://iklim.gov.tr/db/turkce/haberler/files/State%20and%20Trends%20of%20Carbon%20Pricing%202024-Full%20Report.pdf>
- Yeşil Ekonomi. (2024, June 11). *İklim Kanununda son aşamaya gelindi*. Yeşil Ekonomi. <https://yesilekonomi.com/iklim-kanununda-son-asamaya-gelindi/>



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CIRCULAR TAXATION DUE TO THE CIRCULAR ECONOMY: EUROPEAN UNION EXAMPLE

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Abstract

Transition from “take-make-dispose linear economy” to circular economy has become significant importance and prominence in recent years for the aim “to develop a sustainable, low carbon, resource-efficient and competitive economy”. Parallel to sustainable development circular economy aims to promote resource efficiency by minimizing waste and maximizing the value of resources. Resource efficiency, sustainable development, effective management of waste are important cornerstones of circular economy. While as a substructure circular economy has becoming a significant key model for the World; superstructure has been being reshaped such as law, constitutions, public administration. In this study circular economy is considered in the respect of legislation especially taxation law. There are plenty legislation trends in circular economy. These are; setting strict environmental product standards, creating the role out environmental ‘scores’ for all products on the market, developing and mainstreaming certifications and warranties for recycled materials, strengthening universal ‘Right to Repair’ legislation, tightening producer responsibility regulations, cutting taxes on circular products and services and increase them on linear ones. In the scope of tax systems naturally in taxation legislation, certain types of taxes has become key term of taxation system. On the grounds of the fact that circular taxes emerged and has become vital and versatile role in tax systems. When it comes to European Union, via harmonisation and approximation circular fiscal policies and circular tax can be implemented among the member states and candidate states. The radical shift of fiscal policies among the European Union has created new debates about approximation and harmonisation of circular tax legislation. This study is important for the literature by discussing the current situation, future of tax systems and alternative solution proposals which are analysed due to the emergence of the circular economy in European Union case. The aim of the study to reveal the panorama of the current environmental taxation system, to reveal the importance of the tax system in the process of the transition to circular economy as an arising phenomenon; circular taxes, to discuss the

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importance of circular taxes than environmental taxes, to discuss possible effects of circular taxes and essential precautions, demands and barriers of circular taxation in European Union case. The official data of European Union have been used in this study.

Keywords: circular taxation, European Union, sustainable development, circular economy

1. INTRODUCTION

In recent years European Union and member states have been enduring unpredictable socio economic issues. As of Covid -19 pandemic, the World have been facing many obstacles as well as the war between Ukraine and Russia. Besides this, Europe have been facing more plenty climate impacts such as deluges, floods, heat waves, forest fires and droughts. Furthermore, air pollution triggers approximately 300,000 premature deaths across Europe each year (European Environment Agency, 2023). Plastic pollution can affect the most remote places of the World. So food systems, drinking water sources, depletion of agricultural land and the biodiversity are new global challenges. Among all the problems in the World refugee and immigrant problem arised from many reasons such as climate change, wars are the other huge demands for Europe.

Therefore, managing and protecting the renewable sources are more urgent than yesterday for European Union. However among all the unforeseen problems well functioning labour markets, competition and welfare systems are the main aims of sustainability of European Union. When we are looking at this panorama EU still has been seeking new economic transformation to settle and survive in sustainability.

2. PANORAMA OF TAXATION IN EUROPEAN UNION

Environmental taxation has a vital key role in sustaining the European Green Deal objectives and the transformation to decarbonised economy. The European Commission states that well-planned tax reforms could “play a direct role by sending the right price signals and providing the right incentives for sustainable behaviour by producers, users and consumers” (European Commission, 2017). However, all attempts for transformation to green economy indeed circular economy; still environmental taxes made up the less than 6% of the revenue. 4% of the environmental taxes are made of taxes on pollution or use of the resources (European Environment, Agency, 2023). So environmental taxes are not well planned and well designed and lucrative tax reform design. On the other hand renewable sources are more urgent and more significant than yesterday. Hence, EU needs a new tool for more sustainable and more effective than environmental taxes. EU has an ambition to become the first climate-neutral entity and to transform the economy to competitive circular economy (Mottershead et. al., 2021). Arising firm industrial ecology and environmental economics Circular economy and circular taxation are new instruments to settle climate-neutral entity. Due to the plenty uneffective attempts for implementing of the environmental taxes it is obvious that transforming EU economy from linear economy to circular economy is very essential for EU economy and future. But there should be more aimed approach to be implemented. This approach encompasses behavior change, logic change, reduction in both resource use and resource waste.

2.1. Taxation Princibles in European Union

However, taxation is the last area that EU tempt to intervene due to the concept of taxation equals to national sovereignty. So, EU focuses on to remove the barriers for the Single Market

and preventing distortions to competition. Before shift to another tax principle; a consensus should be established among the member states.

Indeed, despite all awareness of essentiality of circular taxes special taxation legislation takes unanimity across all member states.

2.2. Pilot Implementations of Circular Taxation

Before to discuss circular economy, certain environmental tax cases among the EU can pave the way for circular taxation and can pave the way for new tax reforms. These examples are of importance for sparking new circular taxes.

However, indeed the concept of circular taxation is beyond the environmental taxation; first EU began to implement environmental taxes. Alas, EU is not successful at collecting environmental taxes. Before introducing circular taxes environmental taxes which were implemented in some cases below were not effective.

As of 1991 Sweden has implemented taxes on energy and transport that reduced the tax burden on labour (Tax Foundation Europe, 2020). Then successively Denmark 1993, Netherlands 1996, Finland 1997, Slovenia 1997, Germany 1999 introduced this kind of tax. In total, at least 25 Euro billion contributed to the economy (European Commission, 2021).

In 1996, the UK began to implement landfill tax however now UK is not a member state. Also, for reducing unemployment contributions Germany increased the VAT rate (Elliott, 2016).

On the grounds of the fact that implementing government bodies such as limited knowledge of environmental taxes and data requirements, concerns about the potentiality of lack of competitiveness, administrative burden, difficulty of tax collection are certain reasons of why environmental taxes are not effective tool. Circular taxation due to the circular economy is another approach of taxation for accomplishing the objectives.

Circular taxation embarks from the discussion on getting the prices right” to using taxation as efficient ways of accomplishing the objectives. Circular taxes can diminish consumption and exceeded use of resources and drive to positive green impacts such as carbon footprints. In addition circular taxes helps transform linear economy to efficient circular economy.

In 2021 European Union’s Plastics Own Resource was begun to be implemented. This implementation was thought to be contribution by each member state due to the mission of the establishment of EU (Mottershead et. al., 2021).

Transition to circular taxation from environmental taxation certain tax cases can show the current situation, barriers and recommendations. Therefore, some past implementations and the newest implementation as to the circular and environmental taxes can give clues for the future. For instances, product Tax-Vehicles (Yanatma, 2023).

Another pilot case is product tax-vehicles. Automotive vehicles are made of intensive materials so reducing environmental impacts of producing intensive materials are significant important for EU. On the grounds of the fact that the introduction of circular taxes of vehicles can strengthen the existence of other environmental taxes and incentives.

However, taxes for vehicles have many challenges so it should be enforced in common consensus among the member states and the citizens.

Due to the logic of circular economy some member states like Belgium and the Netherlands introduced VAT reduction for repair services or relief tax. VAT is considered as consumption tax hence VAT can be implemented through the production to distribution phase of the product's supply chain. VAT reduction on repair stage or relief tax aims to extend the reuse and repair the product so it will extend the product's lifetime.

As the former member state UK introduced waste tax or Landfill tax while being a member state of EU. The logic of this tax is to encourage the circular economy transition. This tax case is beyond the environmental tax for protecting the impact of landfilling. Via this tax landfilling can be priced.

3. BARRIERS AND CHALLENGES OF THE IMPLEMENTATION OF CIRCULAR TAXES

Despite many barriers taxation has become a new base or context of circular economy. In March 2023, EU Commission proposed a directive on the 'Right to Repair' targeted at handling the growing e-waste problem and accomplish 2050 net-zero goals. It is a legal guarantee for prioritizing repair of a product over replacement for consumers who can be only able to request replacement if the repair is more expensive.

Government bodies, limited knowledge, nature of difficulty of tax collection, consumers' behavior, difficulties of compliance and enforcement, higher cost of circular taxation etc. Despite plenty barriers for implementing circular taxation the World and EU is on the edge of requirement of transforming the economy due the climate crisis. However circular economy approach is urgent, it is still in infancy because of the demands. So, there should be some recommendations for implementing circular taxes. Lack of consumer awareness, low prices of virgin materials, lack of data, no sense of urgency and company culture, products are not designed for circular economy are some barriers of circular taxes.

Despite many planed tax reform attempts there are many barriers and challenges of implementation of circular taxes. The first reason of the challenges of implementing a circular taxation among EU is being as domestic, national. Although not only Sustainable Development Goals also EU has aimed that circular taxation is the novel broader approach of EU; many attempts are regulated in domestic base. So, the results of these domestic implementations can be minimised. Taxation is seen as the indication of sovereignty hence EU has played as a referee

in taxation field. As if there was a broader EU circular taxation legislation there would have encompassed many concerns due to the dubious nature tax structure of circular taxation.

4. RECOMENDATIONS OF THE IMPLEMENTATION OF CIRCULAR TAXES

Although there have been many barriers and challenges for implementing the circular taxes, circular tax concept is unescapable and unavoidable for the next generations and the rest future of the World. Hence, what can be done or what kind of shifts can be done for effective implementation of circular taxes.

Despite its applicability and potential impact across the economy, the concept of circular taxation is still in its infancy. Circular taxation is a versatile tool for circular public finance policy will lead to a reduction in many resources and resource waste.

Circular taxation aims needs an integrated approach for every member state's characteristic for long term results. Not only in EU also among the World EU and member states are to be in collaborative approach involving government bodies.

A more targeted approach to fiscal reform is essential and required for getting more benefits from circular economy.

So, what should be done for spreading the implementation of circular taxes.

- By harmonisation and approximation across the Europe, candidate states circular economy and circular taxes can be supported. Legislation is an essential tool for harmonisation.
- Tax instruments should be designed to guarantee environmental sustainability and measures to combat irreversible situations of environmental degradation
- Furthermore, EU can develop guidance for how to use revenue in fighting tax evasion and tax avoidance.
- The last one, various circular taxes can be implemented due to the regional properties

5. CONCLUSION

Due to the plenty reasons of the requirement of circular taxes because of circular economy many challenges have been still waiting to be implemented. As government bodies, limited knowledge, nature of difficulty of tax collection, consumers' behavior, difficulties of compliance and enforcement, higher cost of circular taxation demands still have been demands for circular taxation. Especially legislation for circular taxes is the first barrier for the new approach.

However, many obstacles, barriers, challenges circular taxes will play a prominent role for circular economy. Beyond the environmental taxes circular taxes will contribute more radical shifts in the economic structure and change prices, consumer behavior, repair, recycling, reuse etc.

In addition, circular taxes will bring more social outcomes and bring another approach called as ESG (environment, social, governance) and sustainable development.

REFERENCES

- Elliot, T. (2022). *Landfill Tax in the United Kingdom*. Available: <https://ieep.eu/wp-content/uploads/2022/12/UK-Landfill-Tax-final.pdf>
- European Commission (2017). Available: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32017H0761>
- European Commission (2021). *Plastics own resource*. Available: https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/revenue/own-resources/plastics-own-resource_en#:~:text=The%20plastics%20own%20resource%2C%20in,to%20the%20EU%20policy%20priorities
- European Environment Agency (2023). *Premature deaths due to exposure to fine particulate matter in Europe*. Available: <https://www.eea.europa.eu/en/analysis/indicators/health-impacts-of-exposure-to>
- European Parliament (2020). Available: <https://www.europarl.europa.eu/topics/en/article/20200618STO81513/green-deal-key-to-a-climate-neutral-and-sustainable-eu>
- Mottershead, D., Watkins, E., Gore, T., Andersen, M. S., Pedersen, A. B., Whiteoak, K., de Bruyn, S., Vergeer, R., Chowdhury, T., Van Hummelen, S., & Chewpreecha, U. (2021). *Green taxation and other economic instruments*. Available: https://environment.ec.europa.eu/system/files/2021-11/Green%20taxation%20and%20other%20economic%20instruments%20-%20Internalising%20environmental%20costs%20to%20make%20the%20polluter%20pay_Annexes_10.11.2021.pdf
- Tax Foundation (2020). *Looking Back on 30 Years of Carbon Taxes in Sweden*. Available: <https://taxfoundation.org/research/all/eu/sweden-carbon-tax-revenue-greenhouse-gas-emissions/>

Yanatma, S. (2023). *Which European countries pay the least and most tax on cars?*. Available:
<https://www.euronews.com/business/2023/12/26/which-european-countries-pay-the-least-and-most-tax-on-cars>



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02 / MANAGEMENT AND ORGANISATION STUDIES



THE “IDEAL” MANAGER PROFILE: A LONGITUDINAL STUDY IN HIGHER EDUCATION

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Abstract

The Management role has undergone several changes over time, with different requirements for those wishing to occupy this position. The evolution of research in the field, changes in the curricula of management courses, and the demands posed by new scenarios and organizational structures, among other factors, call for a new definition of the roles and functions of the manager. In addition to these changes, societal transformations regarding gender equality opportunities have contributed to the feminization of the role, thus implying a reflection on the impact of these changing roles on the manager's profile. This study is based on a case study that aims to respond to this need by proposing to identify the profiles of managers over time in Portuguese society. Additionally, it aims to study the role of gender as a moderating/mediating variable, using a sample consisting of management students from a public university. For this purpose, a self-administered questionnaire was used to collect data at three different times (pre-2008; 2013-14; 2023), containing a list of personal and professional attributes for the identification of the ideal manager profile. It is expected that the results will show different profiles over time, account for the influence of the above mentioned societal changes on the profiles of the ideal manager, as well as identifying the effect of gender on the definition of these profiles.

Keywords: manager profiles, manager role, higher education, gender, longitudinal methodology

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1. THEORETICAL BACKGROUND

The role of manager has undergone significant changes over time, evolving from a mechanical, task-centered, and bureaucratic perspective (Fayol, 1916/2013; Morgan, 2006) to more organic, culture-centered, and strategically oriented perspectives (Mintzberg, 1973; Morgan, 2006; Wickert et al., 2021). These transformations in the content and role of management have had implications for how management is practiced within organizations (Abdelgaffar, 2021; Marathe et al., 2020), shaping the expectations for those aspiring to become managers and build careers in this field. Economic, social, and technological challenges have prompted internal transformations within organizational structures and cultures (Abdelgaffar, 2021; Hassard & Morris, 2022), challenging traditional management profiles (Marathe et al., 2020). A central element in this transformation has been the role of management schools, through theoretical production, research, and the development of curricula aimed at preparing future managers (Marathe et al., 2020; Mousa et al., 2022). It is within this dynamic social and organizational context that this study seeks to identify the ideal manager profile and trace its evolution over time based on the perceptions of undergraduate management students. In Portuguese universities, these transformations materialized with the implementation of the Bologna Process at the end of the first decade of the 21st century (David & Abreu, 2007; Reichert & Tauch, 2004). Recently, management programs have undergone several changes, placing greater emphasis on ethics, social responsibility and sustainability, diversity and inclusion policies, and artificial intelligence (e.g Abdelgaffar, 2021; Hassard & Morris, 2022; Marathe et al., 2020) to align with international guidelines related to curricular accreditations, United Nations' Sustainable Development Goals (Macht et al., 2020) and Principles for Responsible Management Education (Henderson et al., 2019). Therefore, it is of great relevance to understand how these changes have affected the profile of the manager.

In addition to these transformations within universities, there has been a progressive feminization of management programs (Chaleta et al., 2020). In this context, it is also important to explore how gender may contribute to explaining potential differences in the perception of the ideal manager profile.

2. METHODOLOGY

This research originated from a previous project (Fernandes & Cabral-Cardoso, 2003) that utilized a sample of students from the undergraduate Management course at a Portuguese university. The initial study aimed to explore gender stereotyping of managers using a quantitative methodology. A questionnaire was administered to the target population, asking respondents to describe five stimuli based on a set of personal attributes and professional competences: "someone who engages in management activities" (a gender-neutral stimulus), "woman," "man," "female manager," and "male manager."

As part of the ongoing project, additional data was collected and grouped into three distinct time periods to develop a cross-sectional study focused on gender and managerial profiles (Table 1). The first period, covering 2002-2008, corresponds to the pre-Bologna management curriculum, which was characterized by a more instrumental and technical approach, with little systematic focus on ethical, sustainability, and inclusion issues. This period was longer than the others because bachelor's degrees were five years in duration, and data was collected from students entering their first year of management studies. These years were grouped into a single period because they occurred before the Bologna Process, during which the curriculum remained stable.

The second time encompasses data collected between 2013-2014, a phase when the changes brought about by the Bologna Process had already been fully integrated into the educational system. During this period, there was a growing awareness of a management approach more engaged with social and ethical issues, along with a strategic perspective.

The most recent period corresponds to the 2023-24 academic year, during which, as a result of various accreditation processes, management curricula began to emphasize not only social concerns but also sustainability, particularly environmental sustainability. In addition to these considerations, management programs increasingly focused on entrepreneurship, introducing courses that aimed to integrate new management approaches with innovation, initiative, and creativity.

Building on this previous project, the current study was developed with the following objectives: to identify the "ideal" manager profile, to explore how this profile has changed over time, and to examine the role of gender in defining the "ideal" manager profile. The study focused on participants who were asked to characterize the gender-neutral stimulus, "someone who engages in management activities"—essentially, the ideal manager.

In the first two time periods, the questionnaire was administered in paper format during classroom sessions. For the most recent period, the questionnaire was distributed online using Google Forms to management students at the School of Economics and Management, University of Minho. The questionnaire consisted of three sections: sociodemographic characterization of the participants, characterization of the manager profile based on personal attributes and professional competencies, and identification of students' expectations regarding their future careers as managers. For this article, only the data collected from sections 1 and 2 were analyzed.

Table 1. Time Periods and Sample Characterization

TIME PERIODS			SEX		AGE			NATIONALITY		YEAR	
2000-08	2013-14	2023-24	F	M	MIN	MAX	AVER	PT	OTHER	3	4-5
94	94	51	146	93	17	42	21,3	228	11	165	74
39,3%	39,3%	21,3%	61,1%	38,9%				95,4%	4,6%	69%	31%

3. RESULTS

To identify the ideal manager profile, we began by conducting a principal components analysis, specifying the extraction of three factors based on prior research (Fernandes & Cabral-Cardoso, 2003), as detailed in Table 2.

Table 2. Principal Components Analysis

Factor Analysis KMO 0,862 Loadings ≥ 0,455	FACTORS	ALPHA	ITEMS	AVER	LABEL	SAMPLE ITEMS
	F1 High-Performance Profile	0,947	31	4,29	High-Performance Profile	Dynamic; Responsible; Efficient; Able to plan; Able to adapt; Competent; Determined; Innovative; Organized; Able to decide; Lider; Intelligent; Assertive; Competitive; Rational
	F2 Diminished Femininity	0,855	11	2,53	Diminished Femininity Profile	Romantic; Maternal; Feminist; Sensitive; Emotional; Domestic; Fragile; Victim
	F3 Authoritarian Masculinity	0,781	09	2,79	Authoritarian Masculinity Profile	Authoritarian; Rigid; Insensitive; Aggressive; Chauvinist

Based on the output of the factor analysis, the following dimensions emerged. The first factor suggests a manager profile centered primarily on instrumental traits and skills related to three normative dimensions of the ideal manager: efficiency, leadership, and entrepreneurialism. We have named this factor the High-Performance Profile (F1). The second factor reflects a classic stereotype of femininity, emphasizing nurturing roles, emotional sensitivity, domesticity, and a perception of fragility and victimhood, labeled Diminished Femininity (F2). These dimensions seem to align with conventional societal expectations of women, where traits such as being maternal, romantic, and domestic are highlighted. Finally, the third factor corresponds to adherence to traditional, often rigid norms, coupled with authoritarian attitudes that may exhibit insensitivity or aggression. It also implies a chauvinistic perspective that asserts male superiority and control. This last factor is associated with Authoritarian Masculinity (F3).

These three dimensions appear to contribute in contradictory and differentiated ways to the overall manager profile. The first dimension aligns positively with what can be considered an ideal manager, while the other two dimensions are negatively related to this profile (see Table 3).

Table 3. Descriptive Statistics of the Three Factors

Descriptive Statistics									
	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
FACTOR1	239	2,90	5,00	4,2906	,42473	-,596	,157	,431	,314
FACTOR2	239	1,00	4,00	2,5302	,60530	-,497	,157	-,095	,314
FACTOR3	239	1,11	4,33	2,7927	,61829	-,011	,157	-,423	,314
Valid N (listwise)	239								

To examine temporal variations in the perceived "ideal" manager profile, a one-way ANOVA was conducted to compare three distinct time periods (independent variable) against the composite scores representing each "ideal" manager profile (dependent variable). Results indicated significant differences in the definition of the "High Performance Profile" ($F = 10.25$, $p < .001$), suggesting its evolution over time (Table 4).

Table 4. ANOVA Summary Table for Managers' Profiles by Time Periods

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
FACTOR 1	Between Groups	3,432	2	1,716	10,250	<,001
	Within Groups	39,503	236	,167		
	Total	42,934	238			
FACTOR 2	Between Groups	,894	2	,447	1,222	,297
	Within Groups	86,307	236	,366		
	Total	87,201	238			
FACTOR 3	Between Groups	,083	2	,042	,108	,898
	Within Groups	90,901	236	,385		
	Total	90,984	238			

Post-hoc Bonferroni comparisons (Tables 5 and 6) revealed a significantly higher mean score for the 2000-2008 period ($M = 4.41$, $SD = 0.36$) compared to both the 2013-2014 period ($M = 4.26$, $SD = 0.40$) and the 2023 period ($M = 4.10$, $SD = 0.50$). However, no significant difference was found between the 2013-2014 and 2023 periods ($p = .06$).

ANOVA results did not indicate significant differences for the "Diminished Femininity Profile" and the "Authoritarian Masculinity Profile," suggesting that time did not influence the definition of these profiles.

Table 5. ANOVA Descriptives

Descriptives								
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		
						Lower Bound	Upper Bound	Minimum
FACTOR 1	2000-2008	94	4,4187	,36021	,03715	4,3449	4,4924	3,45
	2013-2014	94	4,2653	,40074	,04133	4,1832	4,3473	3,13
	2023	51	4,1012	,50003	,07002	3,9606	4,2418	2,90
	Total	239	4,2906	,42473	,02747	4,2365	4,3447	2,90
FACTOR 2	2000-2008	94	2,5464	,55650	,05740	2,4324	2,6604	1,36
	2013-2014	94	2,4632	,64820	,06686	2,3305	2,5960	1,00
	2023	51	2,6239	,60713	,08501	2,4531	2,7946	1,00
	Total	239	2,5302	,60530	,03915	2,4531	2,6074	1,00
FACTOR 3	2000-2008	94	2,8085	,63702	,06570	2,6780	2,9390	1,44
	2013-2014	94	2,7695	,58233	,06006	2,6502	2,8888	1,44
	2023	51	2,8061	,65766	,09209	2,6211	2,9911	1,11
	Total	239	2,7927	,61829	,03999	2,7139	2,8714	1,11

Table 6. Post-Hoc Comparisons for Managers' Profiles by Time Periods Using Bonferroni

Multiple Comparisons								
Dependent Variable	(I) PERIOD	(J) PERIOD	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
FACTOR 1	Tukey HSD	2000-2008	2013-2014	,15340*	,05968	,029	,0126	,2942
			2023	,31747*	,07115	<,001	,1496	,4853
		2013-2014	2000-2008	-,15340*	,05968	,029	-,2942	-,0126
			2023	,16407	,07115	,057	-,0038	,3319
		2023	2000-2008	-,31747*	,07115	<,001	-,4853	-,1496
			2013-2014	-,16407	,07115	,057	-,3319	,0038
	Bonferroni	2000-2008	2013-2014	,15340*	,05968	,032	,0095	,2973
			2023	,31747*	,07115	<,001	,1459	,4890
		2013-2014	2000-2008	-,15340*	,05968	,032	-,2973	-,0095
			2023	,16407	,07115	,066	-,0075	,3356
		2023	2000-2008	-,31747*	,07115	<,001	-,4890	-,1459
			2013-2014	-,16407	,07115	,066	-,3356	,0075
FACTOR 2	Tukey HSD	2000-2008	2013-2014	,08317	,08821	,614	-,1249	,2912
			2023	-,07746	,10517	,742	-,3255	,1706
		2013-2014	2000-2008	-,08317	,08821	,614	-,2912	,1249
			2023	-,16064	,10517	,280	-,4087	,0874
		2023	2000-2008	,07746	,10517	,742	-,1706	,3255
			2013-2014	,16064	,10517	,280	-,0874	,4087
	Bonferroni	2000-2008	2013-2014	,08317	,08821	1,000	-,1295	,2959
			2023	-,07746	,10517	1,000	-,3311	,1761
		2013-2014	2000-2008	-,08317	,08821	1,000	-,2959	,1295
			2023	-,16064	,10517	,384	-,4142	,0930
		2023	2000-2008	,07746	,10517	1,000	-,1761	,3311
			2013-2014	,16064	,10517	,384	-,0930	,4142
FACTOR 3	Tukey HSD	2000-2008	2013-2014	,03901	,09053	,903	-,1745	,2525
			2023	,00241	,10794	1,000	-,2522	,2570
		2013-2014	2000-2008	-,03901	,09053	,903	-,2525	,1745
			2023	-,03660	,10794	,939	-,2912	,2180
		2023	2000-2008	-,00241	,10794	1,000	-,2570	,2522
			2013-2014	,03660	,10794	,939	-,2180	,2912
	Bonferroni	2000-2008	2013-2014	,03901	,09053	1,000	-,1793	,2573
			2023	,00241	,10794	1,000	-,2578	,2627
		2013-2014	2000-2008	-,03901	,09053	1,000	-,2573	,1793
			2023	-,03660	,10794	1,000	-,2968	,2237
		2023	2000-2008	-,00241	,10794	1,000	-,2627	,2578
			2013-2014	,03660	,10794	1,000	-,2237	,2968

*. The mean difference is significant at the 0.05 level.

To assess the influence of gender on the perceived "ideal" manager profile, linear regression analyses were conducted. Results indicated no significant relationship between gender and

profile scores, suggesting that gender does not differentially impact the definition of the profiles. Subsequent exploratory analyses comparing profiles by gender also yielded no significant differences.

4. DISCUSSION AND CONCLUSION

Our findings reveal three distinct profiles contributing to a differentiated and contradictory conceptualization of the ideal manager. The High-Performance Profile, primarily centered on instrumental traits and skills aligned with efficiency, leadership, and entrepreneurialism (Barba-Sanchez et al., 2022), emerges as the dominant idealization. This profile merges elements of bureaucratic and strategic management (Fayol, 1916/2013; Mintzberg, 1973; Marathe et al., 2020) and aligns with contemporary emphasis on entrepreneurship (Marethi et al., 2020; Schultz, 2022). Its prevalence extends beyond academia, as evidenced by its alignment with societal representations (Observador, 2021).

In contrast, the gendered profiles of Diminished Femininity and Authoritarian Masculinity occupy negative and exclusionary positions. These profiles reflect traditional gender stereotypes (Ferry, 2024) but are explicitly rejected by management students in favor of a modern, neoliberal, and gender-neutral ideal (Niemi & Weaver-Hightower, 2021). However, it is also important to argue that the neoliberal nature of the High-Performance Profile can be understood as gendered, as it promotes a normative form of masculinity centered on competition, success, and an individualistic perspective (Mavin & Yusupova, 2022). While students reject conventional gender constructions like Diminished Femininity and Authoritarian Masculinity, which carry negative connotations, the neoliberal profile introduces a new form of masculinity that remains persistent and largely unquestioned in terms of gender relations in the workplace.

Temporal analysis indicates that while the negative association of gendered profiles remains consistent, the High-Performance Profile has evolved. The profile was more strongly endorsed in the 2000-2008 period compared to subsequent periods (2013-2014 and 2023). Although Western societies today are characterized by neoliberal discourses around work and management (Bal & Dóci, 2018; Mudge, 2008) — explaining the prominence of such profile in our sample — it is notable that students from the earliest academic years tend to place less emphasis on this profile. This shift may reflect generational values (Casanova et al., 2021), with younger generations increasingly questioning neoliberal work regimes. It could also be a result of curriculum diversification and the growing interdisciplinary nature of management education (Marathe et al., 2020), which fosters a more nuanced and less rigid understanding of managerial roles. In fact, Portuguese bachelor's programs in management have recently undergone significant changes, incorporating ethical concerns and issues of diversity and inclusion (Gomes & Eugénio, 2021), which challenge the neoliberal nature of the High-Performance Profile. Therefore, we argue that the curriculum of management programs should continue this

trend, promoting a diverse and inclusive view of management regarding what it means to be a manager and who should occupy leadership positions.

Finally, the absence of gender differences in the construction of the ideal manager profile suggests a shared internalization of the modern, neoliberal management ideal by both male and female students (Niemi & Weaver-Hightower, 2021). This challenges traditional gender expectations in management. Paradoxically, while Western societies have made strides toward gender equality through education, institutional, and governmental initiatives — promoted in part by the European Union — they also emphasize a neoliberal regime that obscures gender inequalities, focusing on individual responsibility for success without considering broader social and cultural gender structures (Mavin & Yusupova, 2022). This investment may have influenced students' perceptions of gender relations. As noted earlier, the persistence of the neoliberal managerial profile among students shows that they tend to overlook its gendered nature. Both male and female students often adopt this profile as the legitimate standard for success.

REFERENCES

- Abdelgaffar, H. A. (2021). A review of responsible management education: Practices, outcomes, and challenges. *Journal of Management Development*, 40(9/10), 613-638. <https://doi.org/10.1108/JMD-03-2020-0087>
- Bal, P. M., & Dóci, E. (2018). Neoliberal ideology in work and organizational psychology. *European Journal of Work and Organizational Psychology*, 27(5), 536-548. <https://doi.org/10.1080/1359432X.2018.1449108>
- Barba-Sánchez, V., Mitre-Aranda, M., & del Brío-González, J. Á. (2022). The entrepreneurial intention of university students: An environmental perspective. *European Research on Management and Business Economics*, 28(2), 100184. <https://doi.org/10.1016/j.iedeen.2021.100184>
- Casanova, M. L., Costa, P., Lawthom, R., & Coimbra, J. L. (2021). Neoliberal economic policies' effects on perceptions of social justice and sociopolitical participation in Portugal. *Frontiers in Psychology*, 12, 694270. <https://doi.org/10.3389/fpsyg.2021.694270>
- Chaleta, E., Pissarra, J., & Correia Jesuino, J. (2020). Gender in higher education: Portuguese landscape. In C. Fontanini, K. M. Joshi, & S. Paivandi (Eds.), *International perspectives on gender and higher education* (pp. 17-32). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-83909-886-420201002>

- Fátima, D., & Abreu, R. (2007). The Bologna process: Implementation and developments in Portugal. *Social Responsibility Journal*, 3(2), 59-67. <https://doi.org/10.1108/17471110710829731>
- Fayol, H. (1916/2013). *General and industrial management*. Pitman.
- Fernandes, E., & Cabral-Cardoso, C. (2003). Gender asymmetries and manager stereotype among management students. *Women in Management Review*, 18(1/2), 77-87
- Ferry, N. (2024). Where is the patriarchy?: A review and research agenda for the concept of patriarchy in management and organization studies. *Gender, Work & Organization*, 32(1), 302-329.
- Gomes, J., & Eugénio, T. (2021). Teaching sustainable development in business sciences degrees: Evidence from Portugal. *Sustainability Accounting, Management and Policy Journal*, 12(3), 611-634. <https://doi.org/10.1108/SAMPJ-10-2019-0365>
- Hassard, J., & Morris, J. (2022). The extensification of managerial work in the digital age: Middle managers, spatio-temporal boundaries, and control. *Human Relations*, 75(9), 1647-1678. <https://doi.org/10.1177/00187267211003123>
- Henderson, L. H., Wersun, A., Wilson, J., Yeung, S. M., & Zhang, K. (2019). Principles for responsible management education in 2068. *Futures*, 111, 81-89. <https://doi.org/10.1016/j.futures.2019.05.005>
- Macht, S. A., Chapman, R. L., & Fitzgerald, J. A. (2020). Management research and the United Nations Sustainable Development Goals. *Journal of Management & Organization*, 26(6), 917-928. <https://doi.org/10.1017/jmo.2020.36>
- Marathe, G. M., Dutta, T., & Kundu, S. (2020). Is management education preparing future leaders for sustainable business? Opening minds but not hearts. *International Journal of Sustainability in Higher Education*, 21(2), 372-392. <https://doi.org/10.1108/IJSHE-02-2019-0090>
- Mavin, S., & Yusupova, M. (2022). ‘I’m competitive with myself’: A study of women leaders navigating neoliberal patriarchal workplaces. *Gender, Work & Organization*, 30(3), 881-896. <https://doi.org/10.1111/gwao.12939>
- Mintzberg, H. (1973). *The nature of managerial work*. Harper & Row.
- Morgan, G. (2006). *Images of organization*. Sage Publications.
- Mousa, M., Massoud, H., & Ayoubi, R. (2022). Responsible management education in time of crisis: A conceptual framework for public business schools in Egypt and similar Middle Eastern contexts. *Public Organization Review*, 22, 403-419. <https://doi.org/10.1007/s11115-021-00532-6>

- Mudge, S. L. (2008). What is neo-liberalism? *Socio-Economic Review*, 6(4), 703-731.
<https://doi.org/10.1093/ser/mwn016>
- Niemi, N. S., & Weaver-Hightower, M. B. (Eds.). (2021). *The Wiley handbook of gender equity in higher education*. John Wiley & Sons.
- Observador (2021, September 21). Empreender: mais do que sorte, um processo. *Observador*.
<https://observador.pt/2021/09/21/empreender-mais-do-que-sorte-um-processo/>
- Reichert, S., & Tauch, C. (2004). Bologna four years later: Steps toward sustainable reform of higher education in Europe. *European Education*, 36(3), 36-50.
<https://doi.org/10.1080/10564934.2004.11042365>
- Schultz, C. (2022). A balanced strategy for entrepreneurship education: Engaging students by using multiple course modes in a business curriculum. *Journal of Management Education*, 46(2), 313-344. <https://doi.org/10.1177/10525629211017958>
- Wickert, C. (2021). Corporate social responsibility research in the journal of management studies: A shift from a business-centric to a society-centric focus. *Journal of Management Studies*, 58, E1-E17.
- Wickert, C., Post, C., Doh, J. P., Prescott, J. E., & Prencipe, A. (2021). Management research that makes a difference: Broadening the meaning of impact. *Journal of Management Studies*, 58(4), 297-320. <https://doi.org/10.1111/joms.12594>



ADOPTION INTENTION OF DRONE TECHNOLOGY IN MALAYSIAN FOOD DELIVERY SERVICES: AN EMPIRICAL INVESTIGATION OF PREDICTORS AND CHALLENGES

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Abstract

The current Industrial Revolution era seems to enforce new ways of implementing online food delivery services, one of which is the use of drone delivery. One of the problems is that the existing food delivery services use human riders which are prone to accidents, for example about 1600 death cases were reported in 2020 involving p-hailing (food and parcel) riders. Also, the use of drones is needed to help victims of natural disasters such as floods, typhoons, and landslides. Malaysia has commenced the trial use of drone food delivery to tackle these problems. Particularly, consumers' behavioural intentions to use drone food delivery services have been laid low with complex aviation rules and regulations. Hence, the main objective of this study is to examine the predictors of adoption intention in drone food delivery among food delivery providers and consumers in Malaysia. Furthermore, it aims to investigate the readiness of food delivery service providers and collaborators in adopting drone technology and to examine the moderating effect of the generational gap on the relationships between specified predictors and adoption intention. The research methods used are qualitative and quantitative research designs. The quantitative data will be collected using an online survey and will be analysed using structural equation modelling (SMART PLS). For qualitative technique, the telephone interviews with 15 food delivery service providers and drone collaborators will be conducted and analysed using verbatim analysis. The expected output is a new adoption

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intention model of drone food delivery services in Malaysia. The result will be significant to the nation in terms of increasing the adoption of delivery drones hence increasing automation in line with the Fourth Industrial Revolution (IR 4.0). This research also improves the economy and societal benefit through efficient supply chain and transportation of services in urban and affected areas such as the spread of diseases or natural disasters, i.e., floods and landslides.

Keywords: adoption intention, drone technology, food delivery services, technology readiness, technology acceptance, Malaysia

1. INTRODUCTION

The title is about the adoption intention of drone food delivery services in Malaysia. The title is new in the drone area because limited empirical studies have been done before on drone adoption intention in food delivery services in Malaysia. Such empirical studies on drone food delivery services have been conducted in the USA and Korea. Secondly, the underpinning theories have not been used in drone studies since the models have only been used in traditional marketing areas. Hence, more empirical studies using underpinning theories need to be conducted to close these gaps. The current industrial revolution era seems to enforce new ways of implementing marketing strategies such as in online food delivery services using drones. However, the usage of drones is very limited and has not been adopted by food delivery services in Malaysia. Drone has been used in other industries in Malaysia such as for border security surveillance, area photography, agriculture, topography, (New Straits Times, 2015), and natural disasters such as flood relief operations including delivery of critical supplies, [Noor Atiqah, 2021], but not in food delivery services. Hence, Malaysian marketers must step up the usage of drones for food delivery because other countries such as Spain where drone food delivery is delivered to yachts (Aerocamaras) (Espinoza, 2021), Singapore (i.e., Food Panda) (Abdullah, 2020), United Kingdom (Amazon.com) (Morrison, 2021), Thailand (Minor Food Group) (Tan, 2020), and the United States (i.e., Wing, Amazon.com, Google) (Vincent, 2021), have already widely used this new drone technology. The existing food delivery services use human riders who are prone to accidents due to busy traffic, for example, about 1600 death cases were reported in 2020 involving p-hailing (food and parcel) riders (EdgeProp, 2020). Therefore, the usage of drone delivery is needed because it can reduce accidents and death cases as reported earlier.

The drone's adoption and usage might expand due to its innovative roles and usefulness in surveying, tracking, security, surveillance, and logistics. Furthermore, during the novel Coronavirus, COVID-19 pandemic, which affected not fewer than 320 million people worldwide with a death toll of over 5.52 million and in Malaysia, there were 2.8 million affected cases and a total 31,750 of deaths (JHU CSSE, 2022), no contact services are highly preferred, the demand for drone delivery service has been driven up hence increase automation in line with the Fourth Industrial Revolution (IR 4.0). As a result, it has driven society and the authorities to reconsider, understand, and make use of drone innovation, especially in food delivery services in Malaysia. Furthermore, only a few empirical theoretical studies have been conducted regarding drone adoption intentions in Malaysia such as Chamata (2016); Nier, Wahab, & Daud (2020). However, the mentioned studies investigated drone application for general purposes (e.g., stock take activity at logistic firms and parcels) instead of drone adoption intention in food delivery services. Therefore, the current research will contribute to the development of the body of knowledge on drones' adoption intention. In other words, the current research will indirectly increase the awareness of Malaysian citizens towards drone food delivery services. Besides, the suggested model for drone adoption intention would benefit

entrepreneurs interested in investing in drone technology and policymakers who may use it to consider modifying aviation regulations in favour of drone technology. Thus, there is a need to study the adoption intention of drone applications and usage in food delivery services in Malaysia. In other words, the current study aims to investigate the readiness of food delivery service providers and collaborators in adopting drone technology and to examine the moderating effect of the generational gap on the relationships between specified predictors and adoption intention. This study can assist the government in promoting the adoption of delivery drones, thereby advancing automation in line with the Fourth Industrial Revolution (IR 4.0). In addition, it will benefit society by helping to address urgent issues during disasters in areas unreachable by conventional methods and by reducing environmental hazards quickly and efficiently.

2. LITERATURE REVIEW

2.1. Malaysian Drone Food Delivery Services

Drone delivery services in Malaysia have been tested in Cyberjaya in June 2019. This testing is continued by AirAsia Group Bhd. and officially launched by the Minister of Science, Technology, and Innovation on 3rd March 2021 (Hanif, 2021). Drone food delivery has been tested in the main city, which is Cyberjaya because customers who order food delivery are busy and prefer convenience and are mainly from main cities (McCarthy, 2020). Furthermore, the usage of drones is more suitable in main cities to overcome traffic congestion.

The first trial test was conducted by Express Food, while the drone was provided by Average Drone Sdn. Bhd. which has been in operation since 2014. According to its CEO, Hamdee Hamdan stated that the cost of delivery through drones could be as low as RM2.50. The drone can be flown through light rain however cannot fly in heavy rain (Malay Mail, 2022).

2.2. Factors Affecting Consumer's Acceptance of Drone Food Delivery Services

The usage of drone production through various sectors has grown as the distribution of drones has improved efficiency and operating efficiencies (Avanti, 2019). This has also been considered effective in emergency circumstances. Consumers aged 18 to 34 had positive perceptions about these drone food delivery services available. We have viewed drone delivery as new, futuristic, revolutionary, and useful, albeit risky. For example, with drone delivery, they get their purchased merchandise, like food, faster (Khan, Tausif, & Javed, 2019). In addition, consumers have also seen drone delivery services as a relatively environmentally friendly option (Hwang & Kim, 2019).

Drone usage was a fast and inexpensive service delivery tool as it reduced delivery time to as low as 30 minutes and delivered the goods to the doorstep of the customer, which in effect improved the competitiveness and versatility of customers in everyday life (Gagliardi, 2019; Kapser & Abdelrahman, 2020). These benefits underpin the desire of consumers to pursue

drone food delivery services because it is a fast, cost-effective, and environmentally friendly alternative. The usage of drone delivery expanded due to its innovative roles and usefulness in surveying, tracking, security, surveillance, and logistics especially during the novel Coronavirus, COVID-19 pandemic, which affected not fewer than 320 million people worldwide with a death toll of over 5.52 million.

2.3. Generation Gap

Considering the rise of new technology and a lack of communication between both older and younger people, generational differences have an impact on not just relationships but also day-to-day activities. Through a series of well-organized programs that included training seminars and social service initiatives, Phillips concentrated on creating a partnership model that connected universities, schools, and local communities. To break the "ice" and develop a close parent-child connection, the intergenerational gap needs to be closed by the combined efforts of both generations.

Several issues, including inequality, access, the calibre of the information, and the impact of new technology on children's educational and social development, have been brought up by the popularity of the internet. It has been observed that the older generation also seems to share this quality of ambivalence especially as their children become more expert with handling new technologies and the internet.

2.3.1. Different Perceptions of Relationships

It indicates that parents and teenagers may view their connection with one another differently. In a study, 2590 adult child and older parent dyads from the national survey of families and households were examined and their perspectives of intergenerational solidarity were contrasted. It is widely recognized that parent-child connections are among the most significant and are a significant factor in both generations' emotional and psychological well-being. These interactions have also been linked to different forms of help between the generations. Although there is generational consensus on some issues, the research found that parents are more likely to see their relationships with their kids favourably. Recent works have examined the social, and structural aspects of intergenerational relationships in later life which suggests that societies and individuals within them are ambivalent about relationships between parents and children in adulthood.

2.4. Adoption Intention

Venkatesh et al. (2003) suggested that the adoption intention to use a given technology has a significant influence on usage behaviour. In general, the term adoption intention is defined as the individual's inclination to accomplish a given activity or behaviour, for example when the banks introduced Internet Banking, there was the adoption intention by customers and it was successful in increasing the ease of transactions and the number of transactions, therefore there

was a rise in profitability and revenues for the banking industry, (Wungwanitchakorn, 2002). Therefore, when drone technology is to be introduced for food delivery, then the consumers, as well as food and beverage suppliers, shall have the intention to adopt this effectively to gain the entire benefits from it.

Wang, Dacko, and Gad, (2008) from the University of Warwick, United Kingdom, found that perceived newness, perceived benefit, and product evaluation have a significant co-relationship with adoption intention. This therefore supports that in the digital era with process innovation and the search for convenience and speedy services, the usage of drone/UAV systems for food delivery is expected to be a fruitful choice. Moreover, Yoo, Yu, and Jung (2018) have concluded that drones are less expensive, faster, eco-friendly, and so innovation may be positively related to the adoption intention of customers in favour of drone technology being introduced for food delivery but privacy risks, delivery risks, performance risks and complexity are hurdles for the drone delivery adoption.

Prabowo and Nugroho (2019) found that it is necessary to strengthen user perception in engaging any new products and services, therefore positive user attitudes and convenience motivation are vital in encouraging 732 respondents of users to adopt online food delivery in 10 cities in Indonesia. Moving on, in Fiji, it was understood that social influence is crucial in perceived usefulness and perceived ease of use for women to adapt themselves to tech-savvy goods and services (Sathye, Prasad, Sharma, Sharma, & Sathye, 2018). Further to that, Chen, Choi, and Charoen (2019), in a study entitled “Drone Delivery Services: An Evaluation of Personal Innovativeness, Opinion Passing and Key Information Technology Adoption Factors” surveyed 182 respondents and found that marketing, technology adoption and personal innovativeness support customers’ intention to adopt drone delivery services and hence this concludes that customers nowadays are mature and willing to accept drone delivery services. Recently, in 2020, Knobloch and Schaarschmidt identified that there exists physical risk, loss risk, financial risk, data risk, noise risk, harassment risk, or spy risk in engaging drone technology in delivery services, hence the risks shall be reviewed and prevented by suppliers willing to engage drone technology for food delivery (Knobloch & Schaarschmidt, 2020). Overall, it can be seen from the above journal articles that the analysis of adoption intention for drone technology to be introduced for food delivery is positive and can be successful via marketing, technology adoption, social influence, perceived newness, perceived usefulness, and personal innovativeness. However, privacy risks, delivery risks, performance risks, and complexity shall be avoided when drone technology is to be introduced for food delivery so that customers feel secure and protected when engaging the services using drone technology.

2.5. Underpinning Theories

Established theories related to adoption behaviour such as the TAM, TRI, and TRAM models will be reviewed as possible underpinning theories to be used in this study. This study is unique, as the use of drones is very limited in Malaysia and has been applied in other industries but not

in food delivery services. In previous studies, TAM, TRI, and TRAM models have been adopted in fields such as border safety surveillance, photography, land surveying, medical, and agricultural sectors, but not in food delivery. Therefore, applying these theoretical frameworks to food delivery services is a novel approach.

2.6. Technology Acceptance Model

2.6.1. Technology Readiness and Acceptance Model (TRAM)

TRAM is the latest development that blends the growing personality dimension of TRI with the unique aspect dimension of TAM. It discusses how personality factors can affect the experience of an individual, and how it incorporates new technology. The dimensions of TRI personalities are comparable to TAM. Throughout this case, the addition of actual use complements the previously conducted study.

2.6.2. Technology Readiness Index (TRI)

TRI was used to calculate the general beliefs and thoughts of an individual towards delivery drone technology. TRI was chosen because it could discern whether a person was a user of the technology. This may also group users in a more nuanced way based on positive and negative beliefs about the system. Parasuraman (2000) stated that individuals who possess optimism and innovation, as well as experience less discomfort and feelings of insecurity, are more likely to adopt new delivery technology. They are optimism, innovation, discomfort, and insecurity.

2.7. Predictors of Adoption Intention in Using Drone Technologies

Based on the idea of TRAM which has been tested through numerous studies, when a technology is taken into consideration on usefulness that might be a chance to use those technologies. TRAM suggests that the perceived ease of use and perceived usefulness are concurrently figuring out an individual's aim to utilize this technology.

2.8. Antecedents of Optimism

An extra-optimistic approach is generally more powerful in accomplishing the anticipated outcomes. In other words, optimists generally tend to bring awareness to bad activities and could get hold of the extra flawed technology. Optimism appears in the generation as extra beneficial and smooth to apply and they are now no longer so troubled about the bad outcomes of technology (Kuo, Liu, & Ma, 2013). Optimism is an inclination to trust that most humans will enjoy the best as opposed to the wrong matters in life (Walczuch, Lemmink, & Streukens, 2007).

2.9. Delivery Risks

Delivery risks are generally the chance or probability of risk of default of delivery due to various factors and they may exist due to multiple factors such as physical risk, loss risk, financial risk,

and performance risks. This list is not exhaustive because there could be other factors that may contribute to delivery risks. This means that the supplier of food delivery or service provider could fail in accomplishing their side of services to customers and this is high in using drone/UAV systems for food delivery. In a 2020 journal article by Ngui entitled “Crashed! Why Drone Delivery is Another Tech Idea Not Ready to Take Off”, delivery risks have been identified for engaging drone technology for food delivery because this area is unregulated, dangerous, and intimidating because confusion can arise in many ways (Tom, 2020). Therefore, there has been reluctance by food services to use drone technology for food delivery (Choe, Kim, & Hwang, 2021). Moreover, Schenkelberg (2016)] found in his study entitled “How reliable does a delivery drone have to be?” explained that drones are subject to delivery risks due to sensor failure, gearbox or motor failure, logic failure, strike on the power line, tree, shotgun blast or bird, battery exhaustion, battery charging fault causing fire and malicious attack or hacking to disrupt delivery. Hence, the optimal solution to delivery risks whilst using drone technology for food delivery shall be taken to achieve reliability in using drone technology for food delivery. Apart from that, Hwang and Choe (2019) in their study entitled “Exploring perceived risk in building successful drone food delivery services” examined the delivery risks' impact on the image of drones being reliable in food delivery services. In this study, it was concluded that there are time risks, performance risks, and psychological risks in delivering food to customers using drone technology and this leads to a negative image, thus reducing the adoption intention of food suppliers and customers. In addition, identified that there exist delivery risks such as physical risk, loss risk, financial risk, data risk, noise risk, harassment risk, or spy risk in engaging drone technology in delivery services, hence the risks shall be reviewed and prevented by suppliers willing to engage drone technology for food delivery.

2.10. The Conceptual Framework

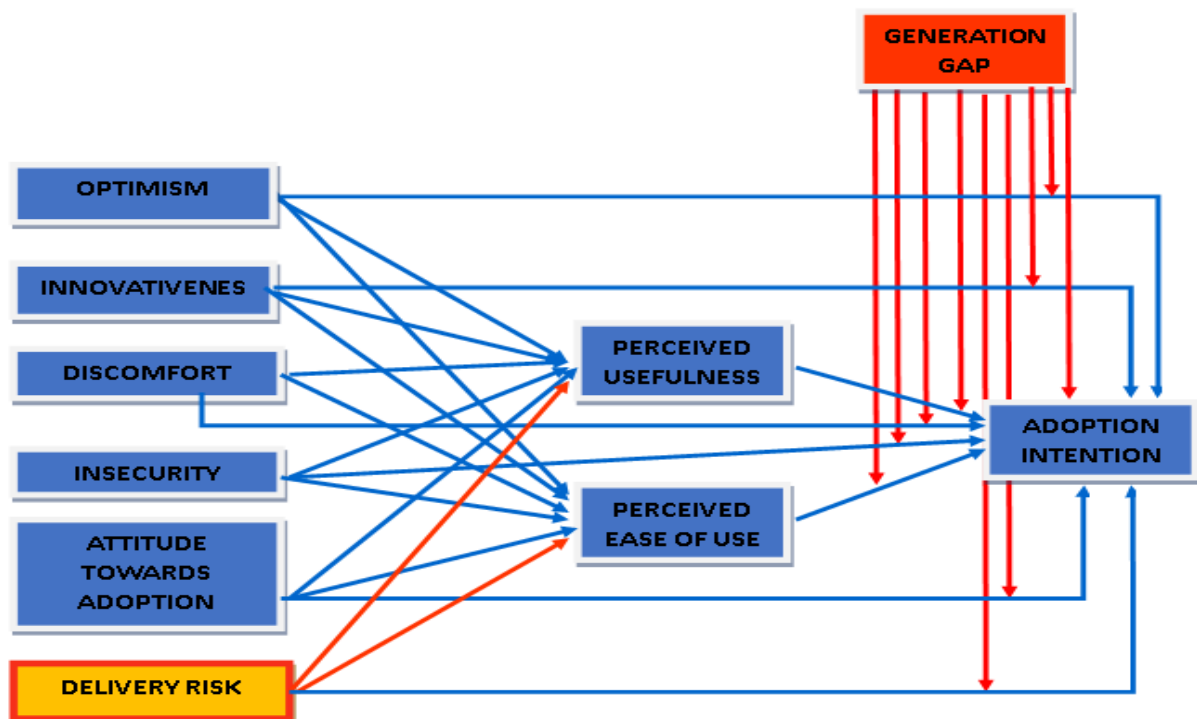
This study is unique since the usage of drones is very limited and it has been used in other industries but none in food delivery services in Malaysia. In previous studies, TAM, TRI, and TRAM have been adopted in other fields such as border safety surveillance, photography, land survey, and medical and agriculture sectors but not in food delivery services. Hence, the usage of these underpinning theories is a new application for food delivery services.

The first gap in the usage of drone technology for food delivery services in Malaysia is still scarce. However, it has been widely used in the USA, Europe, and some Asian countries such as Singapore and Thailand. Hence, drone usage in food delivery can be applied and is a necessity in Malaysia. This vacuum is a good opportunity for food delivery services and other small businesses to embark on this advanced technology usage of drones in line with IR 4.0. The second gap is regarding very limited empirical studies conducted in Malaysia in drone studies compared to other countries such as South Korea, USA, Spain, etc. The third gap is the existing studies on drones have been conducted in other settings such as the telecommunication industry. Additionally, there is an effect of the generation gap on technology adoption.

Millennials (generation Y) have often led older citizens in their adoption and use of technology, and this largely holds till today. However, older generations, such as Generation X and baby boomers, have seen a major increase in digital use (Vogels, 2019). As a result, there is a pressing need to bridge the gap as technology continues to evolve.

Optimism, innovativeness, discomfort, insecurity, attitude towards adoption, and delivery risk are the personality dimensions that are viewed in technology readiness, personality dimensions affect people's tendency to embrace and use new technologies. In this regard with the dimensions, mental empowering is done through optimism and innovativeness, while acknowledgment and acceptance of new technology are mentally inhibited by discomfort and insecurity. The current study will encourage the government to promote the adoption of delivery drones, thereby advancing automation in line with the Fourth Industrial Revolution (IR 4.0). Additionally, it benefits society by helping to address urgent issues during disasters in areas unreachable by conventional methods and by reducing environmental hazards quickly and efficiently. Figure 1 shows the conceptual framework of the study.

Figure 1. The Conceptual Framework



3. RESEARCH METHODOLOGY

3.1. Research Design

Quantitative and qualitative research approaches will be the research designs of the study. This study adopted a quantitative cross-sectional data approach in the data collection process based on past studies. Thus, data will be collected, analysed, and summarized statistically.

Quantitative data will be obtained through an online survey to accommodate COVID-19 pandemic restrictions. This will enable us to obtain information relating to beliefs, attitudes, perceptions, or even opinions from other people in their natural environment (Graziano, & Raulin, 2004; Gay, & Diehl, 1992; Murison, 2019). The online collection method will be conducted through social media platforms such as WhatsApp, Facebook, and Instagram. For qualitative technique, telephone interviews and online focus group discussions with selected food delivery service providers and collaborators (Easyfly Autonomous Solution Sdn. Bhd. and Civil Aviation Authority of Malaysia (CAAM)) will be conducted.

3.2. Sampling Method

Unit analysis of this study is consumers for the quantitative method and food delivery service providers for the qualitative method. For the quantitative method, a multistage sampling method will be conducted based on generation gap and location. Generation will be divided into four: Gen baby boomers, X, millennial (Y), and Z. The reason for selecting generation gaps is the adoption level of technology varies among each gap. The location will be in Kuala Lumpur, Selangor, Penang, and Johore, and selected food delivery service providers in Malaysia. The main reasons for selecting the four states are (1) drone services have been tested and used in main cities such as Cyberjaya, AirAsia Group Bhd., and lately, flood relief in Selangor (2) customers who ordered food delivery are busy and prefer convenience and are mainly from main states, (3) usage of drone is more suitable in main states to overcome traffic congestion (4) the selected states are representing most developed and populous states in Malaysia.

For the qualitative method, the researchers will conduct telephone interviews with 15 selected food service delivery providers in Malaysia. Also, telephone interviews will be conducted with CAAM and drone collaborator, Easyfly Autonomous Solution Sdn Bhd to interrogate information regarding rules and regulations on drone aviation policy.

3.3. Population

The population for consumers will be based on the population of citizens in each of the four states (Selangor, Kuala Lumpur, Penang, and Johore) selected for the study and the population of food delivery service providers will be based on all food delivery service providers in Malaysia.

3.4. Sample Size

The sample size is 384 or about 400 samples will be needed according to Krejcie and Morgan (1970) based on the sample size table which is calculated based on the population size specified above, i.e., the number of consumers in Selangor, Kuala Lumpur, Penang, and Johore and selected food delivery service providers in Malaysia.

The sample size for the qualitative method through in-depth telephone interviews is 15 selected food service delivery providers in Malaysia. The 15 food service delivery providers are selected

using systematic random sampling i.e., every fourth company in the directory list. According to the four locations (Kuala Lumpur, Selangor, Penang, and Johore), the three most popular food delivery service providers selected for each state from a total of 67 across Malaysia. Also, in-depth telephone interviews with two authorities will be conducted: CAAM and drone collaborator, Easyfly Autonomous Solution Sdn Bhd to obtain information regarding rules and regulations on drone aviation policy.

3.5. Data Collection Technique

For the quantitative method, a non-probability online survey method will be used. Several studies have been conducted to validate the use of non-probability sampling for online surveys. For this study, 800 questionnaires will be distributed online using social media platforms such as WhatsApp, Facebook, and Instagram method to Malaysian consumers in Kuala Lumpur, Selangor, Johor, and Penang. The method will be used to ensure a high response rate (DeFranzo, 2023). For the qualitative method, the researchers will conduct telephone interviews with 15 selected food service delivery providers in Malaysia. Also, telephone interviews will be conducted with CAAM and drone collaborator, Easyfly Autonomous Solution Sdn. Bhd. to interrogate information regarding rules and regulations on drone aviation policy.

3.6. Measurement of Construct

The variables of this study will be adapted from relevant past studies (adoption intention of drone, optimism, innovativeness, discomfort, insecurity, attitude towards adoption, perceived usefulness, perceived ease of use, and delivery risk). All measurements will be pilot-tested to determine their reliability and suitability for the drone sector using factor analysis. All variables are measured using a 5-point Likert Scale from 1-strongly disagree to 5-strongly agree based on arguments from past studies. For the qualitative method, structured questions will be designed to accommodate RQ1 and RQ2. Additionally, structured questions will be developed to tap information from focus group discussions (FGD) with collaborators, such as Easyfly Autonomous Solution Sdn. Bhd. and CAAM.

3.7. Analysis Method

Analysis methods for quantitative for this study are descriptive statistics using Statistical Package for Social Science (SPSS) version 20.0 and structural equation modelling (SEM) using partial least square (SMARTPLS) version 3.2.7. Hypotheses will be tested with SMARTPLS 3.2.7 to predict the extent to which independent variables (optimism, innovativeness, discomfort, insecurity, attitude towards adoption, and delivery risk) explain the dependent variable (adoption intention) with the mediating effects of perceived usefulness and perceived ease of use, and the moderating effect of the generation gap. This quantitative analysis will answer research objectives three to seven (RO3-RO7). In the qualitative method, a verbatim analysis of interview sessions will be conducted by examining open-text feedback from food service providers and collaborators to gain insights into their sentiments, opinions, and

experiences regarding drone technology usage. This qualitative analysis will address research objectives one and two (RO1-RO2).

4. CONCLUSION

A journal article entitled “Consumer Acceptance of Drones in Urban Areas” found that drones may still have a high level of significant delivery risks when engaged for commercial purposes in Pakistan and hence retailers are reluctant to convert their traditional delivery services modes to drone/UAV systems. This was also the position in the study by Kellermann, Biehle, and Fischer (2020), which highlighted that the emerging technology in drone technology proposes solutions for the environment and traffic but has delivery risks that outweigh its benefits, and hence may not offer a widespread solution in food delivery. Moreover, Mittendorf, Franzmann, and Ostermann (2017)] pointed that innovation and advancement in technology are vital for reducing delivery risks that exist when using drone technology. Even Hii, Courtney, and Royall (2019) confirmed that delivery risks such as sensor failure, and gearbox or motor failure exist when using drone technology systems. Therefore, precautions and contingency planning are a must for businesses engaging drone technology in delivery services.

In conclusion, delivery risks exist when using drone technology in food delivery so delivery service companies shall analyse both the pros and cons and engage in strategic planning tools to reduce service delivery failure risks in using drone technology so that customer confidence and reliability are kept at a high level. Therefore, the current study will help the industry increase the efficiency of supply chain and transportation in food delivery services. Managers should leverage these insights to refine their service offerings, focusing particularly on service quality and user experience. By addressing consumers' concerns about delivery risks and discomfort, managers can enhance customer satisfaction and increase adoption rates. Additionally, it can assist the government in promoting the adoption of delivery drones, thereby advancing automation in line with the Fourth Industrial Revolution (IR 4.0).

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REFERENCES

Abdullah, A. Z. (2020). *Foodpanda collaborates with ST Engineering on drone food delivery trials*. Today Online. Accessed: 30 May 2022. [Online]. Available: <https://www.todayonline.com/singapore/foodpanda-collaborates-st-engineering-drone-food-delivery-trials>

- Avanti, K. (2019). *Drone tech and the roar of Malaysia's flying dragons*. Computer Weekly. Accessed: 11 July 2022. [Online]. Available: <https://www.computerweekly.com/news/252466404/Drone-tech-and-the-roar-of-Malaysias-flying-dragons>
- Chamata, J. (2016). *A proposal for the adoption of unmanned aerial technology in Malaysia*. In 4th Borneo Research Education Conference, BREC. Accessed: 3 July 2022. [Online]. Available: <https://www.researchgate.net/publication/314264272>
- Chen, C., Choi, H., & Charoen, D. (2019). Drone delivery services: An evaluation of personal innovativeness, opinion passing and key information technology adoption factors. *Journal of Information Systems Applied Research*, 12(1), 4-5. Accessed: 29 July 2022. [Online]. Available: <http://jisar.org/2019-12/n1/JISARv12n1p4.html>
- Choe, J. Y., Kim, J. J., & Hwang, J. (2021). Innovative marketing strategies for the successful construction of drone food delivery services: Merging TAM with TPB. *Journal of Travel & Tourism Marketing*, 38(1), 16-30. <https://doi.org/10.1080/10548408.2020.1862023>
- DeFranzo, S. E. (2023). *4 main benefits of survey research*. SnapSurveys Blog. Accessed: 16 December 2022. [Online]. Available: <https://www.snapsurveys.com/blog/4-main-benefits-survey-research/>
- EdgeProp. (2020). *Accidents: Miros to 'hold talks' with food delivery companies*. Accessed: 26 June 2022. [Online]. Available: <https://www.edgeprop.my/content/1713422/accidents-miros-hold-talks-food-delivery-companies>
- Espinoza, D. (2021). *Yacht food delivery by drone in Ibiza*. Majorca Daily Bulletin Accessed: 30 May 2022. [Online]. Available: <https://www.majorcadailybulletin.com/news/local/2021/08/20/88409/fooddeliverydroneforyachtsibiza.html>
- Gagliardi, N. (2019). *UPS completes first residential drone deliveries from a CVS pharmacy*. ZDNET. Accessed: 16 July 2022. [Online]. Available: <https://www.zdnet.com/article/ups-completes-first-residential-drone-deliveries-from-a-cvs-pharmacy/>
- Gay, L. R., & Diehl, P. L. (1992). *Research methods for business and management*. MC. Millan Publishing Company.
- Graziano, A. M., & Raulin, M. L. (2004). *Research methods: A process of inquiry* (5th ed.). Pearson.

- Hanif, M. (2021). *Airasia bakal tawar perkhidmatan penghantaran menggunakan dron, teksi udara*. Careta. Accessed: 4 July 2022. [Online]. Available: from <https://careta.my/article/airasia-bakal-tawar-perkhidmatan-penghantaran-menggunakan-dron-teksi-udara>.
- Hii, M. S. Y., Courtney, P., & Royall, P. G. (2019). An evaluation of the delivery of medicines using drones. *Drones*, 3(3), 52. <https://doi.org/10.3390/drones3030052>
- Hwang, J., & Choe, J. Y. (2019). Exploring perceived risk in building successful drone food delivery services. *International Journal of Contemporary Hospitality Management*, 31(8), 3249-3269. <https://doi.org/10.1108/IJCHM-07-2018-0558>
- Hwang, J., & Kim, H. (2019). Consequences of a green image of drone food delivery services: The moderating role of gender and age. *Business Strategy and the Environment*, 28(5), 872-884. <https://doi.org/10.1002/bse.2289>
- JHU CSSE. (2022). *Novel coronavirus (COVID-19) cases*. Accessed: 3 July 2022. [Online]. Available: <https://github.com/CSSEGISandData/COVID-19>.
- Kapser, S., & Abdelrahman, M. (2020). Acceptance of autonomous delivery vehicles for last-mile delivery in Germany – Extending UTAUT2 with risk perceptions. *Transportation Research Part C: Emerging Technologies*, 111, 210-225. <https://doi.org/10.1016/j.trc.2019.12.016>
- Kellermann, R., Biehle, T., & Fischer, L. (2020). Drones for parcel and passenger transportation: A literature review. *Transportation Research Interdisciplinary Perspectives*, 4, 100088. <https://doi.org/10.1016/j.trip.2019.100088>
- Khan, R., Tausif, S., & Javed Malik, A. (2019). Consumer acceptance of delivery drones in urban areas. *International Journal of Consumer Studies*, 43(1), 87-101. <https://doi.org/10.1111/ijcs.12487>
- Knobloch, M., & Schaarschmidt, M. (2020). *What impedes consumers' delivery drone service adoption? A risk perspective*. Arb. Fachbereich Inform, 1-18. Accessed: 3 August 2022. [Online]. Available: <https://dnb.info/1212033957/34#:~:text=The%20quantitative%20results%20show%20that,impede%20drone%20delivery%20service%20adoption>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607-610. <https://doi.org/10.1177/001316447003000308>

- Kuo, K. M., Liu, C. F., & Ma, C. C. (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record system. *BMC Medical Informatics and Decision Making*, 13, 88. <https://doi.org/10.1186/1472-6947-13-88>
- Malay Mail (2019). *Food delivery drone trials begin in Cyberjaya end-June*. Accessed: 6 July 2022. [Online]. Available: <https://www.malaymail.com/news/malaysia/2019/06/18/cyberjaya-to-get-drone-food-delivery-service-by-end-june/1763107>
- McCarthy, A. (2020). *The rise of food delivery services: Why consumers order in*. DoorDash. Accessed: 4 July 2022. [Online]. Available: <https://get.doordash.com/en-us/blog/rise-in-food-delivery-and-why-it-is-popular>
- Mittendorf, C., Franzmann, D., & Ostermann, U. (2017). *Why would customers engage in drone deliveries?*. AMCIS. Accessed: 23 January 2023. [Online]. Available: <https://core.ac.uk/works/17802742>
- Morrison, O. (2021). *Food delivery by drone prepares for take-off after UK watchdog approval*. Food Navigator. Accessed: 8 June 2022. [Online]. Available: <https://www.foodnavigator.com/Article/2021/04/20/This-will-all-begin-to-scale-across-Europe-from-2023-onwards-Food-delivery-by-drone-prepares-for-take-off-after-UK-watchdog-approval>
- Murison, M. (2019). *How drones can support traffic solutions*. Zeitview Blog: News, Tips, Events & More DroneBase. Accessed: 13 November 2022. [Online]. Available: <https://blog.zeitview.com/how-drones-can-support-traffic-solutions>
- New Straits Times. (2015). *Educating enthusiasts on safe use of drones*. Accessed: 21 June 2022. [Online]. Available: <https://www.nst.com.my/news/2015/09/educating-enthusiasts-safe-use-drones?d=1>
- Nier, R. D., Wahab, S. N., & Daud, D. (2020). A qualitative case study on the use of drone technology for stock take activity in a third-party logistics firm in Malaysia. *IOP Conference Series: Materials Science and Engineering*, 780(6), 062014. <https://doi.org/10.1088/1757-899x/780/6/062014>
- Noor Atiqah, S. (2021). *MOSTI mobilises 20 drones to send aid to flood victims*. New Straits Times. Accessed: 9 April 2022. [Online]. Available: <https://www.nst.com.my/news/nation/2021/12/757504/mosti-mobilises-20-drones-send-aid-floodvictims>
- Parasuraman, A. (2000). Technology readiness index (TRI) a multiple item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4), 307-320. <https://doi.org/10.1177/109467050024001>

- Prabowo, G. T., & Nugroho, A. (2019). Factors that influence the attitude and behavioral intention of Indonesian users toward online food delivery service by the Go-Food Application. In *12th International Conference on Business and Management Research (ICBMR 2018)* (pp. 204- 210). Atlantis Press. <https://doi.org/10.2991/icbmr-18.2019.3>
- Sathye, S., Prasad, B., Sharma, D., Sharma, P., & Sathye, M. (2018). Factors influencing the intention to use of mobile value-added services by women-owned microenterprises in Fiji. *The Electronic Journal of Information Systems in Developing Countries*, 84(2), e12016. <https://doi.org/10.1002/isd2.12016>
- Schenkelberg, F. (2016). How reliable does a delivery drone have to be? In 2016 annual reliability and maintainability symposium (RAMS) (pp. 1-5). *IEEE*. <https://doi.org/10.1109/RAMS.2016.7448054>
- Tan, H. H. (2020). *First drone delivery of pizza in Thailand carried out*. Minimize Insights. Accessed: 18 June 2022. [Online]. Available: <https://www.minimeinsights.com/2020/06/28/first-drone-delivery-of-pizza-carried-out-in-thailand>
- Tom, N. M. F. (2020, June 30). Crashed! Why drone delivery is another tech idea not ready to take off. *International Business Research*, 13(7), 251-264. <https://doi.org/10.5539/ibr.v13n7p251>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Systems Quarterly*, 27(3), 425-478. <https://doi.org/10.2307/30036540>
- Vincent, J. (2021). *Alphabet's drone delivery wing hits 100,000 deliveries milestone*. The Verge. Accessed: 23 June 2022. [Online]. Available: <https://www.theverge.com/2021/8/25/22640833/drone-delivery-google-alphabet-wing-milestone>
- Vogels, E. A. (2019). *Millennials stand out for their technology use, but older generations also embrace digital life*. Pew Research Center. Accessed: 10 September 2022. [Online]. Available: <https://www.pewresearch.org/short-reads/2019/09/09/us-generations-technology-use/>
- Walczuch, R., Lemmink, J., & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information & Management*, 44(2), 206-215. <https://doi.org/10.1016/j.im.2006.12.005>

- Wang, Q., Dacko, S., & Gad, M. (2008). *Factors influencing consumers' evaluation and adoption intention of really-new products or services: prior knowledge, innovativeness and timing of product evaluation*. ACR North American Advances. Accessed: 28 July 2022. [Online]. Available: [https://www.researchgate.net/publication/290590531_Factors_influencing_consumers' _evaluation_and_adoption_intention_of_really_-_New_products_or_services_Prior_knowledge_innovativeness_and_timing_of_product_evaluation](https://www.researchgate.net/publication/290590531_Factors_influencing_consumers_evaluation_and_adoption_intention_of_really_-_New_products_or_services_Prior_knowledge_innovativeness_and_timing_of_product_evaluation)
- Wungwanitchakorn, A. (2002). Adoption intention of banks' customers on internet banking service. *Abac Journal*, 22(3). Accessed: 26 July 2022. [Online]. Available: <http://www.assumptionjournal.au.edu/index.php/abacjournal/article/view/717>
- Yoo, W., Yu, E., & Jung, J. (2018). Drone delivery: Factors affecting the public's attitude and intention to adopt. *Telematics and Informatics*, 35(6), 1687-1700. <https://doi.org/10.1016/j.tele.2018.04.014>



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DETERMINING THE MOST APPROPRIATE HOTEL WITH FUZZY AHP METHOD

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Abstract

Choosing suitable accommodation is very important when planning a trip. This study, through the fuzzy analytical hierarchy process (FAHP), aims to support tourists' decision-making in choosing the optimal accommodation based on the judgment of tourism experts. Based on the literature, eight of the most important factors influencing this decision-making were selected, and three hotels will serve as alternatives. The results showed that 'cost per person' was the most influential factor with a weight of 0.335, followed by 'room facilities' with a weight of 0.248. The factor with the lowest impact on the choice of accommodation was 'children's policies' with a weight of 0.035, which was the least influential factor. Meanwhile, 'meals' and 'reservations policy' had approximately the same importance in decision-making. Considering the factors with the greatest impact, reducing costs, improving accommodation, and increasing the quality of service would bring tourism structures closer to tourists.

Keywords: Fuzzy AHP, hotel selection, factor, decision-making

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1. INTRODUCTION

The tourism industry is one of the main factors in Albania's economy. The numerous natural and cultural attractions of the country, from year to year increase the interest of tourists to visit it. According to the official data of the Ministry of Tourism, only in 2023, the country's economy from tourism income increased by 4.173 million euros, approximately 1.37 million euros more than the income this sector brought in 2022. Albania is a favorite destination throughout the year, only in the first two months of this year there were 970 thousand foreign visitors, from 686 thousand in the same period of the previous year.

The development of tourism is associated with the development of the country's infrastructure, the improvement of tourist structures, and the increase in the quality of service. When choosing suitable accommodations, tourists face specific challenges. According to Mahdi et al. (2021), choosing the right accommodation is about comfort and ensuring a pleasant and memorable travel experience. Factors such as the variety of hotels, personal preferences, budget constraints, etc., complicate this decision-making. Moreover, subjective factors such as service quality, location, price, cleanliness, and access to cultural or natural attractions often make it difficult for tourists to identify with certainty the best accommodation option. An optimal choice can only be made by analyzing and evaluating the most important factors that affect holiday satisfaction.

The use of MCDM methods is the optimal choice when we have to choose between many alternatives and when the selection is influenced by several factors (Ali et al., 2012). Vatankhah et al. (2023) showed that 11% of the MCDM literature (374 publications) pertains to travel and tourism. These methods are mostly used in the selection of hotels and tourist destinations.

In this study, based on the judgments of tourism experts, who analyzed the factors identified in the literature, one of the decision-making methods with multiple criteria, Fuzzy AHP, was used to calculate their weights. Also, three hotels in different areas of the coastal city of Vlore were chosen as alternatives for this study. The results of this work help both tourists and accommodation structures.

The article is organized as follows: in continuation of this introduction, several papers are presented that have applied the Fuzzy Analytic Hierarchy Process method in choosing a suitable accommodation during a trip, the factors that the authors have taken into consideration, and the results achieved. The following is a brief presentation of the methodology used, presenting the method used in more detail. The paper ends with the results and conclusions sections.

2. LITERATURE REVIEW

Chen et al. (2012) calculated the weights of the factors that influence the choice of five-star hotels. According to the authors, location was the most important factor for that category of tourists who frequent five-star hotels, followed by security, price, room and reception desk,

service quality, and hotel facilities. In their study, Zaman et al. (2016) showed how the weight of the six criteria that influenced the choice of a hotel could be calculated. AHP was the method that the authors used in this study, taking into consideration the responses of 250 surveyed tourists. The results showed that cleanliness, location, and value for money were the criteria that most influenced the choice of a hotel. Sezgin et al. (2016) analyzed the choice of a suitable hotel in the Mersin region by local tourists. The authors use the AHP method for determining the weights of the criteria and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method for ranking the five hotels taken into consideration. AHP results showed that 'cleanliness' was the most valued criterion followed by 'comfort' and 'cost/benefit', while 'location' and 'staff' had the same influence. The factor with the least impact on the election was 'free Wi-Fi'. Gülsün et al. (2017) in their study focused on the ranking of five hotels through five criteria taken into consideration such as room price, cleaning service, food diversity, security level, and proximity to the destination. In their study, the analysis was done through three of the most used MCDM methods to achieve a solid result. The authors showed that the AHP and TOPSIS methods gave the same result, while VIKOR (Vise Kriterijumska Optimizacija I Kompromisno Rešenje) was not suitable for this decision-making.

An extended model of the Complex Proportional Assessment (COPRAS) method was applied by Roy et al. (2019) for web-based hotel evaluation and selection. Hotels were ranked and rated according to performance and several criteria from the tourists' point of view. 'Value for money', 'food', and 'facilities' were the three most important factors according to experts who analyzed customers' preferences and feedback. They turned out to be less important in decision-making 'price', and 'location'. Mahdi et al. (2021) in their study used Fuzzy-AHP and GIS (Geographic Information Systems) methods to model preferences in the selection of accommodation by tourists. They analyzed 364 accommodation places in the city of Budapest and showed that half of them were recommendable for tourists. In their work, the factor with the greatest impact on choosing accommodation was the 'price per room' followed by the 'security level'. 'The free cancellation service' turned out to be the factor with the least influence on the choice of tourists, while 'breakfast included in the price' and 'distance from the center' had the same influence.

According to Karamasa (2021), the criteria that most affect the perception of the quality of service offered by hotels are 'availability of prices' followed by 'politeness and level of respect'. Other important factors in this study were 'reliability', 'flexibility of service and process', 'quality of restaurant service', and 'cleanliness'. The study refers to three-star hotels in the province of Erzurum in Turkey, and analysis was done through the Complex Proportional Assessment (SWARA) method which also showed that the least influential factors were 'housekeeping quality', and 'front office service quality'. Meanwhile, in his study, Akpinar (2022) analyzed the choice of a hotel in the conditions of the pandemic. SWARA and COPRAS were the methods used to evaluate the safe tourism certification criteria to solve the problem of choosing the most suitable hotel. As expected, the most important factors in this period were 'safety measures' and 'staff measures'.

Based on the literature, the factors considered in this study are presented in Table 1 below.

Table 1. Criteria for Selection an Accommodation

Factors	Descriptions
C1. Cost per person	Cost of accommodation per night for one person
C2. Review score	Impressions of previous tourists
C3. Room facilities	Private bathroom, air conditioning, sea view, balcony, kitchen
C4. Facilities	Free Wi-Fi, parking, family rooms, 24-hour front desk
C5. Child policies	Children of all ages are welcome and under 3 stay free
C6. Reservation policy	Free cancellation, no prepayment, book without credit card
C7. Meals	Breakfast included self-catering, breakfast & dinner included
C8. Location	Distance from destination or city center

In choosing a hotel, depending on the number and nature of the criteria and the number of alternatives, different decision-making methods with multiple criteria can be used. Let's compare TOPSIS, VIKOR, and Fuzzy AHP (Analytic Hierarchy Process with Fuzzy Logic) as three of the most used methods in this type of decision-making, presenting their strengths and weaknesses.

TOPSIS is a simple method to understand and implement. Using this method, we can rank the alternatives based on their distance from the ideal solution. The choice of an accommodation is based on many criteria, also the alternatives can be numerous and this is not an obstacle for this method. TOPSIS has several limitations. First, it uses subjective weighting of criteria, and decision-makers often lack sufficient information to assign accurate weights. Second, it does not take into account inaccuracies in the decision-maker's judgments.

If we had conflicting criteria in decision-making, VIKOR would be one of the methods we could use. VIKOR does not enable direct comparisons between criteria but evaluates alternatives based on their proximity to the ideal and non-ideal solution. Through the sensitivity analysis, the method provides a clear overview of how changing the weights of the criteria affects the ranking of the alternatives. Like TOPSIS, VIKOR does not manage ambiguities in the data, reducing its effectiveness.

Fuzzy AHP is an efficient method, especially when making decisions when human judgment is involved and preferences are not very clear. The method allows direct pairwise comparisons of criteria, which helps in decision-making. It also structures the problem into three or more levels, simplifying complex decision-making. This method is also suitable for group decision-making and the use of fuzzy numbers allows decision-makers to fine-tune the relative importance of criteria. Fuzzy AHP is more complex to calculate than TOPSIS or VIKOR. Pairwise comparisons for each criterion and alternative can be time-consuming, especially when the number of criteria and alternatives is considerable. In the selection of hotels, considering many hotels and criteria significantly lengthens the decision-making time.

In this paper, including eight criteria and only three hotels that serve as alternatives, and based on the judgments of three experts, we will use the FAHP method. In the future, further

development of this study is planned, where a larger number of alternatives will be included, and the analysis will include the above three methods to make a comparison of the achieved results.

3. METHODOLOGY

Among the decision-making methods with multiple criteria, the FAHP method is widely used in the tourism industry, especially when it comes to choosing accommodation during travel. First, subjective criteria such as service quality, convenience, or location must be taken into account in this decision-making and this method through fuzzy logic is more flexible in human judgments and preferences.

Second, during pairwise comparisons of criteria, decision makers can express themselves in linguistic terms, (e.g., 'equally important', 'much more important'). Then these judgments are converted into fuzzy numbers, to get more accurate estimates in this way. Also, this method is more flexible in weighing the criteria through fuzzy groups. In addition, FAHP enables the control of the consistency of the judgments of the decision-makers, assuring us that the decision is based on stable judgments.

In this study, the FAHP method with triangular fuzzy numbers (TFN) was used, which was first introduced in 1983 by Van Laarhoven and Pedrycz.

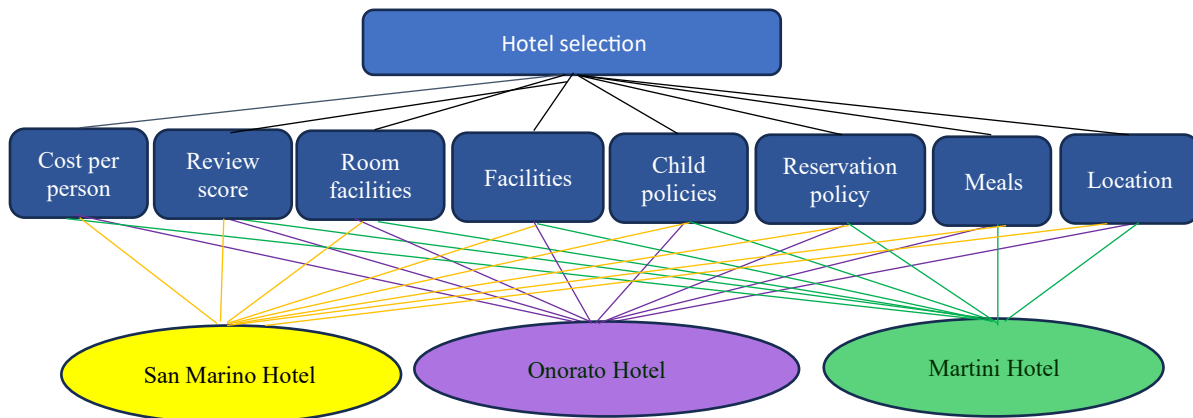
The method is applied in three stages:

- The problem was first structured in three levels, Figure 1.

Goal: choosing a suitable hotel during a trip.

Criteria: The selection of criteria for the selection of the tourist destination was carried out through the literature review and consultation with tourism experts. Studies related to destination selection, tourism management, and multi-criteria decision analysis (MCDA) in tourism were consulted. In this way, the common and influential criteria were identified in these studies on the selection of the tourist destination. Through interviews, tourism experts were consulted and eight suitable and adaptable criteria were selected for the specific touristic context of Albania.

Alternatives: three of the best three-star hotels in the city of Vlore were chosen.

Figure 1. FAHP Hierarchical Structure

- Based on the judgments of experts, a comparison matrix was built based on the membership function of linguistic scale and Fuzzy triangular number (Table 2).

Table 2. Proposed Membership Function of Linguistic Scale

Saaty's scale	Value Description	TFN	Reciprocal TFN
9	Extreme importance	(8, 9, 9)	(1/9, 1/9, 1/8)
8	Absolute importance	(7, 8, 9)	(1/9, 1/8, 1/7)
7	Very Good	(6, 7, 8)	(1/8, 1/7, 1/6)
6	Fairly Good	(5, 6, 7)	(1/7, 1/6, 1/5)
5	Strong importance	(4, 5, 6)	(1/6, 1/5, 1/4)
4	Preferable	(3, 4, 5)	(1/5, 1/4, 1/3)
3	Moderate advantage	(2, 3, 4)	(1/4, 1/3, 1/2)
2	Weak advantage	(1, 2, 3)	(1/3, 1/2, 1)
1	Equal importance	(1, 1, 1)	(1, 1, 1)

The relative importance of each criterion was calculated as in the matrix below:

$$A = \begin{bmatrix} (1, 1, 1) & l_{21}m_{21}u_{21} & \cdots & l_{1n}m_{1n}u_{1n} \\ l_{21}m_{21}u_{21} & (1, 1, 1) & \cdots & l_{2n}m_{2n}u_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ l_{n1}m_{n1}u_{n1} & l_{n2}m_{n2}u_{n2} & \cdots & (1, 1, 1) \end{bmatrix}$$

- The judgment matrices of the three experts were analyzed through the Fuzzy AHP web application developed by Holecsek and Talasova (2016), and since the number of experts was small, the geometric mean was used to obtain the final results. According to Wu et. al, (2008), if we had used a large number of experts, the use of the arithmetic mean would have been more suitable.

4. RESULT OF ANALYSIS

In the first phase of the study, the opinions of three tourism experts were obtained, two of whom were hotel managers and the other a professor of the faculty of tourism with work experience of no less than 10 years. Their judgments were obtained through interviews that lasted about 25 minutes each after a brief description of the purpose of the study and the factors that were taken

into consideration. Next, each of them made the double comparisons of the factors related to the goal of "choosing an accommodation during a trip" and then the double comparisons of the hotels considered in relation to each factor. The Saaty's 1-9 scale was used for these comparisons. With these data, Saaty's judgment matrices were built with the equivalent fuzzy numbers as in Table 1. The data analysis was done through the Fuzzy AHP web application, which showed that the experts' judgments were consistent with $CR = 0.076$ less than 0.1.

The results achieved above were organized in Excel, and their fuzzy geometric mean value $\tilde{r}_i$ was calculated. For the calculation of fuzzy weights of the criteria, was used,

$$\tilde{w}_i = \tilde{r}_i \otimes (\tilde{r}_1 \oplus \tilde{r}_2 \oplus \dots \oplus \tilde{r}_8)^{-1}$$

where in this case,

$$\begin{aligned} \tilde{r}_1 \oplus \tilde{r}_2 \oplus \dots \oplus \tilde{r}_8 &= (0.86, 0.938, 1.03) \\ (\tilde{r}_1 \oplus \tilde{r}_2 \oplus \dots \oplus \tilde{r}_8)^{-1} &= \left(\frac{1}{1.03}, \frac{1}{0.938}, \frac{1}{0.86} \right) \end{aligned}$$

Table 3 below presents the results of this analysis regarding the criteria.

Table 3. The Relative Weights of Selected Criteria

Criteria	Fuzzy geometric mean value $\tilde{r}_i$	Fuzzy weights $\tilde{w}_i$	Rank
C1. Cost per person	(0.305, 0.314, 0.320)	(0.296, 0.335 , 0.372)	1
C2. Review score	(0.118, 0.139, 0.159)	(0.115, 0.148 , 0.185)	3
C3. Room facilities	(0.210, 0.233, 0.250)	(0.204, 0.248 , 0.291)	2
C4. Facilities	(0.050, 0.057, 0.065)	(0.049, 0.060 , 0.076)	5
C5. Child policies	(0.031, 0.033, 0.037)	(0.030, 0.035 , 0.043)	8
C6. Reservation policy	(0.039, 0.041, 0.049)	(0.038, 0.044 , 0.057)	7
C7. Meals	(0.040, 0.045, 0.056)	(0.039, 0.048 , 0.065)	6
C8. Location	(0.067, 0.076, 0.094)	(0.065, 0.082 , 0.109)	4

Source: Authors' Calculations Using the Fuzzy AHP Application Web

As seen in Table 3, the factor with the greatest impact on choosing accommodation is C1(cost per room) with a weight of 0.335, followed by C3 (room facilities) with a weight of 0.248. In third place in terms of importance in decision-making is C2 (review score) with a weight of 0.148. In fourth and fifth place are the factors C8 (location) and C4 (facilities) with weights of 0.082 and 0.06 respectively. Factors C6 (reservation policies) and C7 (meals) have approximately equal weights; the least important factor was C5 (child policies) with a weight of 0.035.

These results are in accordance with the results of Karamasa (2021), and in contrast with the results of Zaman et al., (2016), and Sezgin et al., (2016), which had 'cleanliness' as the most important factor in the selection.

Considering the results of this paper, hotel managers should work on optimizing price strategies, improving room facilities, continuously monitoring comments left on online

platforms by customers, and improving the quality of service. Since the price per person turned out to be the most important factor in choosing an accommodation, the price policies applied by accommodation structures should be more flexible to attract more visitors. Here we mean seasonal discounts, loyalty packages, and special rates for extended or group bookings. Also, this paper showed that tourists value room amenities, so managers should provide rooms with comfortable beds, air conditioning, high-speed internet, and various entertainment options. Tourists' comments on platforms such as Booking.com, and others, influence future bookings, so hotel managers must make improvements based on these comments to improve the services offered. In this way, they will be able to increase their reputation and trust. Maintaining a presence and reputation on the internet is essential for an accommodation structure. Listing on multiple booking platforms is not enough, but quality presentation, detailed descriptions, and accurate information about the structure and services are needed.

For the calculation of fuzzy weights of the alternatives, was used,

$$\tilde{w}_i = \tilde{r}_i \otimes (\tilde{r}_1 \oplus \tilde{r}_2 \oplus \tilde{r}_3)^{-1}$$

where in this case,

$$\begin{aligned}\tilde{r}_1 \oplus \tilde{r}_2 \oplus \tilde{r}_3 &= (0.88, 0.99, 1.056) \\ (\tilde{r}_1 \oplus \tilde{r}_2 \oplus \tilde{r}_3)^{-1} &= \left(\frac{1}{1.056}, \frac{1}{0.99}, \frac{1}{0.88} \right)\end{aligned}$$

Table 4 below presents the results of this analysis regarding the alternatives.

Table 4. Summarized Results for the Alternatives

Alternatives	Fuzzy geometric mean value $\tilde{r}_i$	Fuzzy weights $\tilde{w}_i$	Rank
San Marino Hotel	(0.445, 0.511, 0.524)	(0.421, 0.516 , 0.596)	1
Onorato Hotel	(0.210, 0.225, 0.247)	(0.199, 0.227 , 0.281)	3
Martini Hotel	(0.225, 0.254, 0.285)	(0.213, 0.257 , 0.324)	2

Source: Authors' Calculations Using the Fuzzy AHP Application Web

Table 4 clearly shows that the hotel with the best performance about the reviewed factors was San Marino Hotel with a weight of 0.516 and the other two hotels were almost equally preferred in the selection during a trip.

5. CONCLUSION

Various platforms such as Booking.com, Tripadvisor.com, and others enable hotels to get closer to their customers. However, they also help the latter to make a better choice and have the opportunity to leave their impressions of the service offered. This is how a better relationship with customers in the tourism sector is achieved. This study analyzes the factors that most influence the choice of a hotel through the FAHP method. These factors have been selected based on the literature and expert opinions together with three of the three-star hotels in the city

of Vlore, located in different areas of the city. The results showed that for tourists choosing three-star hotels, price per person, room facilities and other tourists' impressions of the service received in hotels are the most important factors. So, hotels can attract tourists by making improvements to accommodation units, improving the quality of services, and moderating prices.

Some limitations of this study: First, this study may include the judgments of more experts and a significant number of tourists. Second, only three of the three-star hotels in the coastal city of Vlore were considered. Hotels in different areas of Albania can attract different types of tourists. Expanding the search to more destinations can help hotels identify emerging trends and preferences.

Some recommendations for further studies: The continuous development of tourism in Albania requires studies, the results of which would help both businesses operating in the field of tourism, as well as tourists themselves to have unforgettable experiences in their travels. A study can also be done to rank the factors that influence the choice of hotel and to rank hotels based only on the ratings made by tourists on online platforms. Future research could focus on different hotel categories, such as budget or luxury hotels, to understand how preferences differ between income groups or travel motivations. Hotel managers must be careful when adapting their offers to different types of tourists. Thus, family-oriented hotels may offer child-friendly facilities, while business hotels may offer various conference or event spaces. Future studies could use two or more multi-criteria decision-making methods to rank hotels or factors influencing their choice. In this way, it can be seen which method is more efficient in specific contexts or regions. The study of luxury hotels would provide an overview of the luxury tourism sector in a growing country like Albania. Understanding what factors influence the preferences of luxury tourists can help these hotels refine their strategies.

REFERENCES

- Akpınar, M. E., & Özdil, T. (2022). Hotel selection with safe tourism certificates in Covid-19 pandemic using SWARA and Fuzzy COPRAS methods. *MANAS Sosyal Araştırmalar Dergisi*, 11(2), 783-797. <https://doi.org/10.33206/mjss.942538>
- Ali, N. H., Sabri, I. A., Noor, N. M., & Ismail, F. (2012). Rating and ranking criteria for selected islands using the Fuzzy Analytic Hierarchy Process (FAHP). *International Journal of Applied Mathematics and Informatics*, 1(6), 57-65.
- Chen, I. S., Hashemkhani Zolfani, S., Rezaeiniya, N., & Hasan Aghdaie, M. (2012). The evaluation of five-star hotel: A case in IRAN. *International Journal of Business & Society*, 13(3), 375-390.

- Gülsün, B., Yıldız, S., & Yılmaz, B. (2017). Multi-criteria decision-making and the choice of hotels in the tourism sector. *International Journal of Business Tourism and Applied Sciences*, 5(2), 64-70.
- Holecek P., Talasova, J. (2016). A free software tool implementing the fuzzy AHP method. *Proceedings of the 34th International Conference on Mathematical Methods in Economics, Liberec, Czech Republic* (pp. 266-271).
- Karamaşa, Ç. (2021). Ranking service quality using multi-criteria decision-making methods: Example of Erzurum province. *Journal of Process Management and New Technologies*, 9(3-4), 1-12. <http://dx.doi.org/10.5937/jpmnt9-33449>
- Kwok, P. K., & Lau, H. Y. (2019). Hotel selection using a modified TOPSIS-based decision support algorithm. *Decision Support Systems*, 120, 95-105.
- Liao, H., Yang, S., Kazimieras Zavadskas, E., & Škare, M. (2023). An overview of fuzzy multi-criteria decision-making methods in hospitality and tourism industries: bibliometrics, methodologies, applications, and future directions. *Economic research-Ekonomska istraživanja*, 36(3), 2150871.
- Mahdi, A., & Esztergár-Kiss, D. (2021). Analysis of the effective factors for hotel selection by using the Fuzzy AHP method. *Industry 4.0*, 6(2), 79-82.
- Mahdi, A., & Esztergár-Kiss, D. (2021). Modeling the accommodation preferences of tourists by combining fuzzy-AHP and GIS methods. *Journal of Advanced Transportation*, 2021, 1-16.
- Nguyen, P. H. (2021). A fuzzy analytic hierarchy process (FAHP) based on SERVQUAL for hotel service quality management: Evidence from Vietnam. *The Journal of Asian Finance, Economics and Business*, 8(2), 1101-1109.
- Roy, J., Kumar Sharma, H., Kar, S., Kazimieras Zavadskas, E., & Saparauskas, J. (2019). An extended COPRAS model for multi-criteria decision-making problems and its application in web-based hotel evaluation and selection. *Economic research-Ekonomska istraživanja*, 32(1), 219-253.
- Saaty, T. L., & Vargas, L. G. (2012). Models, methods, concepts & applications of the analytic hierarchy process. *Springer Science & Business Media*, 175.
- Sezgin, M., & Tokay, S. (2016). Determining the most appropriate hotel with multi-criteria decision-making techniques: The example of Mersin Province. *International Journal of Scientific and Research Publications*, 6(6).

- Sharma, H. K., Singh, A., Yadav, D., & Kar, S. (2022). Criteria selection and decision making of hotels using Dominance Based Rough Set Theory. *Operational Research in Engineering Sciences: Theory and Applications*, 5(1), 41-55.
- Van Laarhoven, P. J., & Pedrycz, W. (1983). A fuzzy extension of Saaty's priority theory. *Fuzzy Sets and Systems*, 11(1-3), 229-241.
- Vatankhah, S., Darvishmotevali, M., Rahimi, R., Jamali, S. M., & Ale Ebrahim, N. (2023). MCDM in travel and tourism research since 1997: A bibliometric approach. *International Journal of Contemporary Hospitality Management*.
<https://dx.doi.org/10.2139/ssrn.4324990>
- Wen-Hsiang Wu, Chang-tzu Chiang, & C.-t. Lin. (2008). Comparing the aggregation methods in the analytic hierarchy process when uniform distribution. *WSEAS Transactions on Business and Economics*, 5(3), 82-87.
- Yu, S. M., Wang, J., Wang, J. Q., & Li, L. (2018). A multi-criteria decision-making model for hotel selection with linguistic distribution assessments. *Applied Soft Computing*, 67, 741-755.
- Zaman, M., Botti, L., & Vo-Thanh, T. (2016). Weight of criteria in hotel selection: An empirical illustration based on TripAdvisor criteria. *European Journal of Tourism Research*, 13, 132-138.



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04 / MARKETING STUDIES



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THE IMPACT OF ARTIFICIAL INTELLIGENCE APPLICATIONS ON CONSUMER BEHAVIOR AND PURCHASE INTENTION WITHIN THE SCOPE OF DIGITAL TRANSFORMATION: A BIBLIOMETRIC ANALYSIS

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Abstract

Digital technologies are a necessity for businesses and the applications developed within the scope of digital transformation are a critical element for marketing strategies. Today's changing consumer behavior is a dynamic process impacted by digital transformation, leading to differentiation in marketing strategies implemented by businesses. This study aims to use bibliometric analysis to reveal information about the impact of artificial intelligence on consumer behavior and purchase intention within the scope of digital transformation and development over the last 33 years. Articles were collected from two databases using keyword combinations such as 'artificial intelligence', 'digital transformation', 'consumer behavior', 'marketing', and 'purchase intention'. The final sample comprised 45 peer-reviewed articles after applying inclusion and exclusion criteria. To test the sample, three separate analyses were conducted. A performance analysis identified the publication years of the articles, contributions per country, the output of the relevant journals, and the sectors in which artificial intelligence applications are concentrated and used more. The articles were analysed in-depth for data analysis, providing insights into the evolution of relevant scientific production. The findings of the study offer a broad perspective on research to date and identify potential research gaps. This research aims to contribute to the marketing field by conducting a bibliometric analysis of research on the impact of artificial intelligence on consumer behavior and purchase intention. The Scopus and Web of Science databases were searched for articles published between 1991 and 2024. The results confirm that the literature on this topic has been increasing, especially

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since 2018. The study provides valuable insights for both academics and marketers in predicting consumer buying behavior. The findings indicate that firms widely utilise digital technologies and that AI applications have a positive impact on consumer behavior and purchase intentions. The study also offers recommendations for future research by academics and researchers.

Keywords: digital transformation, artificial intelligence, consumer behavior, purchase intention

1. INTRODUCTION

The exponential advancement of scientific and technological progress has given rise to numerous groundbreaking discoveries and innovations. However, it is artificial intelligence (AI) that is widely regarded as the trailblazer in these advancements (Mariani et al., 2022). Since the 1950s, artificial intelligence has undergone a profound metamorphosis. Extensive research has demonstrated that the implementation of AI technology significantly simplifies consumer decision-making processes. This is achieved by minimizing search costs, expediting decision-making, providing a diverse range of options, and eliminating the influence of sales organizations (Huang and Rust, 2021). The emergence of AI, possessing human-like intelligence and the ability to tackle intricate problems, has resulted in its widespread adoption across all domains (Lee and Choi, 2016). Algorithms are meticulously designed to enable computers to follow instructions and solve problems. The utilization of artificial intelligence has proven to be advantageous for both marketers and consumers in the 21st century. It has emerged as a novel and innovative approach to problem-solving and generating innovative solutions through a machine learning process, which employs language. It is not only marketers who are interested in artificial intelligence; consumers also benefit from it. While the majority of their clientele utilise artificial intelligence, the company generates revenue by optimising the utilisation of financial and temporal resources to fulfil consumer demands. (Kim and Kim, 2017).

The field of AI has evolved to a level where it has transformed the interface of functions into an interface that is easy to use for users and focused on consumers. As a result, consumers are ready to receive support from AI in the stages of purchasing, selecting, researching goods.

Artificial intelligence algorithms play a crucial role in assisting marketers to achieve cost reduction and enhance consumer profitability (Yin and Qiu, 2021). In today's modern era, artificial intelligence has become an essential element in the decision-making processes of consumers, particularly in relation to their purchasing and consumption behaviors. Consumers readily embrace artificial intelligence due to its ability to simplify their lives and support the pursuit of a sustainable lifestyle. As a novel tool of the 21st century, artificial intelligence has become indispensable and convenient for consumers, enabling them to harness technology for their own advantage while simultaneously optimizing costs and saving time. The profitability of artificial intelligence across various domains has significantly contributed to its widespread acceptance and utilization among consumers.

The research investigated the utilization of artificial intelligence (AI) and its essential role in the marketing industry. It delves into a range of AI applications across different marketing sectors. Additionally, the research explores additional AI-driven innovations within marketing fields. Lastly, the research highlights and deliberates on the significant marketing benefits derived from AI.

2. REVIEW OF LITERATURE

2.1. Artificial Intelligence Applications and Marketing

Artificial intelligence (AI) is a field of computer science that enables machines to comprehend and replicate human communication and behavior. The advent of this technology has facilitated the development of intelligent machines based on the data provided that is capable of thinking, responding, and performing actions that are analogous to those performed by humans. (Toorajipour et al., 2021).

Artificial intelligence has the potential to be utilized by marketers to gain a deeper understanding of consumer behavior and enhance their ability to classify consumers and direct them towards the subsequent phase of their journey, thus offering them an optimal experience. Marketers can enhance the return on investment by avoiding the expenditure of resources on ineffective ventures. This can be achieved by meticulous examination of consumer data and an understanding of the true desires of the consumer.

In particular, providing results for consumer needs and providing appropriate product production and service delivery, managing real-time pricing demand fluctuations, designing websites according to needs using artificial intelligence applications, and making consumer purchasing processes more flexible and easier are among the application areas that can be realized within the scope of marketing is taking.

2.2. The Impact of Artificial Intelligence on Consumer Behavior and Purchase Intention

The consumer's attitude and orientation towards the purchase of a particular good or service, and the degree of willingness to pay, are collectively referred to as the intention to buy. The experience of artificial intelligence has been found to enhance consumer confidence and intent for specific products and services. Commercial organizations extensively utilize AI, which has led to the ability of consumers to visualize products in a distinctive way through augmented reality applications. This, in turn, assists them in making well-informed decisions when purchasing. Businesses have embraced various AI-enabled technologies to provide consumers with the best and personalized choices. (Pantano et al., 2017; Reinartz, 2019). The innovative technology utilized by artificial intelligence assists consumers in understanding their purchasing preferences with exceptional clarity. Previous research has indicated that the objective of artificial intelligence is to develop programs with human-like problem-solving capabilities that enhance the decision-making skills required for purchasing intent. (Qian and Xu, 2019). Furthermore, research has indicated that online platforms utilising artificial intelligence facilitate a safer and risk-free purchasing experience for consumers. (Haenlein, 2019). Artificial intelligence is a technology that is designed to be user-friendly, and it is used by consumers to make purchasing decisions while taking advantage of products or services. (Yoo, 2010). The significance and efficacy of artificial intelligence (AI) can be attributed to its

capacity to furnish consumers with a substantial volume of pertinent and organised data pertinent to purchasing-related activities. (Sohn and Kwon, 2020).

It can be argued that consumers' virtual experiences play a crucial role in determining their purchasing intentions. Indeed, research indicates that a positive virtual experience has a positive effect on consumers' purchasing intent. (Pantano et al., 2017). A study has found that consumers who purchase products from online stores that employ artificial intelligence are more satisfied with their purchase decisions.

3. METHODOLOGY

The methodology of this study consists of a comprehensive three-stage process that includes the selection of bibliometric databases, identification of keywords, identification of studies by year, identification of country-based contributions, and identification of the journals in which the studies were published.

3.1. Defining the Keywords and Identification of Key Outcomes

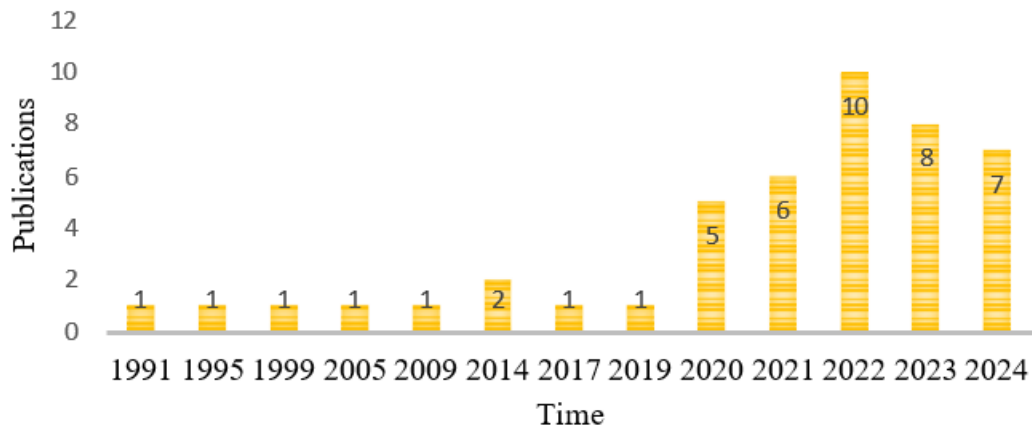
The initial search used keywords included in the 'artificial intelligence', 'digital transformation', 'consumer behavior', 'marketing', and 'purchase intention'. These keywords were entered into the two databases using the 'all fields' search function. As can be seen in Table 1, this methodology was used with all two databases.

Table 1. Keyword Combinations

Database	• Web of Science • Scopus
Number of studies	• 14.973 • 4.560
Total  19.533	

3.2. The Process of Analysing Data

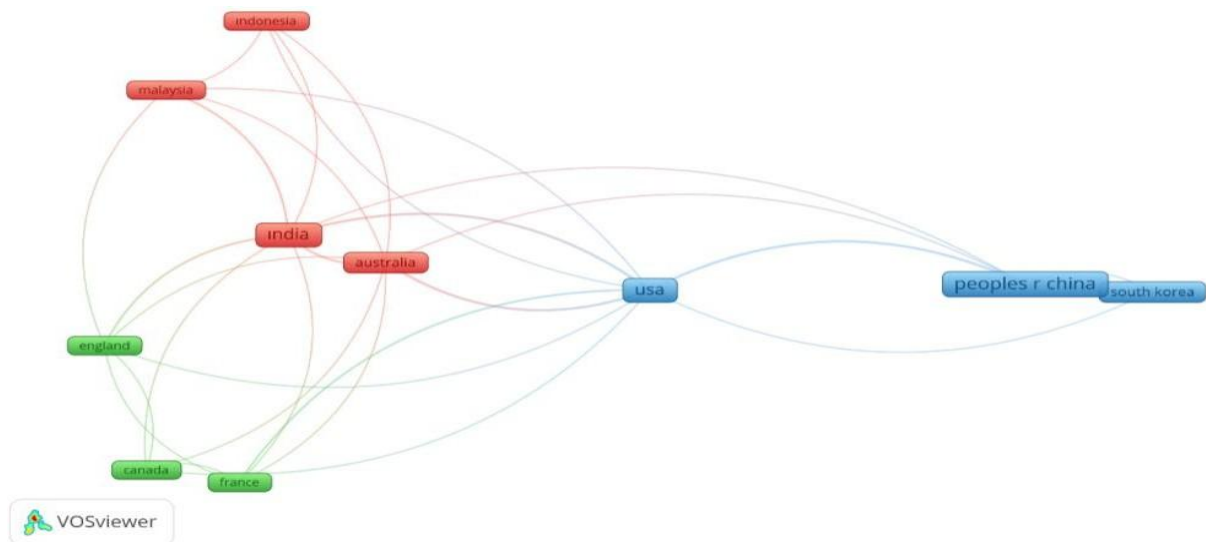
The study aimed to analyze keywords related to artificial intelligence and consumer behavior and purchase intention. The analysis included the number of studies conducted by year, country-based contributions, and journal-based publications. The final sample comprised 45 peer-reviewed articles after applying inclusion and exclusion criteria. The studies published every year are shown in Figure 1.

Figure 1. Number of Publications by Year

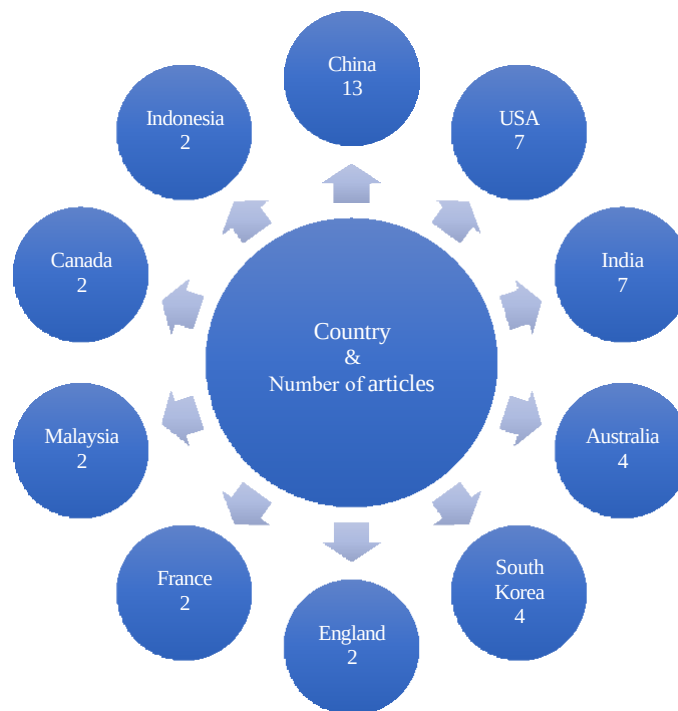
It is seen that studies on artificial intelligence applications, consumer behaviour and purchase intention in the field of marketing have increased in 2020 and in the following years. It is seen that the highest level was reached in 2022 in terms of the number of publications.

3.3. Determination of Contribution by Country

The research identifies the top-producing countries in a field based on the authors' country of origin. The map shows the country with the highest number of publications. The top 10 contributing countries were identified. The map is shown in Figure 2 and Table 2 outlines the top 10 countries with the most publications.

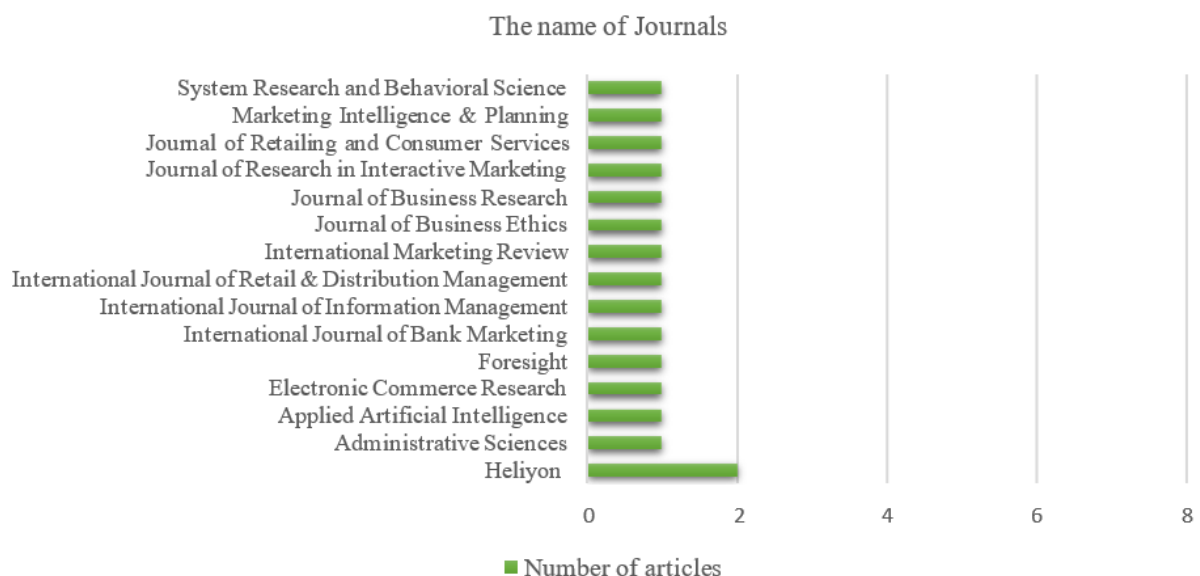
Figure 2. Map of the Most Prolific Countries

Within the scope of the studies carried out, it is seen that the most productive countries are China, America and India, respectively, based on the origins of the authors.

Table 2. The 10 Most Productive Countries

3.4. The Determination of the Number of Publications According to Journals

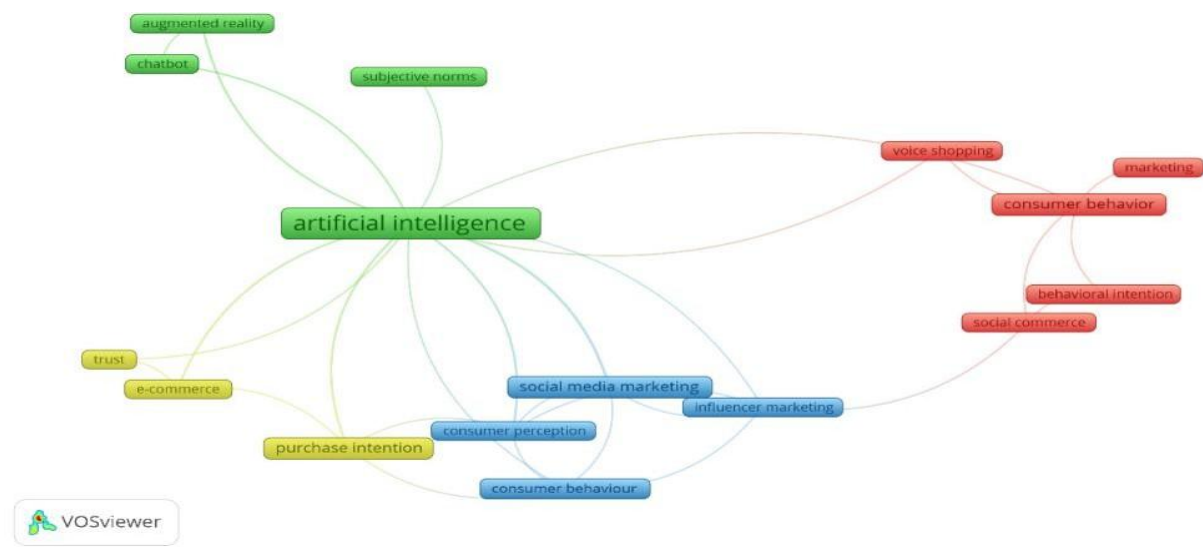
The 15 articles were published in 15 journals: the statistics show that the articles were not concentrated on just a few journals but were published over a wide variety. Table 3 lists the 15 most featured academic journals. Since consumer behavior and purchase intention are related to the business field and, more specifically, to marketing, most of the journals are associated with marketing in some way. Academic studies within the scope of artificial intelligence applications, consumer behavior and purchase intention are still very new, and there are still few studies in this field.

Table 3. The Fifteen Most Prominent Academic Journals

3.5. Publication Performance of Academic Journals

An analysis was carried out for the keywords used in the studies conducted within the scope of artificial intelligence. In the analysis, the studies conducted in the field of business administration were determined in accordance with the purpose of the study. The keywords used in the journals in which these articles were published were determined, and various clustering results were obtained regarding the scope of the studies conducted so far. The results for keywords are shown in Figure 3.

Figure 3. Visualization of Keywords



4. RESULTS

Four clusters emerged after the keyword analysis of the studies carried out. In this context, in the first cluster more studies on consumer behaviour and purchasing attitude are included. In particular, it is stated that studies on voice shopping are prominent and that consumers can shop online by speaking and the purchasing process becomes easier. In the second cluster, the concepts of artificial intelligence and augmented reality stand out. In this cluster, it was concluded that more studies were carried out on the use of chatbot applications by consumers during service procurement. The third cluster includes studies on the concepts of social media marketing and influencer marketing. In this context, it is seen that especially the relationships with consumer perception and consumer behaviour are examined. Through artificial intelligence applications, businesses can produce content and analyse data on social networks. In the fourth and last cluster, it is seen that studies on consumers' purchase intention and e-commerce concepts have been carried out. Another result is that the mediating effect of the concept of trust is investigated in the studies conducted for this.

As a result of the bibliometric analysis, it is seen that the studies on how consumer behaviours are shaped with artificial intelligence in today's digital age and accordingly, the direction in which consumers' purchasing behaviours have evolved are especially concentrated in 2020 and

beyond. When these studies are analysed by country of origin, it is seen that China, America and India stand out. Considering the number of studies, it is seen that there are still few publications in the field.

5. CONCLUSION AND DISCUSSION

As a result of the studies carried out, four clusters emerged and in this context, it can be stated that there are studies in which the concepts of purchasing behaviour, consumer perception and trust are at the forefront. It is seen that studies on e-commerce, retail sector and social media are more intense.

The analysis of the studies revealed that the advent of artificial intelligence has significantly altered consumer purchasing intentions. Furthermore, consumers now feel more secure and are more willing to shop online, particularly when utilising AI-supported technology.

Within the scope of future studies in the field, it can be investigated how artificial intelligence can be used to create personalised experiences for consumers, especially for businesses and researchers, and how marketing analytics techniques can be used to target potential consumers. Especially the evaluation of the results obtained from consumers at the point of data analysis is very important in this respect. In this way, increasing the studies on determining the target market and making the right positioning will be beneficial in terms of determining consumer behaviour and purchase intention.

AI tools have proven to be a time-saving asset for businesses, allowing them to allocate their resources towards other crucial aspects of digital marketing. The emergence of artificial intelligence has brought about significant technological advancements, which have far-reaching consequences. Consequently, in the forthcoming years, research focusing on the utilization of AI in digital marketing will play a pivotal role in fostering innovation, enhancing productivity, and delivering personalized services. This will not only benefit the field of digital marketing but also contribute to the growth and success of businesses. Particularly, the e-commerce and retail sectors can conduct extensive studies in this domain, especially in relation to online purchases.

Another research proposal for the field is the use of artificial intelligence to assess consumer behaviour and patterns, predict future outcomes and adjust advertising appropriately. AI-powered machine learning algorithms have the capability to analyze extensive sets of past consumer data in order to identify the most suitable advertisements for consumers and pinpoint the ideal stage in the purchasing journey. Artificial Intelligence offers the advantage of optimizing the distribution of content at the most opportune moment by leveraging trends and data. In this context, especially the use of machine learning will contribute.

Artificial intelligence is being used in many fields, especially in the finance, tourism, healthcare and retail sectors. Different outcomes are produced by each use case, including enhanced

campaign performance, improved consumer experience, and heightened efficiency in marketing operations. In this context, it is of great importance to increase the number of studies on artificial intelligence applications, especially in determining consumer behaviour and examining purchase intentions, and to identify gaps in the field.

REFERENCES

- Haenlein, M., Kaplan, A., Tan, C. W., & Zhang, P. (2019). Artificial intelligence (AI) and management analytics. *Journal of Management Analytics*, 6(4), 341-343. <https://doi.org/10.1080/23270012.2019.1699876>
- Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of The Academy of Marketing Science*, 49, 30-50. <https://doi.org/10.1007/s11747-020-00749-9>
- Kim, H. K., & Kim, W. K. (2017). An exploratory study for artificial intelligence shopping information service. *The Journal of Distribution Science*, 15(4), 69-80. <https://doi.org/10.15722/jds.15.4.201704.69>
- Lee, J. Y., & Choi, B. S. (2016). Suggestions for nurturing ecosystem to spur artificial intelligence industry. *Electronics and Telecommunications Trends*, 31(2), 51-62.
- Mariani, M. M., Perez-Vega, R., & Wirtz, J. (2022). AI in marketing, consumer research and psychology: A systematic literature review and research agenda. *Psychology & Marketing*, 39(4), 755-776. <https://doi.org/10.1002/mar.21619>
- Pantano, E., Rese, A., & Baier, D. (2017). Enhancing the online decision-making process by using augmented reality: A two country comparison of youth markets. *Journal of Retailing and Consumer Services*, 38(1), 81-95. <https://doi.org/10.1016/j.jretconser.2017.05.011>
- Qian, M., & Xu, Z. (2019). A study of dynamic recognition of consumer brand decision-making preference based on machine learning method. *Nankai Bus. Rev*, 22(1), 66-76.
- Reinartz, W., Wiegand, N., & Imschloss, M. (2019). The impact of digital transformation on the retailing value chain. *International Journal of Research in Marketing*, 36(3), 350-366. <https://doi.org/10.1016/j.ijresmar.2018.12.002>
- Sohn, K., & Kwon, O. (2020). Technology acceptance theories and factors influencing artificial intelligence-based intelligent products. *Telematics and Informatics*, 47, 101324. <https://doi.org/10.1016/j.tele.2019.101324>
- Toorajipour, R., Sohrabpour, Nazarpour, A. N. Oghazi, P., & Fischl, M. (2021). Artificial intelligence in supply chain management: A systematic literature review. *Journal of Business Research*, 122, 502-517. <https://doi.org/10.1016/j.jbusres.2020.09.009>

- Yin, J., & Qiu, X. (2021). AI technology and online purchase intention: structural equation model based on perceived value. *Sustainability*, 13(10), 5671. <https://doi.org/10.3390/su13105671>
- Yoo, W. S., Lee, Y., & Park, J. (2010). The role of interactivity in e-tailing: Creating value and increasing satisfaction. *Journal of Retailing and Consumer Services*, 17(2), 89-96.



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05 / FINANCE AND ACCOUNTING STUDIES



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FINANCE AND ACCOUNTING STUDIES: EXPLORATION OF NEW FINANCIAL TECHNOLOGIES, ETHICAL ACCOUNTING PRACTICES, AND THE IMPACT OF THE GLOBAL FINANCIAL LANDSCAPE ON BUSINESSES AND ECONOMIES

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Abstract

Today, all industries are undergoing a significant digital transformation, where multiple organizations and industries are being forced to reinvent the way they do business, taking into account new competitors. The speed of business will continue to increase as consumers, across their need for business ecosystem, respond in real-time, i.e. with more and more companies increasing their efficiency of the digital economy. And, in this context, ethics will be at the basis of any business. This is because, while it is clear that digital technologies could transform most sectors, there are a number of challenges that need to be understood, such as ethics and up-to-date regulation. The impact of new technologies resulting from the evolution of the internet has introduced at the business level, whether in terms of operational management or influence on accounting work, has allowed steps to be taken in transactions and in economic and financial analysis, with the introduction of new, more sophisticated management models. In fact, accounting services have always been subject to process improvement for decades, however, the flow of more comprehensive operations and the availability of new services through electronic means has had as its main reflection a greater flexibility and simplicity in the use of accounting information and, thus, allowed a multidirectional dynamic between the company and customers. In this sense, the starting question was posed: what is the importance of new financial technologies, ethical accounting practices in the global financial scenario in

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companies and economies? To answer this question, it was proposed as a general objective to determine the importance of new financial technologies, ethical accounting practices in the global financial scenario in companies and economies. To this end, a bibliometric analysis will be carried out using R studio.

Keywords: accounting, business, ethical accounting practices, new digital technologies

1. INTRODUCTION

Although digital transformation is a central topic of debate today, the premises of digital products, services, and social networks were already emerging as key components in the 1990s and 2000s (Auriga, 2016). For example, in the commerce sector, advertising and mass media campaigns were recognized as important digital channels for reaching customers, even though purchases were still predominantly made in physical stores.

From 2000 to 2015, the rise of smart devices and social media platforms led to a significant transformation in how customers interacted with businesses (BDI & Roland Berger, 2015). At the same time, businesses began to realize their ability to communicate digitally with their customers one-on-one, in real time (Mazzone, 2014).

The framework of digital transformation involves the integration of various actors, such as businesses and customers, across value-added chain systems (Bouée & Schaible, 2015), alongside the application of new technologies. In this context, digital transformation requires skills related to data extraction, analysis, and the conversion of data into actionable insights (Mazzone, 2014).

Financial companies, like other businesses, rely on managing transaction costs. In the absence of full trust between parties, interactions in the production and customer markets are characterized by risks, such as principal-agent challenges and incomplete or asymmetric information (Haddad et al., 2019).

The digital transformation, driven by the fourth industrial revolution, has led to the emergence of sophisticated, technology-enabled financial services known as FinTech, which have transformed the financial landscape. FinTech has rapidly gained global adoption, revolutionizing the traditional financial services industry by offering innovative and disruptive solutions (Arner et al., 2017).

FinTech represents a dynamic segment at the intersection of financial markets and the technology sector, where technology-driven start-ups and new market entrants innovate products and services traditionally offered by the financial system. As such, FinTech is increasingly disrupting the traditional value chain in financial services (Haddad et al., 2019).

The fourth industrial revolution has also penetrated the financial industry, leading to the growth of FinTech firms characterized by technological innovations that drive new, profitable business models for financial services (Stern et al., 2017). Wonglimpiyarat (2017) described FinTech as financial services supported by technology, where integrated IT enhances core performance. Compared to traditional finance, FinTech enables quicker revenue generation, better service delivery, and cost reduction, thereby reconfiguring the financial industry and stabilizing the system (Shin & Choi, 2019).

The rapid transition from research to application in the financial services sector is evidenced by the integration of technologies such as AI, predictive analytics, and process optimization across various financial activities (Kou, 2020). Activities such as credit applications, investment management, and cashless payments are increasingly conducted via FinTech solutions.

According to Saksonova and Kuzmina-Merlino (2017), FinTech firms are typically start-ups, often small- and medium-sized enterprises (SMEs), that possess specialized knowledge of innovative products or have the ability to enhance existing services. Innovation has driven performance improvements and profitability across various industries, including financial services.

The significance of financial services has been underscored since the global financial crisis of 2008. Traditional financial services provided a sense of security, employment, and stability (Gomber et al., 2018). However, the limitations of traditional banks—exacerbated by the crisis—pushed consumers towards FinTech solutions that offered improved customer experiences, better performance, and greater convenience (Gassot et al., 2016; Haddad & Hornuf, 2019).

While traditional financial services have struggled to meet the diverse needs of the market, innovations such as microfinance, crowdfunding, and SME-focused stock exchanges have quickly spread globally (Drummer et al., 2017). FinTech growth continues to unlock potential solutions to persistent problems in the financial services industry (Pang and Lu, 2018).

Recent studies highlight the ways managers and workers operate in environments characterized by rapid digital interactions, short cycle times, technological intensity, and the gig economy (Sutherland, 2020), creating what some describe as a "perfect storm" of technological disruption. In this context, modern technologies, such as AI, are playing a vital role in human resources management, as suggested in a Forbes article (2019).

Decision Support Systems (DSS) distinguish between structured, semi-structured, and unstructured data, reducing large datasets into structured information that supports decision-making processes in manufacturing (Kaplan & Haenlein, 2019). Additionally, DSS aims to prevent production issues by identifying problems before they arise.

AI is a transformative technology that can be defined in various ways but generally refers to machine-based systems capable of interpreting external data, learning from it, and adapting to achieve specific objectives (Kaplan & Haenlein, 2019).

Studies in AI are currently divided into four main branches: neural networks and pattern recognition, artificial life creation, robotics, and classical AI, which seeks to replicate reasoning mechanisms in machines (Petriglieri et al., 2019).

2. METHOD

This research analyzes studies related to the exploration of new financial technologies, ethical accounting practices, and the impact of the global financial scenario on companies and economies between 2015 and 2023. The selection of this time frame is justified by the significant growth in the adoption of disruptive financial technologies and the increased awareness of ethical accounting practices, particularly in response to the 2008 financial crisis and the subsequent acceleration of digitalization.

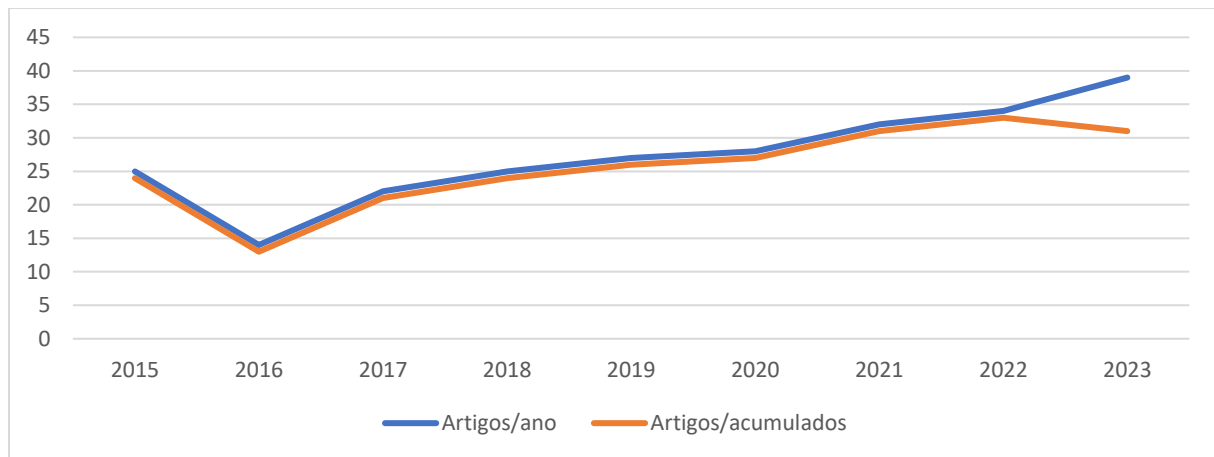
To conduct the analysis, the SCOPUS and Web of Science (WOS) databases were consulted, identifying a total of 1,875 articles related to the theme "Exploration of new financial technologies, ethical accounting practices, and the impact of the global financial landscape on businesses and economies." Articles were selected based on relevance and quality, focusing on peer-reviewed publications. After the initial screening, the research focused on studies addressing the integration of new financial technologies, such as FinTech and AI, with ethical accounting practices, and the impact of these innovations on global financial systems.

The data analysis will be conducted using R Studio through a bibliometric approach. This technique will allow for the identification of research trends and emerging topics at the intersection of financial technology and accounting ethics, as well as the contributions of the analyzed studies to the financial and accounting fields.

Table 1. Presentation of Search Results in Databases

Source	Scopus							WOS	
Keywords	<i>new financial technologies, ethical accounting practices, impact of the global financial landscape on businesses and economies.</i>								
Results	1.050							825	
Results after joining the two databases								1.875	
Final Sample	1024								
Years	2015	2016	2017	2018	2019	2020	2021	2022	2023
Articles/year	25	14	22	25	27	28	32	34	39
Articles/Accumulated	24	13	21	24	26	27	31	33	31

Note: Own Elaboration

Graph 1. Presentation of Search Results in Databases

Note: Own Elaboration

The oldest article included in the analysis is by Ristovska et al. (2014), titled *"The Impact of Globalization, EA,"* which examines the effects of globalization on business. The authors concluded that the undeniable focus in this area is the success and reliability of commercial enterprises, where the ultimate goal is economic satisfaction, minimizing risks, and establishing long-term strategies to sustain an enterprise in a given environment. Participation in global markets, internationalization, and the transfer of business activities across geographic boundaries—facing different and often uncertain environments—has been a constant feature of international economic activity for at least three centuries.

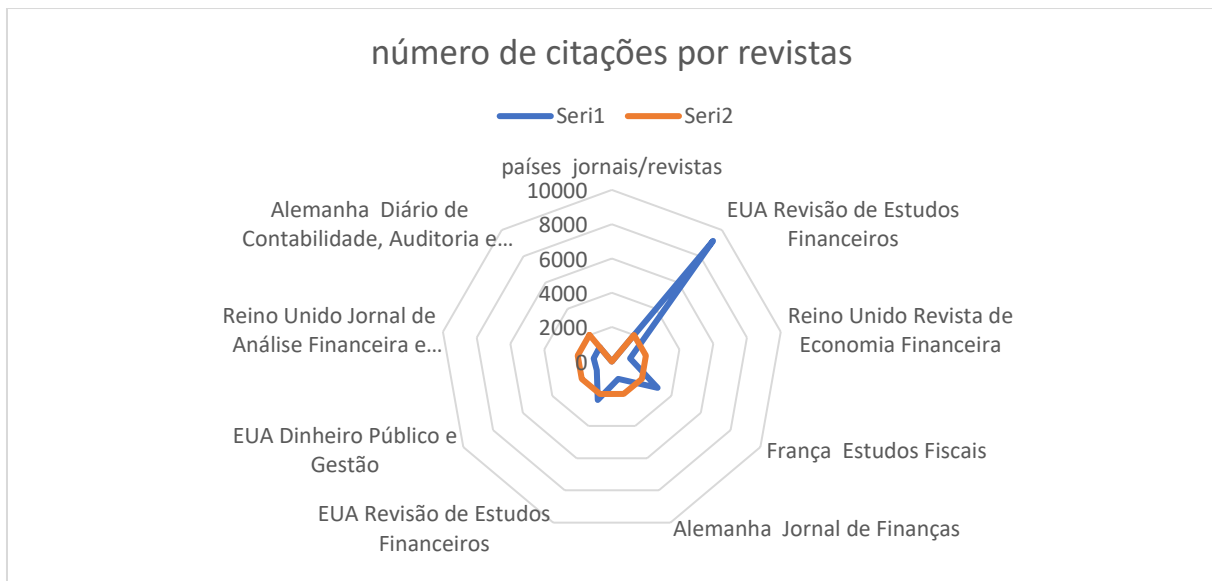
Most important newspapers and magazines

Table 2. Most Important Newspapers and Magazines

Countries	Newspapers/magazines	Number of citations	
USA	Review of Financial Studies	9.176	2015
United Kingdom	Journal of Financial Economics	1072	2016
France	Tax Studies	3088	2017
Germany	Jornal de Finanças	1085	2018
USA	Review of Financial Studies	2390	2019
USA	Public Money and Management	1020	2020
United Kingdom	Journal of Financial and Quantitative Analysis	1075	2021
Germany	Accounting, Auditing and Accountability Journal	1089	2022

Note: Own Elaboration

It was observed that there is a greater number of citations in the studies of the journal Estudos Fiscais (n=3088), in the journal Revista de Estudos Financeiros (n=2390), and in the Journal of Accounting, Auditing and Accountability (n=1089).

Graph 2. Number of Citations by Journals

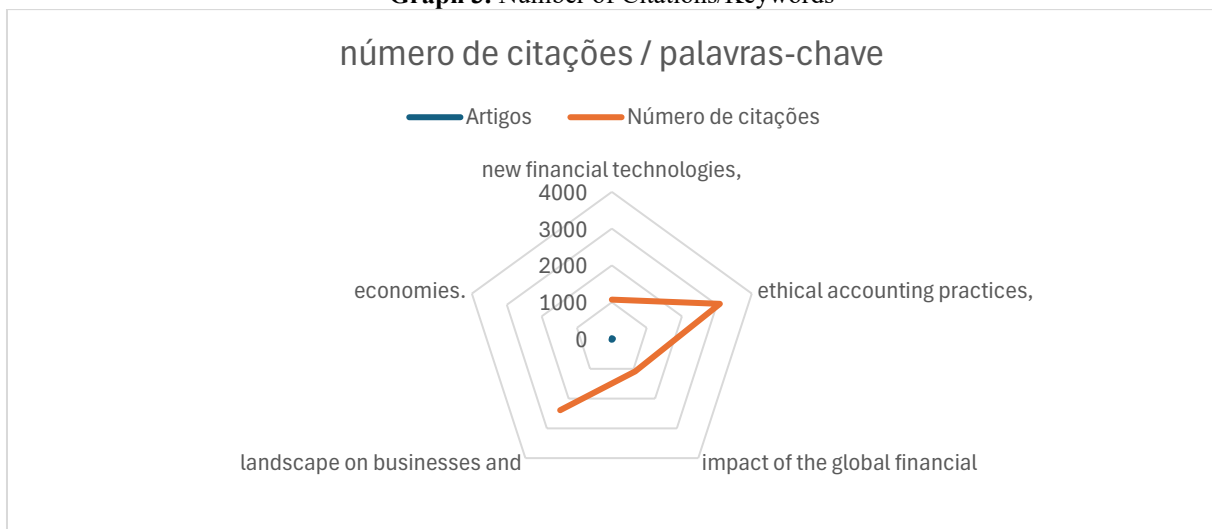
Note: Own Elaboration

Table 3. Keywords in the Articles / Number of Citations

Keywords	Articles	Number of citations
new financial technologies	25	1072
ethical accounting practices	32	3088
impact of the global financial	22	1085
landscape on businesses and economies	17	2390

Note: Own Elaboration

It is observed that the largest number of citations is in articles with the keywords "ethical accounting practices," (n=3088), followed by the keywords "new financial technologies," (n=1072), the keywords "impact of the global financial" (n=1085).

Graph 3. Number of Citations/Keywords

Note: Own Elaboration

Table 4. The Main Articles of High Importance

Anos	Articles
2023	The Impact of New Technology on Ethics in Accounting: Opportunities, Threats, and Ethical Concerns
2021	Professional ethics and accounting and finance responsibility in the context of digital technologies
2020	The effect of emergent technologies on accountant's ethical blindness
2019	Ethical Accounting Practices and Financial Reporting Quality: Evidence from Listed Firms in Nigeria

Note: Own Elaboration

The main articles of high importance are:

2023: The article titled "The Impact of New Technology on Ethics in Accounting: Opportunities, Threats, and Ethical Concerns" explores the advantages of using AI technology, big data analytics, and blockchain in accounting. These technologies have the potential to process large volumes of data while accelerating automation, reducing response times, and enhancing the relevance of accounting information. However, as AI continues to be implemented in various sectors, it presents threats, including data loss and the displacement of human jobs.

2021: The study "Professional Ethics and Accounting and Finance Responsibility in the Context of Digital Technologies" focuses on the impact of digital technologies on professional ethics and the public interest in accountability within accounting and finance. This article highlights the modern context in which ethics and professional responsibility are addressed, emphasizing the need to enhance the competencies of accounting and finance specialists, particularly in technical and business skills. The study concludes that a change in mindset—toward a growth-oriented approach—is essential for successfully navigating the disruptive effects of digital technologies on professional ethics.

2020: The article "The Effect of Emergent Technologies on Accountant's Ethical Blindness" investigates the impact of blockchain-based, IoT-enabled, and AI-enabled distributed ledger technologies on reducing the risk of ethical blindness in accounting (Sherif & Molson, 2020). The authors analyze how these emerging technologies offer both opportunities and challenges for ethical decision-making in the accounting profession. They conclude that while certain challenges can be mitigated through the adoption of these technologies, others require social and legal interventions to avoid potential risks.

2019: The article "Ethical Accounting Practices and Financial Reporting Quality: Evidence from Listed Firms in Nigeria" analyzes the relationship between ethical accounting practices and the quality of financial reporting among listed manufacturing companies in Nigeria. The study shows that the integrity of accountants is positively and significantly related to the quality of financial reporting, and the objectivity and professional behavior of accountants also have a statistically significant positive effect on financial reporting quality. The findings indicate that ethical accounting practices play a critical role in enhancing the quality of financial reporting in these industries.

3. CONCLUSION

The analysis carried out in this article aimed to identify the most relevant studies on Finance and Accounting focusing on the exploration of new financial technologies, ethical accounting practices, and the impact of the global financial landscape on companies and economies. This analysis is crucial as it highlights the dynamic nature of research in these areas, which continues to evolve and grow within academic databases.

In this context, it was observed that 2023 marked the highest number of published articles in this field, particularly due to the acceleration of digital transformation and technological innovations in finance. Similarly, 2021 saw a significant rise in publications, especially following the COVID-19 pandemic, which had a profound impact on financial and accounting practices globally. In terms of geographic distribution, the USA had the highest visibility in databases, with articles in the *Review of Financial Studies* (n=9,176), followed by France, with a significant number of articles in *Fiscal Studies* (n=3,088).

At present, first-generation AI has become a common tool in several organizations. However, there is increasing speculation regarding the evolution of this technology into general AI, which is expected to have the ability to reason, plan, and autonomously solve problems beyond its initial design scope. While general AI may take on more complex tasks in the future, it is not yet seen as a fundamental threat to the uniquely human aspects of modern management, such as social interactions between workers, managers, and employees. In the long term, artificial superintelligence could emerge, where machine-based systems may become self-aware and conscious, possessing creativity, social skills, and general wisdom—traits traditionally associated with humans.

REFERENCES

- Arner, D. W., Barberis, J., & Buckey, R. P. (2016). FinTech, RegTech, and the reconceptualization of financial regulation. *Nw. J. Int'l L. & Bus.*, 37, 371. <https://scholarlycommons.law.northwestern.edu/njilb/vol37/iss3/2>
- Auriga. (2016). *Digital Transformation: History, Present, and Future Trends*. Accessed: 15 June 2017. Available: <https://auriga.com/blog/2016/digital-transformation-history-present-and-future-trends/>
- BDI., & Roland Berger. (2015). *The digital transformation of industry, A European study commissioned by the Bundesverband der Deutschen Industrie e.V. (BDI) and Roland Berger*. https://www.rolandberger.com/publications/publication_pdf/roland_berger_digital_transformation_of_industry_20150315.pdf

- Boueé, C., & Schaible, S. (2015). *The Digital Transformation of Industry*. Study: Roland Berger and BDI.
- Drummer, D., Feuerriegel, S., & Neumann, D. (2017). Crossing the next frontier: The role of ICT in driving the financialization of credit. *Journal of Information Technology*, 32(3), 218-233.
- Gassot, Y., Jun, J., & Verdier, M. (2016). Digital Innovation and Financial Transformation. *DigiWorld Economic Journal*, 103, 211.
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). About the FinTech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems*, 35(1), 220-265. <https://doi.org/10.1080/07421222.2018.1440766>
- Haddad, C., & Hornuf, L. (2019). The emergence of the global fintech market: economic and technological determinants. *Small Business Economics*, 53, 81-105.
- Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, 62(1), 15-25.
- Mazzone, D. M. (2014). *Digital or Death: Digital Transformation — The Only Choice for Business to Survive Smash and Conquer* (1st ed.). Mississauga, Ontario: Smashbox Consulting Inc.
- Pang, K., & Lu, C. S. (2018). Organizational motivation, employee job satisfaction and organizational performance: An empirical study of container shipping companies in Taiwan. *Maritime Business Review*, 3(1), 36-52. <https://doi.org/10.1108/MABR-03-2018-0007>
- Petriglieri, G., Ashford, S. J., & Wrzesniewski, A. (2019). Agony and ecstasy in the gig economy: Cultivating holding environments for precarious and personalized work identities. *Administrative Science Quarterly*, 64(1), 124-170. <https://doi.org/10.1177/0001839218759646>
- Saksonova, S., & Kuzmina-Merlino, I. (2017). Fintech as financial innovation – the possibilities and problems of implementation. *European Research Studies Journal*, 20(3A), 961-973.
- Shin, J., & Choi, Y. K. (2019). Organizational innovativeness and its determinants in South Korean nonprofit human service organizations. *Nonprofit Management and Leadership*, 30(1), 51-68.

Sutherland, A. (2020) *Technology is Changing Lending: Implications for Research*. Available at SSRN: <https://ssrn.com/abstract=3695597>

Wonglimpiyarat, J. (2017). FinTech banking industry: a systemic approach. *Foresight*, 19(6), 590-603. <https://doi.org/10.1108/FS-07-2017-0026>