CURRENT CONCEPTS AND INNOVATIVE RESEARCH IN SOCIAL, HUMAN AND ADMINISTRATIVE SCIENCES

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CONTENT

Environmental Justice and Legal Struggle: The Erzincan İliç Mine Case in Turkey

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ABSTRACT

This article focuses on the legal dimension of the tragic disaster that occurred in February 2024 at the İliç Çöpler mine in Erzincan, Turkey, which is home to one of the largest gold reserves in the world, resulting in the deaths of 9 people. The study introduced the İliç Çöpler mine, where cyanide gold exploration activities were carried out. It also explained the process that led to the disaster. The legal process of the İliç gold mine in the local and higher courts is then discussed in detail. The legal reactions of individuals and non-governmental organisations and what happened in the process are also examined.

The main theme of the article is to examine the Constitutional Court's decisions to overturn the positive decision on the Environmental Impact Assessment, which was issued only 19 days before the mine disaster. It is an analysis of the Constitutional Court's decisions in the İliç gold mine case and an assessment of its significance in terms of environmental justice and legal struggle.

The aim of this article is to analyse the legal dimension of the İliç Gold Mine case, its environmental impact and the role of the Constitutional Court, in order to make a possible contribution to the prevention of environmental injustice in similar cases.

Keywords:

INTRODUCTION

Gold mining, especially cyanide gold exploration activities, is an important issue in Turkey as well as in the world as an area that carries environmental, social and legal risks. Gold mining, which is a complex issue that needs to be considered not only economically but also with its environmental, social and legal dimensions, is also important in terms of environmental sustainability, public safety and public interest. It is inevitable that these activities, which can have long-term effects such as the negative impact on water resources and underground ecosystems, cyanide leakage and contamination causing soil erosion, loss of biodiversity and disruption of ecological balance, the management and hazard dimension of cyanide wastes stored in tailings dams (Büyükkidan, Gumus, 2020), cyanide recovery and waste management (Yılmaz et al., 2019; Kocan, 2021), have social impacts. The concerns raised by this situation in society increase the sensitivity of social movements and environmentalist groups to such activities, and encourage environmental activism. The resulting environmental risks raise concerns about the health and livelihoods of local people and can lead to tensions between mining companies and local communities. Such tensions can sometimes escalate into

legal disputes and trigger the activities of environmental groups and, in particular, civil society organisations.

From a legal perspective, cyanide gold exploration activities are generally highly regulated. At the international level, there are various direct and indirect conventions and legal instruments relating to cyanide gold exploration activities. These conventions generally set environmental protection standards and encourage countries to implement environmental protection measures. However, the effectiveness and enforceability of these conventions may depend on the strength of international cooperation and enforcement mechanisms. There are, of course, national legal frameworks that regulate cyanide gold exploration activities. These regulations generally set environmental protection standards and impose obligations on mining companies to mitigate and compensate for environmental impacts. However, weaknesses in implementation and monitoring can lead to situations where environmental and social standards are not adequately protected. This can lead to violations of local communities' environmental rights and environmental injustice. Such situations are also the subject of various legal proceedings.

In summary, the environmental and legal implications of cyanide gold exploration are complex and varied. In order to keep the impact of these activities on the environment to a minimum and resolve legal issues, it is important to develop more effective regulations and control mechanisms at national and international levels. Ensuring local community participation and environmental justice is also important.

In Turkey, this issue has also been highly controversial from time to time. In particular, the legal case against gold exploration in a region of Turkey famous for its natural and historical beauty, known as the Bergama case, has become an internationally recognised issue. This case has been at the centre of various legal battles over the environmental impact of mining activities and their negative impact on the lives of local people, and has been ongoing for many years. Gold mining activities here have raised concerns about environmental pollution, contamination of water resources, soil erosion and negative impacts on the health of local communities. This situation has provoked reactions from local people and environmental groups, and has led to legal battles. As a result of these legal struggles, the Bergama Mine Case has emerged. This case assesses the environmental and social impacts of gold mining activities and addresses the conflicts of interest between mining companies and local communities. The Bergama Mine Case has become an important reference point in the debate on the environmental and legal aspects of mining activities in Turkey (Çimrin, 2015). Cyanide gold exploration activities have caused social changes by altering the traditional life cycle.

The Erzincan İliç Çöpler mine, like the Bergama case, is the precursor of an important legal process. On 13 February, 9 miners lost their lives when they were trapped under a heap of lime, and the legal process in the administrative

courts and the decisions of the Constitutional Court (CC) are the subject of this study.

ERZİNCAN İLİÇ ÇÖPLER ALTIN MADENİ

ANAGOLD was established in Ankara in 2000 as a subsidiary of Alacer Gold Corporation, a publicly traded Canadian company headquartered in Denver, USA, which is active in metal mining in Turkey. In Turkey, ANAGOLD is currently conducting mining activities at the "Çöpler Gold Mine" site located in Çöpler village, İliç district, Erzincan province.

The licence date of the site is 06 November 1986 and the duration of the licence is forty years. Anagold took over the mining licence on 23 October 2000 and obtained the gold operating permit in 2004. All studies were completed in 2007, the investment decision was made and the process of obtaining legal permits was initiated (Çağatay, 2018). Construction started on 25 October 2009 and was completed in the last quarter of 2010. The first gold was poured on 22 December 2010 and the activity continued until the mining accident.

The Çöpler mine owned by Anagold Madencilik San. ve Tic. AŞ's Çöpler Complex Mining Project located in İliç district, the legal steps taken to obtain the necessary permits are as follows (CHP,2024):
- 16.04.2008 First “Environmental impact assesment (EIA) positive” decision for the mine.
- 02.12.2010 Gold production commenced.
- 10.04.2012 "EIA Positive" decision received for the operation of the mobile crusher plant.
- 17.05.2012 "EIA Positive" decision was taken for the addition of the SART plant to the existing operation, increasing the storage capacity of the Çöpler uneconomic rock (pasa) site and increasing the capacity of the open pit mining activities.
- 24.12.2014 An "EIA Positive" decision was issued for the capacity expansion project including the construction of a sulphide ore enrichment plant and ADT for the extraction and enrichment of sulphide ore at the Çöpler site. The capacity of the Heap Leach Site will be increased from 34 million tonnes to 73 million tonnes.

- 07.10.2021 "EIA Positive" decision was issued for the capacity increase of the existing open pits, revision of the tailings storage areas, expansion of the heap leach plant and capacity increase of the Tailings Storage Facility (TSF). (The project is named "Çöpler Complex Mine 2nd Capacity Increase and Flotation Plant Project").
- In 2023, an "EIA Not Required" decision was issued for the open pit expansion project.

The accident which is the subject of this article occurred on 13 February 2024 at around 2.30 p.m. in the gold mine licensed by Anagold Mining, which operates in the İliç district of Erzincan province, during a slope shift in the heap formed for the extraction of gold by leaching. Before going into the legal aspect of the issue, the data from the Preliminary Investigation Report on the Accident Occurring in Erzincan/Iliç Gold Mine Site (IUC,2024) dated 14.02.2024, prepared by Istanbul University-Cerrahpaşa, Faculty of Engineering, Department of Mining Engineering regarding this accident will be shared.

At the site, the material produced by excavation methods is sized and heaped in the crushing and screening plant, and gold recovery is carried out by heap leaching using cyanide to recover the gold ore contained therein. An analysis of the situation at the Erzincan gold mine suggests that the incident was caused by slope failure in the heap leaching area.

According to Google Earth satellite data from 2021, the İliç heap leach site consists of 31 steps, each 8 metres high. The same data indicates that the part of the slope created for heap leaching at the site, which caused the slope failure, consists of 14 steps of 8 metres in height. The slope geometry created from the information obtained using 2021 satellite imagery of the slip and flow area is shown in Figure 1.

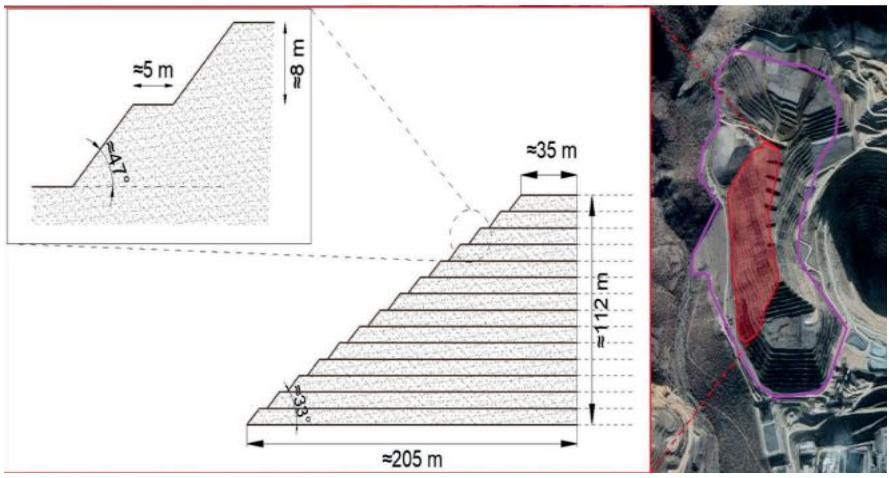

Figure 1.

According to the 2021 satellite images, there is a leach pile in the quarry consisting of 14 steps and considering that the height of the step is 8 m, a pile height of approximately 112 m has been reached. This shows that an area of approximately 177,000 m2 and a mass of approximately 20,160,000 m3 of material extracted and subjected to the leaching process in the area where the flow occurred slipped and flowed and caused the problem.
In Figure 2, the approximate slope geometry and slope design parameters are given in the A-A' section, based on the information obtained from satellite images of the sliding and flowing area in 2021.

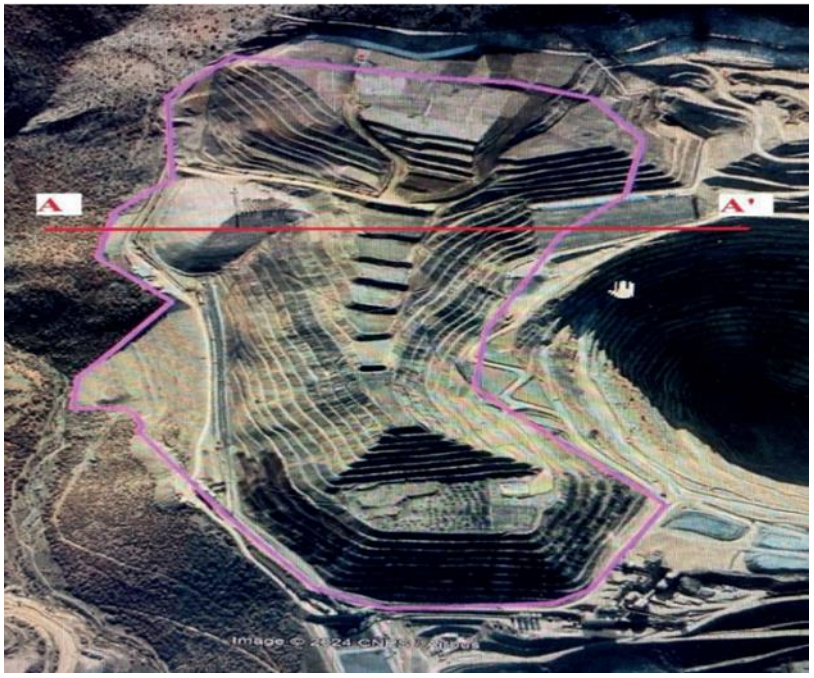

Figure 2.

At the site and its surroundings, the slip and flow area is close to the nearby Euphrates River (Figure 3) and the HEPP dam located on it, and the post-slip flow occurred in this direction. The region in which the site is located is also known to have major and minor faults. It is known that slope failures, which will occur in any man-made tailings, dump or heap leach site due to an engineering initiative, will not occur without cause and without warning. These bulk materials should be carefully and carefully monitored and evaluated, questioning all factors that could lead to slippage. In order for a heap of this size to remain stable, it is very important that mining engineering discipline is strictly adhered to and regularly monitored by experts in the field, taking into account the environmental conditions.

Figure 3

ILIC DİSASTER AND LEGAL PROCESS

13.02.2024 dated İliç disaster has overwhelmed the whole country with grief, and in addition to the grief, voices of reaction from individuals and institutions have begun to rise. The importance of mines and mining for the economy and development of the country cannot be denied. However, it is also important to maintain a balance within the principles of sustainability. In this sense, the İliç disaster can be defined as a process in which serious discussions have begun in Turkey. On the one hand, there are organisations that say they have been warning since the start of operations and that they have made these warnings even clearer, especially for the capacity increase in 2021; on the other hand, there are families waiting for their loved ones to come out of the ground; and on the other hand, there are public officials trying to explain the limits of their responsibility.

1. Criminal complaints

Criminal complaints were filed by individuals and institutions both before and after the disaster.

1.1. Criminal complaint for the leak

In this process, at midnight on 21 June 2022, cyanide leaked into the soil from the pipe carrying cyanide to the leaching plant of the İliç Çöpler gold mine. The gendarmerie report, which was reported in the press, stated that "20 m3 of cyanide-containing liquid leaked from the transport pipe". A number of individuals, institutions and organisations, as well as the client organisation, filed criminal complaints against this spill, and the İliç Chief Public Prosecutor's Office concluded in its decisions of 31 October 2022, numbered 2022/241 Investigation and 2022/327 Decision, that the environment had been negligently polluted.

"According to the results of the expert report dated 11.10.2022 and submitted to our Chief Public Prosecutor's Office; ... In terms of occupational health and safety, during the investigation carried out at Anagold Company, the occupational health and safety documents were complete, but the Anagold Company official (Process Manager) and (Oxide Process Chief Engineer) did not take the necessary measures to prevent all dangers that may arise against possible risks that may occur in the leaching area where the pipeline carrying the cyanide solution belonging to the ore processing lot is located, and ignored all dangerous situations such as negativities that may occur in the leach pile area, etc. It has been established that they ignored all dangerous situations and did not take sufficient precautions, and it has been established that they are GUILTY in the incident that occurred, ...".

As the charges were paid in advance by the suspects, a decision was made not to prosecute.

1.2. Criminal Complaints for Loss of Life

On 15.02.2024, the Istanbul Bar Association sent a letter dated 15.02. to Anagold Mining and Company officials, the former and current Minister of Environment, Urbanization and Climate Change and Ministry officials, the Director General of Environmental Impact Assessment, Permitting and Inspection, the experts who wrote the positive EIA report, the Governor of Erzincan and Governor's Office officials, the Provincial Director of the Provincial Directorate of Environment and Urbanization in Erzincan and Directorate officials. It has been announced on their official website that a criminal complaint has been filed against other persons whose responsibility for the disaster will be determined as a result of the investigation regarding manslaughter, intentional pollution of the environment, adding toxic substances, ecocide and other crimes to be determined (Istanbul Bar Association, 2024). The reasons for this criminal complaint are summarized under the following headings:

This tragedy has happened in plain sight; although it was known by all state officials that the danger of this event was imminent and that even the necessary precautions had not been taken, they turned a blind eye and allowed the expansion and continuation of the activity for years.
Two years ago, the mine was closed for 2 months after a cyanide leak at the same location, but unfortunately it was reopened, and the mining company's complaints for the revocation of the operating license remained fruitless.
Experts have stated that the capacity increase project carries risks, and that the EIA positive decision given to the facility is contrary to scientific facts in terms of earthquake risk, protection of water resources and rivers.
The damage and danger caused by the Çöpler Complex Mining Plant, which has become gigantic due to the piecemeal projects prepared in violation of the law, has been made public many times before by non-governmental organisations, and this issue has been proved by the technical reports presented in the lawsuits filed.
In the cases pending before the Erzincan Administrative Court, despite the fact that the potential slippage in the İliç area was emphasised in every petition and every statement at all stages, neither the Ministry, the local administration nor the court took the warnings into account, ignored them and led to today's disaster.
In addition to the criminal complaint filed by the Istanbul Bar Association, the Turkish Medical Association also filed a criminal complaint with the Erzincan Public Prosecutor's Office on 29 February 2024 against the relevant officials of the Ministry of Environment, Urbanisation and Climate Change (Ministry of EUCC) and other public officials, alleging intentional homicide, injury, intentional pollution of the environment and abuse of office (TTB, 2024).

2. Administrative Lawsuits

Based on the legal process experienced in the İliç disaster, a lawsuit was also filed against the positive decision of the EIA.

2.1. Lawsuit against the Positive EIA Report of 2018

The lawsuit petition was filed with the Erzincan Administrative Court requesting the annulment of the EIA positive decision dated 09.08.2018 regarding the project for the revision and capacity increase of the open pit mine in the village of Yakuplu, İliç District of Erzincan.
According to the complaint:
The environmental impact of the project has not been comprehensively assessed,
Drilling, splitting and tunneling activities are being carried out in pasture areas without obtaining the necessary permits, which will have a negative impact on agriculture and livestock farming, and contaminated surface water will affect the drinking water of the surrounding villages,

It was argued that the chemicals to be used in the project would harm human health and the ecological system.
During the proceedings, a report dated 8/7/2019 was prepared by a five-member expert committee consisting of a forestry engineer, an environmental engineer, a geological engineer, a mining engineer, and a civil engineer. In the report it is stated that the cumulative environmental impact of the project has been examined in the positive EIA decision, measures have been taken to ensure the protection of water resources, the project will not bring any additional burden in terms of chemical use, although the EIA report does not include the issue of waste storage, this issue has been covered by another EIA report previously prepared for the facilities in the region, the project will not cause any harm to human health.
It also states that 77.35% of the area to be affected by the project is forest and 22.36% is pasture, that there is no productive forestry activity in the region and that the damaged forest area will be rehabilitated at the end of the project, that the pasture area is currently destroyed in places and will be improved at the end of the project, and that it is committed to obtaining the necessary permits for pasture use. The report concluded that the overall negative impacts of the project were tolerable, that the necessary measures to rehabilitate the environment had been undertaken, and that the positive EIA decision was in compliance with the technical criteria and thresholds established by national and international legislation.
The expert's report was the basis for the court's decision. and dismissed the appeal on 26.9.2019. Reasons for the decision:
It was concluded that the project was prepared in accordance with the procedure established by the legislation, that the problems that may arise within the scope of the project were identified and examined in the EIA report, that the necessary measures and commitments were sufficient and appropriate, that the EIA report was technically in the appropriate format and sufficient, and that The positive EIA decision did not violate the law.
The applicant filed an appeal against the above decision. On 20/2/2020, Council of State dismissed the appeal, stating that the decision had complied with the law and procedure and that there was no reason for its annulment, and decided by majority vote to approve the decision.

2.2. Lawsuit filed against the EIA Positive Report dated 2021

TMMOB filed[2] a lawsuit for the cancellation of the "Environmental Impact Assessment Positive" decision dated 07.10.2021 issued by the Ministry of EUCC for the "Çöpler Complex Mine 2nd Capacity Increase and Flatation Facility Project". Erzincan Administrative Court dismissed the case on the grounds that there was no violation of law and legislation in the positive decision of the Ministry of EUCC, the matter was appealed to the Council of

[2] There are more than one application on the same legal process. 2023/898 ve E:2023/899

State and the Council of State accepted the appeal request and overturned the decision of the Administrative Court on the following grounds :
- The Administrative Court did not examine and evaluate TMMOB's allegations and decided to dismiss the case only by quoting the expert's report,
- The rediscovery and expert examination should be carried out at the site.
- It is not possible for the expert committee appointed ex officio by the court to clarify the dispute technically in terms of its professional fields and expertise,
- In order to clarify the technical aspects of the dispute, experts in the field of geodesy and photogrammetry, geomatics, mapping and cadastral engineers, meteorological engineers, biologists, sociologists, geological engineers, urban and regional planners should be included in the expert commission,
- The Court requested an evaluation of the project's site selection, but the expert report did not evaluate this issue,
- That the expert report consists of general information and repetition of statements in the EIA report,
- It contains technically and theoretically incorrect statements and findings,
- It is not sufficient to clarify the technical aspects of the dispute and leaves out of the evaluation many issues related to the merits of the dispute,
- It contains biased statements that are far from impartiality,
- The activity to be carried out within the framework of the project that is the subject of the dispute is not in the public interest.

In conclusion, the Council of State found that the decision of the Erzincan Administrative Court to reject the lawsuit based on the expert's report was unlawful and annulled the decision and decided that a new expert's report should be conducted and then a new decision on the merits of the case should be made.
Erzincan Administrative Court decided to suspend the execution of the case 19 days after the accident on 04.03.2024 until the expert reports are received.

2.3. 2023 EIA Not Required Decision

In 2023, TMMOB filed a lawsuit with the Erzincan Administrative Court for a stay of execution against the EIA Not Required Decision for the open pit expansion project.
On 03/04/2024, 19 days after the accident, a stay of execution was granted until the expert reports were received.

3. Decisions of the Constitutional Court (CC)

At the end of the administrative judicial proceedings, the matter has been referred to the CC and two decisions of the CC[3] dated 16.01.2024 and

[3] Aplication number 2020/12802 Decision Date: 1/11/2023 Official Gazette 16/1/2024-32431

25.01.2024 were published in the Official Gazette, emphasizing the violation of rights in the case.

3.1. Eşref Oktay Case

In the lawsuit against the positive EIA decision of 2018 described above, the applicant filed an individual application on 4/13/2020 after learning of the final judgment on 3/17/2020.

The plaintiff stated that the village where he lives with his family was affected by the project, that a waste storage facility was built very close to the village and that dangerous chemicals were poured into this facility, that the facility posed a danger to human health and ecological life, and that for this reason, although he requested experts in the field of metallurgical and materials engineering, biologists, and public health, his request was not accepted. The plaintiff also stated that pasture land and livestock in the region had been damaged by the project, yet an agricultural engineer was not included in the expert committee and these issues were not evaluated in the expert report, and that scientific and visual evidence of the damage was not considered by the court, and claimed that the right to a fair trial, life, and respect for private and family life had been violated.

The opinion of the Ministry of Justice stated that the applicant had failed to prove that he had been directly and personally affected by the project's activities and that the question of whether he was a victim should be examined in this context. In his response to the Ministry's opinion, the applicant reiterated the allegations and claims made in his application, stating that the chemicals used and the dust clouds generated by the mining activities caused damage to the environment.

The CC considered it appropriate to examine the application in the context of the right to respect for private life, given the nature of the alleged violation. The first question to be assessed in the concrete application is whether the environmental impact that is the subject of the application has the minimum gravity to trigger the guarantees of Article 20 of the Constitution. It is sufficient that there is a sufficiently close connection between the environmental impact resulting from the activity and the applicant's right to private and family life or the right to use his/her residence. It is understood that the applicant resides in the region where the project for which a positive EIA decision was issued is located and is engaged in animal husbandry. The CC stated that "since it is understood that the application is not clearly unfounded and there is no other reason to decide on its inadmissibility, it should be decided that the application is admissible".

In its decision, the CC stated that it is indisputable that in order to achieve the goal of preventing or minimizing possible negative environmental impacts, the interests of the parties involved in the process must be carefully assessed, and in order to carry out this assessment in a sound manner, it is required to make sure the effective participation of the relevant parties in the process.

Accordingly, a judicial process must be carried out that respects the aforementioned constitutional guarantees, and the conclusion reached must be explained with relevant and sufficient justifications.
In the present case, it is clear that the authorization granted to the project was for a legitimate purpose based on the public interest in the economic benefit of the country. The basis of the plaintiff's allegations is that the project is dangerous and harmful to human health and the environment, and that agriculture and animal husbandry will be adversely affected.
In the course of the proceedings, the Court of first instance ordered an investigation and an expert opinion, on the basis of which it issued a judgment and dismissed the action for annulment of the positive EIA decision. The expert report evaluated in general terms the risks posed by the project to the environment and human health, as well as the plaintiff's claims, and concluded that the necessary measures were provided for in the positive EIA decision. However, the committee that prepared the report did not include an agricultural engineer to provide an opinion on issues related to agriculture and livestock. In addition, it has been noted that the EIA report does not make a fundamental assessment of whether the livestock in the region will be affected by the remaining pasture in the project activity area. The EIA report states that the main livelihood of the people in the region is animal husbandry and that the pasture in the project area is actively used, while the EA simply states that the pasture is destroyed in places and that the project will not affect animal husbandry.

Despite the applicant's substantive allegations that agriculture and livestock farming would be harmed by the project, the expert report made a superficial assessment of the impact of the pasture in the project area on livestock farming. These claims were also not discussed at first instance. Although the expert report states that the pasture in question will be rehabilitated at the end of the project and the damage caused will be compensated, the impact of the mining activity, which will continue for a long time, on livestock farming, which is the main source of livelihood in the region, should also be examined and it should be shown whether the necessary measures are provided for in the EIA report.
In terms of the specific application, it is important to determine whether the authorities have struck a fair balance between the interests of the applicant and the public. However, as a result of the examination carried out in this context, it has been observed that the claims and objections of the plaintiff, which affect the outcome of the dispute, have not been evaluated by the courts of first instance. It has been observed that the court's examination and reasoning based on the expert's report is limited, in that it does not provide a direct response to the applicant's specific allegations, and the applicant has not had the opportunity to properly evaluate these allegations before the judicial authorities.

In the light of the above findings, it is concluded that the public authorities did not approach the case with due diligence, did not properly assess the public and individual interests.
For the reasons CC stated that, it should be decided that the right to respect for private life, guaranteed by Article 20 of the Constitution, has been violated. It was unanimously decided on 1/11/2023 to send a copy of the decision to the Council of State (E.2020/127, K.2020/2232) and to the Ministry of Justice for information.

4. Cezayirlioğlu Consitituonal Court Decision[4]

The applicant filed to the CC on 6/7/2020, after learning on 3/17/2020 of the final judgment at the end of the Administrative Court process of the above-mentioned 2018 positive EIA application.
The applicant stated that his village, where he lives with his family, would be affected by the project, that a waste storage facility would be built very close to the village and that dangerous chemicals would be poured into this facility, that the facility would pose a danger to human health and ecological life, and that for this reason, although he had requested experts in the fields of metallurgy and materials engineering, biologists and public health, his request was not accepted. The plaintiff also claimed that the right to live in a healthy environment, protection and development of material and spiritual existence and respect for private life had been violated, since the pasture land and livestock in the region had been damaged by the project, but an agricultural engineer had not been included in the expert committee and these issues had not been evaluated in the expert report, and the scientific and visual evidence of the damage caused by the project to the environment had not been taken into account by the court.
In the opinion of the Ministry, after stating that the essence of the applicant's complaints is related to the right to a fair trial, it was stated that the application should be declared inadmissible because the issues raised have the nature of a remedial complaint.
On the other hand, the courts of first instance clearly stated the reasons for the necessary connection between the judgments and the facts, and the reasons and legal provisions on which the judgment was based were also clearly stated. The plaintiff did not submit any comments against the opinion of the Ministry.
The CC ruled on the same grounds as in the case of Eşref Oktay and stated that the applicant "resides in the region where the project for which a positive EIA decision was issued is located and is engaged in animal husbandry. Therefore, the impact of the said project on the applicant's right to respect for private life must be evaluated within the scope of Article 20 of the Constitution". Since it is clear that the case is not without merit and there is

[4] Sedat Cezayirlioğlu Decision 2020/20484 Application date 6/7/2020 decision date 25/1/2024

no other reason to decide that it is inadmissible, it should be decided that the right to respect for private life has been violated".
It was decided to send a copy of the decision to the Erzincan Administrative Court (E.2018/1032, K.2019/1309). On 25/1/2024, it was unanimously decided to send a copy of the decision to the Sixth Chamber of the Council of State (E.2020/127, K.2020/2232) and to the Ministry of Justice for information.

RESULTS

The Erzincan İliç Gold Mine is a process that has been on Turkey's agenda for many years, in which individuals and organizations have talked about the risks, used administrative and judicial remedies, but failed to achieve results until the accident and the sad end. In this process, it seems impossible to talk about environmental justice. Environmental justice is the principle that environmental decisions, policies, and practices should be based on the principles of equality, fairness, and participation among all people. In essence, environmental justice emphasizes that all people should have the right to live in a healthy environment.
Environmental justice and litigation play an important role in addressing various environmental issues. These concepts focus on goals such as equal and fair distribution of environmental impacts, community participation in environmental decision-making, and redress of environmental injustices. This concept guides environmental movements, policy makers and legal systems, and is also linked to principles of social justice, human rights and sustainable development. Legal action can be a powerful tool in the fight against environmental injustice. It provides a legal means to assess the impact of environmental policies and projects, especially on vulnerable groups in society. The power of law is a tool that environmental activists and civil society organizations can use to hold governments and corporations accountable.
However, legal challenges are often long and complex processes that require time, resources and commitment to be successful. In addition, the limitations of the law and the uncertainties of judicial processes can limit the effectiveness of legal challenges.
Nevertheless, environmental justice and legal challenges play an important role in addressing environmental problems. However, for these struggles to be

successful, not only legal processes are needed, but also social movements, policy changes, and public awareness.

The case of Erzincan İliç Çöpler Mine is a case of process management where there is no full access to environmental justice, where all individuals and groups do not have equal rights to access, benefit from and be harmed by environmental resources, where the participation of all stakeholders in decision-making processes is not ensured in a realistic and effective manner, where fairness in the distribution of environmental resources and burdens is not ensured, where environmental resources are not fully protected, and where equal access to basic environmental resources such as clean air, water and food is not ensured. There is no doubt that criminal complaints and lawsuits demonstrate that individuals or groups who have suffered harm or loss as a result of environmental harms and impacts have a right to seek redress and accountability from those responsible. But this alone does not ensure environmental justice.

According to Article 168 of the 1982 Constitution of the Republic of Turkey, "Natural wealth and resources are under the sovereignty and disposal of the State" and Article 56 of the Constitution states that "Everyone has the right to live in a healthy and balanced environment. This is the duty of the State and the citizens". In addition, article 125 of the 1982 Constitution states that "all acts and procedures of the administration may be appealed. It includes the rule.

The provisions of the Turkish Constitution indicate the existence of the legal environment necessary for the realization of environmental justice. In fact, the existence of the right of individual appeal to the CC is also extremely important at the point where individuals and non-governmental organizations apply to the courts of first instance and do not obtain results. In particular, the issues highlighted by the decisions of the CC, are also appropriate for the right of access to environmental justice.

Despite the opinion of the Ministry of Justice that "the applicant could not prove that he was directly and personally affected by the activities within the scope of the project and that the question of whether he was a victim should be examined in this context", the CC stated that "it is sufficient that there is a close connection between the environmental impact resulting from the relevant installation, operation or other activity and the applicant's right to use his private and family life or residence" and that it was considered appropriate to examine the application due to the nature of the alleged violations.

In this respect, the CC considered it sufficient that the applicant resided in the region where the positive EIA decision was issued and was engaged in animal husbandry. It is clear that this decision serves environmental justice.

In its decision, the CC emphasized that in order to prevent or minimize possible negative environmental impacts, the interests of the parties involved in the process must be carefully assessed, and in order for this assessment to be carried out in a sound manner, the effective participation of the relevant

parties in the process must be ensured. This is one of the essential conditions for ensuring environmental justice.
The CC has declared that a judicial process must be carried out in compliance with constitutional guarantees, and the result must be explained with relevant and sufficient justifications. This is an important emphasis for the elimination of environmental injustice.
In its judgment, the CC ruled that the authorization granted to the project was for a legitimate purpose based on the public interest in the economic benefit of the country, but that the basis of the allegations was that the project was dangerous and harmful to human and environmental health. This decision shows that the principles of sustainable development are also taken into account in judicial decisions.
During the decision process, the CC reviewed the composition of the expert committee in terms of its areas of expertise and the content of the EIA report, and identified deficiencies. This is an extremely important focus in terms of ensuring environmental justice and necessary participation.
The CC ruled that the Court of First Instance did not provide a direct answer to certain allegations made by the applicant and that the applicant did not have the opportunity to have these allegations duly evaluated before the judicial authorities. In this respect, it has enabled individuals and civil society organizations to have access to environmental information and environmental justice.
The CC also found that the authorities had not approached the case with due diligence and had not properly assessed the public and individual interests at stake. The importance of mining activities for the progress of the country and the provision of economic input is obvious. At this point, the existence of a public interest is also clear. However, when other public interests arise, such as living in a healthy environment, the sustainable availability of natural resources and the protection of ecosystems, gold mining will always be open to debate.
In conclusion, it can be said that the filing of criminal complaints, the filing of lawsuits, the participation of civil society organizations, public institutions and organizations in the decision-making process and the access to justice are important and critical in terms of ensuring environmental justice. Although the decisions of the Constitutional Court in the Iliç Çöpler Mine disaster case did not eliminate the sad consequences of the disaster, they are of a nature to serve environmental justice and make an extremely important contribution to the future of Turkey in terms of containing provisions in the nature of fundamental decisions.

REFERENCES

Büyükkidan, B. and Gümüş, H. (2020). Altın ve gümüş madenciliğinde siyanür kaynaklı kimyasal kazalarda acil durum yönetimi örneği. Afet Ve Risk Dergisi, 3(2), 181-194. https://doi.org/10.35341/afet.720539

Çimrin, F. (2015). Bergama köylü hareketinin dünü ve bugünü. Elektronik Sosyal Bilimler Dergisi, 14(53), 310. https://doi.org/10.17755/esosder.98583

Çimrin, F. and Candan, E. (2014). Siyanürlü altın madenciliği ve toplumsal değişme Bergama örneği. Sosyoloji Araştırmaları Dergisi, 17(1). https://doi.org/10.18490/sad.77759

Çağatay, S. 2018.Metal Madencilik Faaliyetleri Arazi Edinim Süreci: Erzincan İli İliç İlçesi, Çöpler Altın Madeni Örneği, Ankara

CHP İliç Raporu, 2024 Ankara. https://chp.org.tr/yayin/chp-lic-raporu/Open

İÜC,2024, https://cdn.iuc.edu.tr/FileHandler2.ashx?f=erzincan-ilic-altin-madeni-sahasinda-meydana-gelen-kaza-hakkinda-on-inceleme-raporu.pdf

Kocan, F. (2021). Environmental effects of cyanide gold production from ore. Uluslararası Muhendislik Arastirma Ve Gelistirme Dergisi, 13(1), 250-264. https://doi.org/10.29137/umagd.811352

Resmi Gazete, 2024. Eşref Demir Kararı. https://kararlarbilgibankasi.anayasa.gov.tr/BB/2020/12802

Yılmaz, E., Yazici, E., Celep, O., & Deveci, H. (2019). Liç atiklarindan siyanürün geri kazanimi yöntemleri. Bilimsel Madencilik Dergisi, 58(1), 53-71. https://doi.org/10.30797/madencilik.537646;

https://www.istanbulbarosu.org.tr/files/docs/20240215SucDuyurusu.pdf

https://www.ttb.org.tr/userfiles/files/ilic_suc_duyurusu.pdf

Short Term Debt Sustainability of Turkey: Guidotti-Greenspan Rule

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ABSTRACT

With financial globalisation and the liberalisation of capital movements, countries have both seized significant opportunities and faced serious vulnerabilities. This situation, which has also been the cause of many crises, is closely related to the state of countries' international reserves. For this reason, the Guidotti-Greenspan Rule, which is an indicator of countries' ability to repay short-term debt, is frequently used in the literature. This rule establishes a relationship between countries' short-term debt and international reserves, making it a useful rule for measuring whether a country can repay its external debt even if it cannot access any external financing.

This study investigates whether the Guidotti-Greenspan Rule is valid in Turkey. Within this scope, the historical trends of Turkey's short-term external debt and international reserves variables were first presented in tables and graphs, and then the Guidotti-Greenspan Rule was analysed econometrically. Both the tables and graphs and the econometric analysis concluded that short-term external debt is sustainable in Turkey, meaning that the Guidotti-Greenspan Rule is valid in this country.

Keywords – Guidotti-Greenspan Rule, Short Term Debt Sustainability, International Reserevs, External Debt, Structural Break Unit Root.

INTRODUCTION

In the modern world, where financial globalisation has accelerated and capital movements have largely been liberalised, countries have both seized significant opportunities and been exposed to serious vulnerabilities. Crises in countries that are overly dependent on short-term borrowing (such as those experienced in Mexico in 1994, Asia in 1997, and Argentina in 2001) have demonstrated that sudden capital outflows can have devastating effects on such countries. For this reason, countries must use their international reserves not only for exchange rate stability but also for financial stability.

At this point, the question of how to determine and monitor the adequacy of countries' international reserves emerges as a significant issue. This is because insufficient reserves lead to financial weakness in countries. The Guidotti-Greenspan Rule is widely used in the literature as a simple but powerful criterion for reserve adequacy. According to the rule, countries' international reserves should be at a level sufficient to cover their short-term external debt. First proposed by Pablo Guidotti and Alan Greenspan in 1999, this rule is based on the principle that "a country should be able to cover all its short-term liabilities with its reserves for one year, even if it has no access to any external financing sources." Adopted by international organisations such as the World Bank and the IMF, this rule is used to measure countries' vulnerability to potential sudden capital outflows. Despite being a simple and

powerful rule, it has been subject to some criticism for focusing too much on short-term debt, ignoring the quality of reserves and disregarding countries' own internal macroeconomic dynamics.

In this study, the Guidotti-Greenspan Rule is examined first theoretically and then empirically. The study analyses the Turkish economy specifically and explains how the rule can be applied to a developing country. The second section of the study presents information on various external debt ratios and the Guidotti-Greenspan Rule. The third section illustrates the situation in Turkey using tables and graphs, and the fourth section summarises studies conducted on Turkey's external debt. The fifth section presents the results of the econometric analysis, and the study concludes with findings and recommendations.

RATIOS RELATED TO EXTERNAL BORROWING

1. Various External Debt Ratios

Many ratios are used in the literature regarding external debt. These ratios generally focus on the ability to repay long-term external debt. Some of these ratios are presented below.

Total External Debt Stock/GNP: This is one of the commonly used ratios that shows the state of an economy in terms of external debt. In addition to measuring the country's creditworthiness, it is also an important criterion in debt burden and risk calculations (Evgin, 2000: 59).

Total External Debt Stock/Exports: This ratio indicates the country's external debt repayment capacity. This is because external debts taken in foreign currency will be repaid in foreign currency, and the amount of foreign currency entering the country depends on exports.

Debt Service Ratio: This is calculated by dividing the total principal and interest that a country must repay within a year by its exports. This ratio indicates the country's short-term liquidity strength.

External Debt Cost Ratio: Calculated as the ratio of external debt interest payments to exports.

The four ratios listed here are considered fundamental ratios in terms of external borrowing. Other indicators are also used in literature.

External Debt Service/GNP: This ratio, which shows the ratio of the total principal and interest payments that a country must make within a year to the GNP realized in that year, is another indicator of the country's liquidity situation.

Total External Debt Service/Total Foreign Exchange Earnings: Unlike the debt service ratio, this ratio covers not only the country's export earnings but also all foreign exchange earnings such as tourism and worker remittances.

External Resource Requirement Ratio: The calculation method is current account deficit/GNP. This ratio is used to determine the country's need for external resources.

Exports to Imports Ratio: Calculated as exports to imports, a high ratio indicates that the country is not dependent on exports, meaning that foreign exchange earnings are directed towards productive investments.

All of these ratios are very important in terms of showing countries' ability to pay their external debts and providing information to countries that will lend new debts.

2. Guidotti-Greenspan Rule

The Guidotti-Greenspan Rule states that a country should have international reserves at least equal to its short-term debt (Aydın and Tunç, 2025: 1769). Mathematically, this rule is expressed as:

$$\text{Int Res} \geq \text{STED} \quad (1)$$

The Int Res variable in the expression represents international reserves, while STED represents short-term external debt. This expression can also be expressed as:

$$(\text{Int Res})/(\text{STED}) \geq 1 \quad (2)$$

That is, if the ratio of international reserves to short-term external debt is greater than 1, the country is resilient to liquidity shocks. The ratio of international reserves to short-term external debt indicates the proportion of short-term debt that can be repaid using reserves if the country is unable to borrow from international capital markets (Cinel, 2015: 135). Similarly, this rule is important in that it shows that the country can repay its short-term debt without resorting to external debt in the event of a sudden stop in capital inflows (Zehri, 2020: 274-275).

THE SITUATION IN TURKEY

A country as economically fragile as Turkey[1] must also be evaluated in terms of its external debt. To this end, Turkey's international reserves, short-term external debt, and international reserves/short-term external debt ratio data for the years 1989-2025 are presented in Table 1.

Table 1: Data of Turkey

Year	STED	Total Reserves	Total Reserves/STED	Year	STED	Total Reserves	Total Reserves/STED
1989	5,745	9,313	1.621149	2008	56,258	116,916	2.078225
1990	9,500	11,411	1.201168	2009	56,006	112,226	23821
1991	9,117	12,253	1.344017	2010	92,948	110,010	1.183571
1992	13,156	15,253	1.159448	2011	96,867	110,504	1.140785
1993	17,639	17,762	16979	2012	114,621	137,493	1.199545
1994	10,743	16,519	1.537662	2013	141,838	147,880	1.042602
1995	15,410	23,336	1.514367	2014	142,585	141,818	0.994622
1996	17,558	25,054	1.426934	2015	104,559	128,041	1.224589
1997	19,083	27,212	1.426007	2016	90,238	129,524	1.435369
1998	21,092	29,551	1.401053	2017	109,561	136,159	1.242771
1999	23,270	33,911	1.457318	2018	92,722	130,434	1.406731
2000	29,502	34,375	1.165206	2019	95,532	144,858	1.516334
2001	17,539	30,353	1.730623	2020	111,562	128,024	1.147566
2002	18,679	38,074	2.038343	2021	118,178	156,686	1.325851
2003	27,290	44,963	1.647622	2022	148,419	166,411	1.121229
2004	36,597	53,756	1.468888	2023	174,976	180,522	1.031699
2005	43,452	69,994	1.610844	2024	173,411	194,596	1.122166
2006	49,236	92,336	1.875382	2025	169,835	218,111	1.284254
2007	51,679	110,992	2.147733				

Source: CBRT and authors' own calculations. Note: International reserves and short-term external debt data are in millions of dollars.

According to the data in Table 1, Turkey's international reserves are generally larger than its short-term external debt, except for 2014. Although reserves were low in 2014, there is no significant difference between them. Therefore, according to the Guidotti-Greenspan Rule, Turkey has not had an external debt problem since 1989. Looking at the recent past, a similar result

[1] Turkey is mentioned in the literature as part of the group of fragile countries, along with Brazil, South Africa, India, and Indonesia (Xie et al., 2024).

is encountered. Figure 1 presents data for Turkey for the period 2004:12-2025:08.

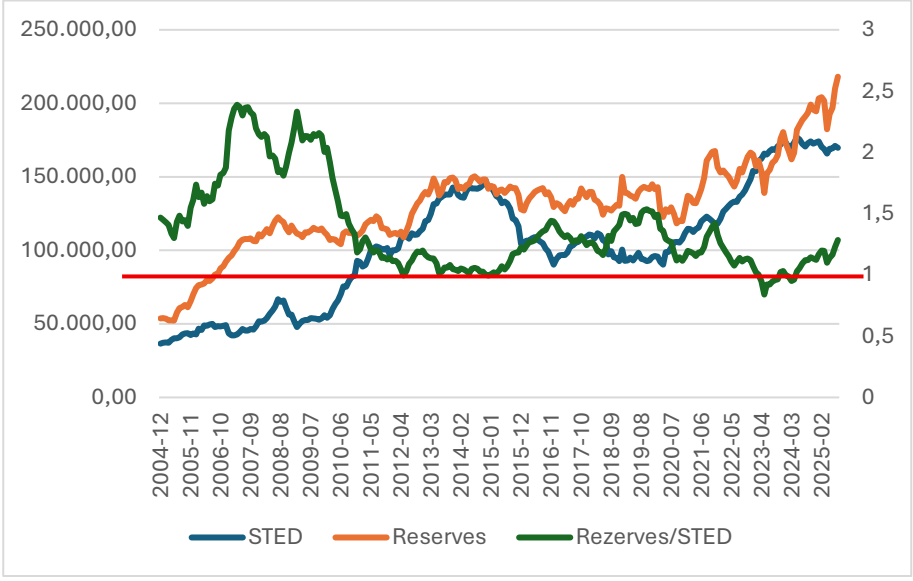

Figure 1: Data of Turkey
Source: CBRT and authors' own calculations. Note: International reserves and short-term external debt data are in millions of dollars.

In Figure 1, the left axis shows international reserves and short-term external debt, while the right axis shows the international reserves/STED ratio. The red horizontal line represents the threshold value of 1 mentioned in Equation 2 according to the Guidotti-Greenspan Rule. As can be clearly seen from the graph, Turkey generally has no problem in terms of external borrowing according to the Guidotti-Greenspan Rule.

LITERATURE

Although there are many different studies in the literature examining Turkey's situation according to various debt indicators, no study has been found that evaluates it from the perspective of the Guidotti-Greenspan Rule. However, many studies conducted using other indicators have reached different conclusions regarding the sustainability of external debt in Turkey. Several studies highlight unsustainability (Togan and Togan, 2025; Kaya et al. 2025; Oskay, 2024; Dallı, 2022; Cline, 2021; Yalçınkaya, 2019; Göktaş and Hepsağ, 2015; Kıran, 2012; Yılancı & Özcan, 2008). By contrast, Akın and Güneş (2022), Göçer (2021), and Önel and Utkulu (2006) suggest weak sustainability, while Gümüş (2022) and Lau et al. (2013) report that Turkey's external debt is sustainable.

The fact that the results of numerous studies have yielded such different conclusions stems from the different methods used and the different periods examined. Therefore, this study is important for literature, as it covers the most recent period and addresses a method that has not been studied in the literature.

ECONOMETRIC ANALYSIS

The sustainability of a variable is tested using stationarity tests in the literature (Yılancı et al., 2021; Yılancı and Pata, 2020; Aydın and Yılancı, 2016). In this study, the stationarity of the international reserves/STED variable was tested. The stationarity of this variable would mean that short-term external debt is sustainable in Turkey according to the Guidotti-Greenspan Rule.

Before proceeding to the analysis process, examining the series' graph provides important insights. For this reason, the graph of the international reserves/STED series is presented in Figure 2.

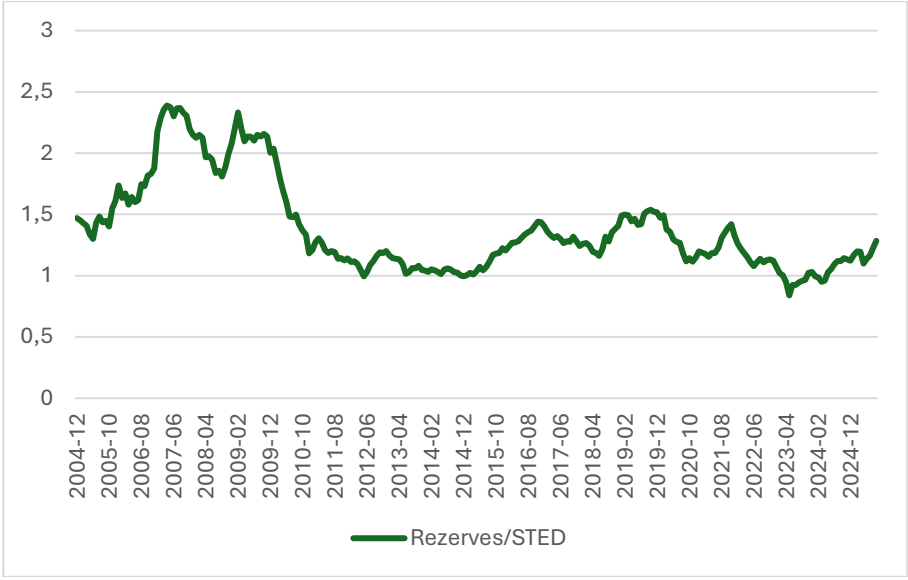

Figure 2: International Reserves/STED Series
Source: Authors' own calculations.

As shown in Figure 2, the series, which exhibited high volatility at high levels prior to 2010, shows lower volatility at lower levels after 2010. This suggests that there may be a structural break in the series. Therefore, it would be appropriate to use a structural break unit root test. In this study, a structural break unit root test was applied to the series, and the results are presented in Table 2. The analysis was performed using the E-views 12 software package.

Table 2: Structural Break Unit Root Results

	Test Stat.	Prob.	Break Date
International Reserves/STED	-5.02	<0.1	2010:01

Note: For Trend and Break Specifications, Intercept only has been selected. The maximum lag length has been set as 15, and the optimal lag length according to the Akaike Information Criterion is found to be 4.

The findings are consistent with Figure 2, indicating that the series had a break in the 2010:01 period and that the series has been stationary including this break. Therefore, according to the Guidotti-Greenspan Rule, short-term external debt in Turkey is sustainable.

CONCLUSIONS AND RECOMMENDATIONS

This study analyses the sustainability of short-term external debt in Turkey, specifically in relation to the Guidotti-Greenspan Rule. Using data from the period 2004:12–2025:08, the analysis examines the ratio of international reserves to short-term external debt both graphically and using econometric methods. The findings indicate that Turkey generally complied with the Guidotti-Greenspan Rule during the period in question, meaning that its international reserves exceeded its short-term external debt stock. This reveals that Turkey has a minimum level of resilience against sudden capital outflows and liquidity shocks.

The structural break unit root test revealed that the international reserves/short-term external debt ratio series exhibited a structural break in 2010. This finding indicates that reserve policies in Turkey changed following the 2008 global financial crisis. The analysis results show that, according to the Guidotti-Greenspan Rule, short-term external debt in Turkey is sustainable and therefore the country does not pose a critical risk in terms of external liquidity. However, the ratio falling below the rule in 2023 and the fluctuations observed in recent years indicate that a cautious policy approach regarding reserve adequacy should be maintained.

From a policy perspective, it would be erroneous to focus solely on short-term external debt in terms of reserve adequacy. The nature and composition of foreign exchange reserves, i.e. how much is held in the form of swaps, deposits or gold, is also important in terms of the reserves' crisis prevention capacity and strength. Therefore, monetary authorities should not only focus on the amount of reserves but also adjust the nature and composition of reserves in a way that prevents crises and develop policies to this end.

REFERENCES

Akın, T., and Güneş, S. (2022). Dış Borçların Sürdürülebilirliği: Kırılgan Beşli Ülkeleri Panel Eşbütünleşme Analizi. Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty, 9(3), 1605-1629. https://doi.org/10.30798/makuiibf.913340

Aydın, M. and Yılancı, V. (2016). Fiscal Sustainability Test: The Case of Turkey. Global Journal on Humanites & Social Sciences, 04, 212-215.

Aydın, S. and Tunç, C. (2025) A farewell to Greenspan-Guidotti rule: has the role of short-term debt as a reserve adequacy indicator disappeared?, Applied Economics Letters, 32:12, 1769-1773, DOI: 10.1080/13504851.2024.2322590.

Cinel, E. A. (2015). Türkiye'de Döviz Rezervleri Yeterli mi?. Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 7(12), 131-144.

Cline, W. R. (2021). Debt Sustainability in Emerging Market Economies After the COVID-19 Shock. https://iepecdg.com.br/wp-content/uploads/2021/11/EIIWP21-02R.pdf, (Access: 05.11.2025).

Dallı, T. (2022). Dış Borçların Sürdürülebilirliği: Türkiye Üzerine Ampirik Bir Analiz. Uşak Üniversitesi Uygulamalı Bilimler Fakültesi Dergisi, 2(2), 1-11.

Evgin, T. (2000). Dünden Bugüne Dış Borçlarımız. Başbakanlık Hazine Müsteşarlığı Araştırma ve İnceleme Dizisi, 26, 35- 36.

Göçer, İ. (2021). Sustainability of External Debt, Current Account Balance and Budget Balance in Developing Countries: A Cross Country Analysis. Journal of Management and Economic Studies, 3(2), 35-53.

Göktaş, Ö. and Hepsağ, A. (2015). The Analysis of External Debt Sustainability by Periodic Unit Root Test with Structural Break: The Case of Turkey. Research in Applied Economics, 7(4), 1-15.

Gümüş, N. (2022). Türkiye'nin Dış Borçlarının Sürdürülebilirliği. Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi, 9(4), 228-245.

Kaya, A., Demirgil, B., and Yeter, F. (2025). Dış Borçların Sürdürülebilirliği: Türkiye İçin Ekonometrik Bir Analiz. Uluslararası İktisadi ve İdari Akademik Araştırmalar Dergisi, 5(1), 92-109.

Kıran, B. (2012). The Sustainability of Turkish External Debt: Evidence from Fractionally Integrated Approach Under Structural Breaks. Economic Research-Ekonomska Istraživanja, 25(1), 18–29.

Lau, E., Baharumshah, A. Z. and Soon, S. V. (2013). The Behavior of External Debt in Asian Countries: Evidence Based on Panel Unit Root Tests. Journal of Business Economics and Management, 14(1), 377–394.

Oskay, C. (2024). Gelişmekte Olan Ülkelerde Dış Borç Sorunu: Türkiye ile BRICS Ülkelerinin Karşılaştırmalı Bir Değerlendirmesi. Çağ Üniversitesi Sosyal Bilimler Dergisi, 21(1), 1-21.

Önel, G., and Utkulu, U. (2006). Modeling the Long-Run Sustainability of Turkish External Debt with Structural Changes. Economic Modelling, 23(4), 669–682.

Togan, A. and Togan, S. (2025). Reforming external debt governance in Turkey to reach external debt sustainability. Journal of Asian Economics, Article 102020, 10.1016/j.asieco.2025.102020

Xie, X., Barut, A., Mohammed, K. S. and Torusdağ, M. (2024). Empowering energy access: Exploring financial inclusion's impact on energy poverty in the fragile five economies. Energy, 309, 1-11. https://doi.org/10.1016/j.energy.2024.133184.

Yalçınkaya, Ö. (2019). Sustainability Analysis of External Debts in Selected Emerging Market Economies: Evidence from Fourier Unit Root Tests. Perspectives on Applied Economics and Politics: Cases from Turkey, 13.

Yılancı, V. and Özcan, B. (2008). External Debt Sustainability of Turkey: A Nonlinear Approach. International Research Journal of Finance and Economics, 20, 91-98.

Yılancı, V. and Pata, U. K. (2020). Are Shocks to Ecological Balance Permanent or Temporary? Evidence from LM Unit Root Tests. Journal of Cleaner Production, 276(10), 1-10.

Yılancı, V., Ulucak, R. and Özgur, Ö. (2021). Insights for a Sustainable Environment: Analysing the Persistence of Policy shocks to Ecological Footprints of Mediterranean Countries. Spatial Economic Analysis, 7(1), 47-66.

Zehri, C. (2020). Capital controls to manage foreign exchange reserves and foreign debts. Zbornik radova Ekonomskog fakulteta u Rijeci/Proceedings of Rijeka Faculty of Economics, University of Rijeka, Faculty of Economics and Business, 38(1), 271-294.

Social Security And International Labour Organization (ILO) C102 - Social Security (Minimum Standards) Convention

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ABSTRACT

Social security is an institutional system that enables individuals to maintain their lives independently by protecting them against the social and economic risks they may encounter throughout their lifetime. From a historical perspective, it is observed that societies initially sought to meet their social security needs through traditional mechanisms based on solidarity and mutual assistance. However, with the process of industrialization in the 19th century, these traditional mechanisms were gradually replaced by institutionalized social security systems. Over time, these systems expanded their scope—particularly through social insurance—and evolved to encompass all segments of society. The International Labour Organization (ILO), as a specialized agency of the United Nations, operates with the aim of ensuring social justice and establishing uniform norms and standards in working life. Through its conventions and recommendations, the ILO plays a central role in defining international labour standards. In this context, the Convention No. 102 on Minimum Standards of Social Security, adopted in 1952, constitutes a fundamental document that sets out the minimum international standards for social security. The Convention covers nine principal areas of risk: sickness, unemployment, old age, employment injury, maternity, invalidity, death, and family benefits. Member States are required to provide protection against at least three of these risks. Although the Convention establishes minimum standards for social security, it does not provide a detailed framework regarding the concept's scope and definition. Nevertheless, it contributes to strengthening social protection standards at the international level by offering flexibility and encouragement to developing countries to advance their social security systems.

Keywords: ILO, Social Security, Law, Social Policy, Social Risk.

INTRODUCTION

Social security, as one of the fundamental components of the welfare state, is regarded as a key determinant of the welfare level of modern societies. The phenomenon of social security emerged towards the end of the 19th century in countries leading the Industrial Revolution, as a response to the economic and social problems arising from industrialization. During this period, the growing working class, the insecurity of working conditions, and income inequalities prompted states to develop new mechanisms to ensure individuals' protection against social risks. In definitional terms, social security refers to a system that provides protection for individuals against various social and economic risks—such as illness, unemployment, old age, disability, and death—that they may encounter throughout their lives, thereby enabling them to sustain their existence independently of others. The

purpose of social security is not only to protect individuals from risks but also to strengthen social solidarity, establish social justice, and support economic stability. The structure and scope of social security systems vary depending on the level of economic development and social conditions of countries. In developed nations, social security systems are comprehensive, offering protection in multiple areas such as health, unemployment, retirement, and family benefits. Conversely, in less developed countries, these systems are often limited in scope, fragmented in structure, and relatively ineffective. This situation stems from factors such as insufficient economic resources, the prevalence of informal employment, a lack of institutional capacity, and administrative infrastructure problems. To reduce these disparities and to establish uniform norms and standards at the international level, the International Labour Organization (ILO) was founded. The ILO adopts various conventions and recommendations aimed at promoting social justice and ensuring decent working conditions. Among the ILO's conventions concerning social security, the most significant is the Convention No. 102 on Minimum Standards of Social Security, adopted at the 35th International Labour Conference in 1952. This convention defines the minimum levels of protection to be provided to individuals within member states' social security systems and serves as a reference framework at the international level. In the first chapter of this study, the concept of social security will be examined comprehensively, and its objectives, principles, and instruments will be discussed. The second chapter will provide a detailed analysis of ILO Convention No. 102, evaluating its scope, strengths, and the limitations observed in its implementation. Furthermore, the study will critically assess the applicability of the Convention, particularly in developing countries, and analyze to what extent the existing standards align with contemporary conditions.

CONCEPTUAL FRAMEWORK

1. Definition of Social Security

Throughout history, human beings have consistently sought to establish mechanisms to protect themselves and their families against various risks and uncertainties. This aspiration has been realized in different forms across time. Initially, social protection manifested through mutual aid and solidarity among individuals, later institutionalizing in the form of

professional and charitable organizations such as the *Ahi* guilds. However, with the advent of the Industrial Revolution, the concept of social security underwent a profound transformation, evolving into a distinct institutional structure that has continued to develop and expand to the present day (Tuncay ve Ekmekçi, 2009). The concept of social security possesses a broad and comprehensive meaning, which makes it difficult to formulate a definition encompassing all of its characteristics. From a lexical perspective, the term *social security* consists of two components: "social" and "security." The word "social" refers to that which pertains to society or the community, whereas "security" denotes a state in which individuals live without fear and in safety.

According to the Universal Declaration of Human Rights, social security refers not only to the necessity that everyone should be protected against risks that occur beyond human control—such as illness, maternity, unemployment, old age, and death—but also to the assurance that all basic needs, including nutrition and shelter, are met. In the view of the International Labour Organization (ILO), social security constitutes a general system of measures aimed at protecting individuals in situations where they may temporarily or permanently lose their income due to circumstances such as illness, occupational disease, work accidents, disability, unemployment, old age, death, maternity, or an increase in the number of dependents (ILO, 2025).

Due to the comprehensive nature of social security systems, various definitions have been proposed. In general terms, social security can be defined as a system that meets the subsistence and living needs of individuals whose income or earnings are interrupted—either permanently or temporarily—due to an occupational, physiological, or socio-economic risk (Talas, 1997). According to another definition, social security refers to the protection of individuals against income losses or increased expenditures that may result from specific social risks (Dilik, 1992). Furthermore, social security may be described as the set of institutions responsible for providing individuals—regardless of their income level—with economic security in the face of certain social risks (Tunçomağ, 1988).

2. The Purpose of Social Security

The fundamental objective of social security is to protect individuals against social risks and to minimize the adverse effects when such risks occur. In this context, social security plays a significant role in preventing or reducing poverty and combating social exclusion. This is because the provision of social security benefits is conditional upon a decrease in income or the inability to earn income due to certain risks—conditions that expose individuals to the possibility of impoverishment. Therefore, social security also serves to prevent the deepening of poverty. Moreover, social security functions as a stabilizing mechanism during periods of economic crisis,

preventing severe disruptions in the economy and social structure. Countries with strong social security systems are able to cope more effectively with crises—particularly with unemployment. Indeed, social security contributes to economic growth by promoting social stability and strengthening the labour force. While social security initially aimed to address social risks and compensate for their consequences at the individual level, contemporary social security policies have expanded to include preventive measures against such risks. Social security holds a crucial position as a mechanism that gives concrete expression to the concept of the welfare state. By aiming to protect those who lack sufficient income to live in dignity and those who are economically disadvantaged, social security also performs the function of redistributing national income more equitably. Through this process, economic inequalities within society are reduced to some extent, thereby contributing to the realization of social justice. Since social security seeks to provide individuals with economic assurance against the financial consequences of specific social risks—namely increased expenditures and income losses—it ultimately ensures the preservation of both the physiological and social existence of individuals (Ehmke & Skaletz, 2009; Moore, 2008; Dündar, 1976).

3. Instruments of Social Security

3.1. Social Insurances

Social insurance represents the most advanced and widespread technique of social security. It is an institution established and organized by the state with the mandatory participation of employees and employers, aiming to provide protection against risks that workers may encounter. Since the primary financing instrument of social insurance is the contribution (premium), this system is also referred to as the "contributory regime" (Güven et al., 1994). Social insurance schemes consist of short-term and long-term branches. Short-term insurance branches include occupational accident and occupational disease insurance, sickness insurance, and maternity insurance, whereas long-term insurance branches encompass old-age, disability, and survivors' (death) insurance.

3.2. Social Assistance

Social assistance encompasses financial support provided to individuals who have fallen into poverty or need due to circumstances beyond their control, with the aim of ensuring a standard of living consistent with human dignity. Social services, on the other hand, aim to create a social environment in which individuals who are poor, disadvantaged, or physically or mentally disabled due to factors beyond their control can lead a life worthy of human dignity (Sözer, 1991). Since social assistance is primarily financed through taxes paid by all citizens, it plays a significant role in enabling the redistribution of national income and minimizing injustices in

income distribution. In particular, the scope of social assistance tends to be broader in economically developed countries (Aydın, 2003).

3.3.Social Works

Social works constitute a systematic and organized set of interventions aimed at alleviating the material, moral, and social deprivations of individuals and families that arise from their personal conditions or external circumstances beyond their control. These works seek to meet their needs, prevent and resolve social problems, and improve and elevate their standards of living. According to another definition, social works refer to the provision of monetary and/or in-kind assistance—such as goods, material support, guidance, counseling, or psychological support—either reciprocally or unconditionally, to individuals who, due to circumstances beyond their control, are unable to achieve the prevailing average living and perception standards in society, and who require social and/or economic support, whether or not their need originates from poverty (Çengelci, 1999).

ILO C102- SOCIAL SECURITY (MINIMUM STANDARDS) CONVENTION

After the Second World War, social security, whose importance in international law gradually increased, gained the opportunity to be incorporated into international instruments. In this context, the International Labour Organization (ILO) addressed this issue by establishing its social security standards through international conventions and recommendations. While conventions are binding for ratifying countries, recommendations do not carry binding force. Among the conventions adopted by the ILO concerning social security, the most significant is the Convention No. 102 on the Minimum Standards of Social Security, adopted by the 35th International Labour Conference in 1952. This convention effectively implemented the proposals outlined in the 1944 Philadelphia Declaration (Güzel et al., 2021).

ILO Convention No. 102 consists of 87 articles. It establishes the minimum framework regarding the risks, persons, scope, and benefit levels that social security systems should cover. The Convention identifies nine categories of risks, which are as follows:

- Sickness (medical care)
- Sickness (cash benefits compensating for loss of income)
- Unemployment

- Old age
- Employment injury and occupational disease
- Maternity
- Invalidity (disability)
- Survivors (death benefits)
- Family responsibilities (family benefits)

A state wishing to ratify Convention No. 102 must provide protection against at least three of the nine risks listed above. However, among the three risks selected, at least one must be related to unemployment, old age, employment injury and occupational disease, invalidity, or death. Therefore, a country ratifying the Convention is not required to ensure protection against all the risks enumerated therein. The distinctive feature of the Convention lies precisely in this flexibility (Perrin, 1983).

Moreover, the Convention transformed into a legal obligation the ideology embodied in the ILO's Recommendation No. 67 on Income Security and Recommendation No. 69 on Medical Care, both adopted in 1944. These instruments had previously influenced the recognition of social security as a human right in the 1948 Universal Declaration of Human Rights. In this way, Convention No. 102 endowed social security with a distinct dimension in international law (ILO, 2025).

Table 1: Persons and Benefit Rates to Be Covered at a Minimum under Convention No. 102

Type of Benefit	Population to Be Covered (%)	Benefit Rate (%)
Sickness	At least 50% of all employees or 20% of the active population	45
Unemployment	At least 50% of all employees or 20% of the active population	45
Old age	At least 50% of all employees or 20% of the active population	40
Employment injury and occupational disease	At least 50% of all employees or 20% of the active population	50
Maternity	At least 50% of all employees or 20% of the active population	50
Invalidity	At least 50% of all employees or 20% of the active population	40
Survivors	At least 50% of all employees or 20% of the active population	40

Source: Casas, 2012.

Table 1 presents the required population coverage rates and monetary benefit levels for the risks included in ILO Convention No. 102. In this context, for all types of benefits, the population to be covered must include at least 50% of all employees or 20% of the active population. The benefit rates vary according to the type of benefit. Specifically, the monetary benefit rate is set at 45% for sickness and unemployment benefits; 40% for old-age, invalidity, and survivors' benefits; and 50% for employment injury, occupational disease, and maternity benefits. The Convention provides a degree of flexibility to the countries that ratify it, allowing them to progressively expand the scope of coverage over time (ILO, 2025).

The Convention provides flexibility to the countries that ratify it, requiring them to progressively expand the scope of coverage over time. The minimum standards set forth in the Convention apply not only to citizens but also, to a certain extent, to foreign nationals. While citizens benefit from

allowances calculated on the basis of their actual or representative earnings and paid at regular intervals, foreign nationals are entitled to benefits sufficient to ensure their basic subsistence (Tunçomağ, 1987). Although this Convention establishes minimum standards for social security, it does not provide an adequate definition of the concept itself. Yet, social security cannot be confined solely to risks and minimum standards. Rather, it should be defined with reference to its purpose, objectives, and function of safeguarding individuals' living standards. In this respect, the Convention grants states broad flexibility concerning the administrative and financial structures of the social security systems to be implemented within their territories. From an evaluative perspective, the minimum norms prescribed by the Convention are intended to serve as an incentive for developing countries that lack established social security systems to take their initial steps in this field. Accordingly, these standards were set at a basic and limited level, providing a starting point for developing countries and paving the way toward the establishment of more comprehensive and functional social security systems. Conversely, for developed countries, these minimum standards offer relatively limited benefits, as their social security systems already exceed the levels prescribed by the Convention. The applicability and necessity of such provisions are therefore minimal in these contexts. From this perspective, the minimum social security standards established by the Convention primarily function as a guiding framework for developing countries in building their social security systems. Nevertheless, for developed nations, such minimum arrangements remain insufficient, underscoring the need for more comprehensive systems that secure individual rights and promote social welfare (Doublet, 1972; Valticos, 1984).

RESULTS AND DISCUSSION

Social security is a system designed to protect individuals against various social and economic risks they may encounter throughout their lives, thereby enabling them to sustain their livelihoods without dependence on others. Throughout history, societies have sought to ensure social security through various traditional mechanisms. These traditional practices, grounded in solidarity and mutual assistance, gradually gave way to institutionalized social security systems from the 19th century onward under the influence of industrialization. Systems in which social insurance predominates have progressively expanded their coverage in line with the rising welfare levels of societies and have been structured to encompass all individuals.

The International Labour Organization (ILO), as an "independent expert body" of the United Nations, possesses its own legal personality, budget, and independent existence. The Organization brings together governments, employers, and workers' organizations to promote social justice as well as social and economic progress. The primary aim of the ILO is to establish international norms and standards to ensure decent work and social justice. In this context, the ILO serves as the central authority in determining international labour standards. By adopting conventions and recommendations and facilitating their ratification by member countries, the ILO ensures the unification of norms and standards. Among the conventions concerning social security adopted by the ILO, the most significant is the Convention No. 102 on Minimum Standards of Social Security, adopted by the 35th International Labour Conference in 1952. The main objective of this convention is to define the minimum level of protection to be provided to individuals within the social security systems of member states and to establish an international framework of standards in this area. The convention identifies nine primary risks: sickness (medical care), sickness (benefits for loss of earnings), unemployment, old age, work accident and occupational disease, maternity, disability, death, and family responsibilities. A state wishing to ratify Convention No. 102 is required to provide protection against at least three of these nine risks. However, one of the three risks chosen must be among unemployment, old age, work accident and occupational disease, disability, or death. While the convention establishes minimum standards for social security, it does not offer a detailed definition or comprehensive explanation of the concept itself. Social security cannot be confined merely to specific risks or minimum standards; rather, it should be defined with reference to its purpose, objectives, and functions, which focus primarily on protecting and enhancing individuals' living standards. In this respect, the convention grants member states considerable flexibility to establish administrative and financial structures suited to their national conditions. Overall, it can be argued that the minimum standards set forth in the convention serve as a foundational framework for developing countries

whose social security systems are not yet fully developed, providing an incentive for progress in this field.

REFERENCES

Aydın, Ufuk. (2003). *İş ve sosyal güvenlik hukuku*. Eskişehir: AnadoluÜniversitesi Yayınları.

Casas, R. (2005). *Setting minimum social standards at EU level.* Main Issues. http://www.eapn.ie/pdfs/155_paper%20I%20%20Issues%20for%2 Social%20Standards%20and%20social%20rights.fin.pdf. Retrieved from the address on November1, 2025.

Çengelci, E. (1999) *Sosyal hizmetler ve çocuk esirgeme kurumu*. Ankara: Aydınlar Matbaacılık.

Dilik, S. (1992). *Sosyal güvenlik*. Ankara: Ankara Üniversitesi Basımevi.

Doublet, J. (1972). *Securite sociale*. Paris: PUF.

Dündar, F. (1976). *Sosyal güvenlik araçlarının makro ekonomik etkileri*. Ankara: AİTİA Yayınları.

Ehmke, E. ve Skaletz, M. (2009). Strengthening Social Security in Economic Crises The Need for a Social Protection Floor. FES Briefing Paper, (14).

Güven, E., Altan, Ö.Z., Gerek, N. (1994). *İş ve sosyal güvenlik*. Eskişehir: Anadolu Üniversitesi Yayınları.

Güzel, A., Okur, A.R., Caniklioğlu, N. (2021). *Sosyal güvenlik hukuku(19.baskı)*. İstanbul: Beta.

ILO (2025). Social *security and the rule of law*. http://www.socialprotection.org/gimi/gess/RessShowRessource.do? essourceId=21980. Retrieved from the address on November1, 2025.

Moore , K. L. (2008). The Future of Social Security: Principles to Guide Reform", The John Marshall Law Review, 41(4),1061-1089.

Perrin, J.F. (1983). Pour une théorie de la connaissance juridique. Revue internationale de droit comparé Année, 3-35.

Sözer, A.N. (1991). Sosyal sigorta ilişkisi. İzmir: Dokuz Eylül Yayınları.

Talas, C. (1997). *Türkiye'de sosyal güvenlik düzeyi*. Ankara: SSK Bülteni 62.

Tuncay, C. ve Ekmekçi, Ö. (2009). *Yeni mevzuat açısından sosyal güvenlik hukukunun esasları (2. baskı)*. İstanbul: Legal Yayınları.

Tunçomağ, K. (1987). *Sosyal sigortalar ve sosyal güvenlik kavramı*. İstanbul: Sermet Matbaası.

Valticos, N. (1984). *Droit international du travail*. Paris: Dalloz.

The Effect of Healthy Living Behavior on Hospital Use

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ABSTRACT

Healthy lifestyle behaviors play a critical role in preventing disease, improving quality of life, and reducing the burden on healthcare systems, particularly hospitals. Practices such as regular physical activity, a balanced diet, adequate sleep, stress management, and avoiding harmful habits not only enhance individual well-being but also contribute to more efficient use of healthcare services. Empirical evidence shows that individuals who adopt healthy lifestyles have significantly lower hospitalization rates and shorter lengths of stay, thereby reducing pressure on hospital resources.

Promoting and maintaining healthy lifestyle behaviors should be a strategic priority within health policy frameworks. Community-based education and awareness programs are essential to promote health literacy and support behavior change. Strengthening primary health care through lifestyle counselling, regular health screenings, and preventive care can lead to earlier disease detection and reduced hospital utilization.

Furthermore, implementing supportive social and economic policies, such as improving access to healthy foods, creating urban spaces that encourage physical activity, and implementing tobacco and alcohol control measures, can facilitate sustainable healthy behaviors. Increasing health literacy and integrating data-driven policy development enable more effective preventive health strategies and equitable resource allocation.

Ultimately, promoting healthy lifestyle behaviors is not only an individual responsibility but also a systemic imperative. By reducing avoidable hospitalizations and improving the efficiency of healthcare services, such behaviors fundamentally contribute to the sustainability and effectiveness of healthcare systems.

Keywords –Hospital Utilization, Healthy Lifestyle Behaviors, Health Management, Hospital Administration, Health System Sustainability, Primary Health Care, Health Literacy, Health Policy.

INTRODUCTION

With the rapid advancement of technology and increased communication capabilities, the time allocated to physical activity and movement in individuals' daily lives has decreased, limiting socialization. Sedentary activities such as playing computer and phone games and watching television have increasingly been preferred over physical activity and social activities. Adopting such lifestyles has triggered excessive weight gain, particularly obesity, and consequently, increased prevalence of various chronic conditions such as diabetes, hypertension, and cardiovascular

disease. Psychosocial problems, such as difficulty socializing, are also among the consequences of this situation, particularly in young individuals.

In addition to individual efforts, government policies play a significant role in combating preventable health problems such as obesity, diabetes, hypertension, and cardiovascular disease. To effectively combat preventable health problems, governments must develop policies that encompass all segments of society, facilitate access to accurate information sources, and expand services that promote healthy lifestyles. Individuals are advised to seek the opportunities provided by the government and adopt a healthy lifestyle that includes a balanced and adequate diet and regular physical activity (Ministry of Health, 2025).

Today, noncommunicable diseases (NCDs)—such as cardiovascular diseases, diabetes, cancer, chronic respiratory diseases, and mental health problems—are the greatest global health threat. According to WHO data, NCDs caused at least 43 million deaths in 2021 (75% of global non-pandemic deaths). 18 million people died before the age of 70 due to NCDs, and 82% of these premature deaths occurred in low- and middle-income countries (WHO, 2025). In the Eastern Mediterranean region, 52% of the disease burden stems from NCDs (AlQuaiz and Tayel, 2009). Among the most common chronic diseases affecting people, cardiovascular diseases and diabetes are two of them (Hamar and at al., 2015). NCDs cause an estimated 35 million deaths each year, accounting for 60% of global deaths (WHO, 2009).

NCDs are highly associated with risk factors such as unhealthy diet, physical inactivity, obesity, tobacco, and alcohol use (WHO, 2025) and are preventable health problems. Therefore, the WHO developed the Action Plan in May 2008. The action plan recognized that to achieve success in combating such diseases, not only health policies but also sectors beyond the health sector must be involved in prevention policies. The six objectives of the 2008-2013 Action Plan are as follows (WHO, 2009):

1. *"Increase the priority given to noncommunicable diseases within development efforts at the global and national levels and integrate the prevention and control of such diseases into the policies of all government departments.*
2. *Establish and strengthen national policies and plans for the prevention and control of noncommunicable diseases.*
3. *Promote interventions to reduce tobacco use, unhealthy diet, physical inactivity, and alcohol use, which are the main modifiable risk factors for noncommunicable diseases.*
4. *Increase the priority given to noncommunicable diseases within development efforts at the global and national levels and integrate the prevention and control of such diseases into the policies of all government departments. Encourage research on the prevention and control of noncommunicable diseases.*

5. *Promote partnerships for the prevention and control of noncommunicable diseases.*
6. *Monitor noncommunicable diseases and their determinants and evaluate progress made at the national, regional, and global levels."*

The ageing of the world's population, along with changes in demographics, socioeconomic characteristics, and lifestyles, has led to an increase in noncommunicable diseases and their resulting disease burden. This burden will increase significantly if preventive approaches are not developed. Therefore, it is recommended that a national policy framework be developed that incorporates policy tools such as healthy community policies that create supportive environments for healthy lifestyles, public media policies that empower society, and programs be developed within the framework of the global strategy for the prevention and control of major noncommunicable diseases (WHO, 2009).

The WHO (1948) defined health as "*not merely the absence of disease or infirmity, but a state of physical, social, and mental well-being.*" However, because many diseases can be prevented today by adopting healthy lifestyle behaviors, the definition of health has taken on a new dimension, and the definition within the context of health promotion has gained importance. Accordingly, health is considered "*not an abstract condition but a means to achieve an outcome that can be described in functional terms, but rather a resource that allows people to live individually, socially, and economically productive lives.*" Furthermore, health is not seen as the goal of life, but as a positive resource that emphasizes social and personal resources and physical capacity for daily living (WHO, 1986, 1998).

The fact that NCDs can be significantly reduced by adopting healthy lifestyle behaviors has also led to a shift in the understanding of public health policies. The "healthy public policy" approach aims to create a supportive environment that strengthens social and physical environmental health to enable people to live healthy lives.

In this new understanding of public health, it is accepted that the following should be achieved:

- "*A detailed understanding of how lifestyle and living conditions determine health status,*
- *Investing in policies, programs, and services that create, maintain, and protect health by supporting healthy lifestyles and creating health-supportive environments, and*
- *Mobilizing resources*" (WHO, 1988).

Healthy lifestyle behaviors refer to the lifestyle habits adopted by individuals to maintain their physical, mental, and social well-being and reduce the risk of disease. A balanced diet, regular physical activity, adequate sleep, stress management, and avoiding harmful habits such as

smoking and alcohol are among the fundamental components of these behaviors. Today, it is vital for individuals to adopt such preventive behaviors for the sustainability of healthcare systems.

Individuals' lifestyles significantly impact their health. Healthy lifestyle changes can reduce morbidity and mortality related to chronic health problems such as cardiovascular diseases, hypertension, and diabetes (Bozhüyük, 2012). Adopting healthy lifestyle behaviors not only has a protective role in physical health but also has significant implications for mental health (Tountas et al., 2007). National-level studies conducted in many countries reveal that at least 50% of annual deaths are caused by unhealthy lifestyle behaviors. Consequently, practices focused on lifestyle changes have gained importance as a fundamental principle for disease prevention and health promotion (Esin, 1999). Adopting healthy lifestyle behaviors significantly reduces individuals' risk of developing non-communicable diseases such as diabetes, cardiovascular disease, and obesity, or the progression of existing diseases. Healthy lifestyle behaviors such as regular physical activity, a balanced diet, and avoiding harmful habits increase the overall health of the population. This will reduce hospital workload, enable more efficient use of healthcare services, shift resources to more productive areas, and alleviate the economic burden on the healthcare system.

NON-COMMUNICABLE DISEASES

Chronic NCDs are associated with unhealthy lifestyles and behaviors and pose an alarming burden for both developed and developing countries (AlQuaiz and Tayel, 2009). Advanced age, undesirable lifestyle factors, and socioeconomic deprivation are associated with the development of chronic diseases, particularly multiple chronic diseases. While increasing life expectancy is an important indicator of healthy living, the increasing proportion of older adults in the population and the increasing proportion of young adults with multiple diseases surviving into old age have significant implications, particularly for healthcare financing and sustainability. Therefore, some countries have implemented public health initiatives and healthcare system reforms to reduce the impact of chronic diseases on individuals and society. For example, healthcare reforms in the United Kingdom have seen measurable improvements in the health of individuals with multiple diseases and complex health conditions. Currently, cost-effectiveness studies of chronic disease interventions are insufficient. The paucity of assessments in this area significantly complicates decision-

making in resource allocation processes aimed at reducing the burden of disease in resource-constrained health systems (McPhail, 2016).

The gradual increase in NCDs increases the need and demand for health services. A significant portion of expenditures is spent on health services, but these expenditures do not improve the overall health of the population (Hamar, et al., 2015).

The prioritization of treatment and acute care models in health service delivery leads to missed opportunities for prevention, early diagnosis, and treatment. For example, in OECD countries, 3% of total health expenditures go to prevention and public health programs covering the entire population. In Europe, 30,000 women die from cervical cancer each year. Moreover, the mortality rate from this disease is two to four times higher in Central and Eastern European countries than in Western Europe. However, these deaths are largely preventable with early detection and treatment (WHO, 2006).

Addressing risk early through preventative measures is crucial to avoiding unnecessary healthcare costs associated with "patient care." Chronic diseases and their effects can be prevented, delayed, or better managed by incorporating healthier lifestyle behaviors, such as healthy eating, increasing exercise, reducing stress, and improving patient self-management (Hamar, et al., 2015).

HEALTHY LIFESTYLE BEHAVIORS

Healthy lifestyle behaviors are among the objectives of the "Healthy Public Policy," one of the five action areas addressed within the scope of health promotion. This aims to create a supportive environment for people to lead healthy lives, thus enabling or facilitating healthy choices (WHO, 2005).

One of the key aspects in this context is health promotion and disease prevention approaches. The WHO defines health promotion as "*the process of enabling people to increase control over their health and improve their health,*" and disease prevention as measures to reduce the occurrence of risk factors, prevent the development of disease, halt its progression, and reduce the consequences of disease once it has established (WHO, 2021).

Developing healthy lifestyle behaviors and preventing diseases requires the acquisition of fundamental life skills. The WHO defines these life skills as "*Health skills, personal, interpersonal, cognitive, and physical skills that enable people to control and direct their lives and develop the capacity to make changes in their environment that will make them conducive to life and health*" (WHO, 2021). The most important aspect in

this context is the competence in healthy living behaviors that individuals must acquire.

A healthy lifestyle is defined as an individual controlling all behaviors that affect their health and selecting and organizing daily activities in accordance with their health status (Esin, 1999). Healthy lifestyle behaviors include nutrition, stress management, exercise, mental well-being, interpersonal relationships, and health responsibility (Bozhüyük, 2012).

Developing healthy living behaviors by individuals will also provide significant benefits in terms of hospital workload. The rise in preventable noncommunicable diseases also increases hospital workload. Therefore, the Budapest Declaration defined "*Health-Promoting Hospitals*," stating that hospitals should assume responsibilities for improving health and encouraging individuals to adopt healthy living behaviors. Health-promoting hospitals are institutions that restructure their management and service processes to improve the health of patients, staff, and the community, and to support sustainable development. These hospitals aim to improve health outcomes across all segments of society by integrating approaches such as patient rights, quality improvement, environmental sustainability, and health literacy (Budapest Declaration, 1991; WHO, 2021).

Healthy lifestyle behaviors are also important for healthcare professionals. Healthcare professionals serve as role models for families and society, and their improved physical and mental well-being will positively impact the healthcare services they provide. A study by Zapka et al. (2009) revealed that a large portion of nurses were overweight or obese, and most did not practice weight management behaviors (Zapka et al., 2009).

Healthy lifestyle behaviors explain 20% of the variance in quality of life among adolescents. Physical activity, body mass index, and adherence to a Mediterranean diet are important components to consider when targeting improvements in adolescents' health-related quality of life (Muros et al., 2017).

Research has shown that countries with higher social protection spending, fewer treatment beds, lower infant mortality rates, and lower alcohol consumption have significantly longer life expectancy. Therefore, policies aimed at investing in social protection spending, improving the quality of care, and promoting healthy lifestyles are recommended (van den Heuvel & Olaroiu, 2017).

The cost of investing in preventing health problems is much lower than the cost of treating them after they occur (Chia et al., 2023). Therefore, developing healthy lifestyle behaviors is important for preventing the development of NCDs or mitigating their progression.

HEALTHY LIFE BEHAVIORS AND HOSPITAL USE

Increasing life expectancy in society and the increase in chronic diseases with age are increasing the demand for healthcare services, particularly hospital utilization. Unhealthy lifestyle behaviors such as poor nutrition, sedentary lifestyle, and incorrect medication use, among others, lead to the onset of chronic diseases at an earlier age or exacerbate existing chronic diseases.

The WHO recognizes the promotion and development of healthy lifestyles and healthy environments as one of the most significant health challenges (WHO, 1988).

Rising healthcare costs are associated with increased primary care utilization and specialist physician service hours, medication use, emergency department visits, and hospital admissions (both frequency of admissions and occupancy rates) (McPhail, 2016). Of these factors, physician service hours, medication use, emergency department visits, hospital admission frequency, and occupancy rates are directly related to hospital utilization.

Reducing NCDs through the adoption of a healthy lifestyle is crucial for sustainable development and the sustainability of the services provided by healthcare institutions. Sustainable development is defined as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs,*" and the healthcare sector is one of the sectors expected to contribute to this goal (WHO, 1997). Therefore, instilling healthy lifestyle behaviors in individuals to reduce hospital and healthcare system utilization has become a necessity today.

RESEARCH ON THE EFFECT OF A HEALTHY LIFESTYLE ON HOSPITAL USE

A healthy lifestyle plays a significant role in preventing chronic noncommunicable diseases. Numerous recent intervention studies have focused on purpose in life, improved mental and physical health, and the development of health behaviors. While the relationships between healthy lifestyle behaviors and healthcare expenditures, chronic diseases, and the risk of death have been studied, limited research has been conducted on the relationship between healthy lifestyle behaviors and hospital utilization. Research on this topic indicates that healthy lifestyle interventions significantly improve hospital utilization rates. The results of these studies will be discussed below.

Two separate "chronic disease management" programs were implemented in Australia in 2009 and 2015, focusing on improving disease management, reducing morbidity and hospital utilization, and delaying disease progression. The 2009 program was found to be effective in reducing the frequency and severity of hospitalizations (Hamar, et al., 2013). A 2015 study retrospectively evaluated hospital utilization rates (hospitalizations, readmissions, total bed days) and costs associated with claims. The study found significant reductions in hospitalizations, readmissions, and bed days over a four-year period. Cumulative program savings due to reduced hospital demands amounted to $3,549 over four years (Hamar, et al., 2015).

A six-year study of American adults found that promoting healthy lifestyle behaviors led to increased use of various preventive healthcare services and reduced the number of nights spent in the hospital by 17%. The study found that individuals were more likely to have a cholesterol test or colonoscopy, women were more likely to have a mammogram/X-ray or Pap smear, and men were more likely to have a prostate exam (Kim, et al., 2014). A study conducted in Taiwan showed that individuals who reported more than 150 minutes of moderate-intensity activity per week had a significantly lower likelihood of hospitalization compared to sedentary individuals (Li et al., 2015).

A study conducted in Türkiye on healthy lifestyle behaviors concluded that older age groups (over 65), a potential health risk group, should be encouraged to adopt healthy lifestyle behaviors, particularly to address the risk of oncology and cardiovascular disease (Sungur et al., 2019).

A study conducted in France found that physical activity in adults was associated with a decrease in prescription drug consumption and outpatient hospitalizations, while increasing the use of preventive healthcare services (Jemna et al., 2022).

A study conducted with older adults in Spain found that adults with more than one healthy behavior were associated with lower healthcare utilization. Compared to participants with zero or one healthy behavior, those with five or six healthy behaviors had a lower risk of polypharmacy, primary care physician visits, and hospitalizations. In older adults, the combination of five to six healthy behaviors halves the risk of polypharmacy and multiple healthcare use (Hernandez-Aceituno, et al., 2017).

A physical activity intervention program designed to reduce sedentary behaviors and increase physical activity in older adults has shown a positive impact on healthy lifestyles in all participants (Chia, et al., 2023).

There is also research on healthy lifestyle behaviors conducted with individuals with chronic diseases:

In a Canadian study with COPD patients, the self-care intervention program demonstrated that: It was found that a) hospitalizations for COPD exacerbations decreased by 39.8% compared to the usual care group, b)

hospitalizations for other health problems decreased by 57.1%, c) emergency room visits decreased by 41.0%, and d) unplanned doctor visits decreased by 58.9% (Bourbeau at al., 2003).

A study investigating the relationship between coronary artery disease risk, genetic risk, and a healthy lifestyle found that a healthy lifestyle (at least three of four healthy lifestyle factors) was associated with a significantly lower risk of coronary events compared to an unhealthy lifestyle (none or only one healthy lifestyle factor), regardless of genetic risk category. Among participants with high genetic risk, a positive lifestyle was associated with an approximately 50% lower risk of coronary artery disease compared to an unfavorable lifestyle (Khera, et al., 2016).

A study conducted in London with patients in poor health found that after 4 weeks of a behavioral change intervention, participants showed significant improvements in their self-efficacy, health, and well-being, with 63% of their lifestyle goals and 89% of their health management goals fully achieved. 99% of patients were satisfied/very satisfied with the service (Gate, et al., 2016). These studies were conducted on individuals with non-communicable diseases and have yielded significantly positive results in reducing healthcare utilization and improving health status. It is clear that promoting healthy lifestyle behaviors in healthy individuals will be highly effective in preventing the development of illnesses, or even in those that do develop, in their milder form.

Patient education is essential in the management and treatment of chronic diseases. Increasing health literacy has a significant impact on reducing hospitalizations, emergency care visits, and non-adherence to patient medication regimens. Improving patients' health literacy is a crucial step toward improving health outcomes (Dahodwala, et al., 2018).

While not directly related to the impact of healthy lifestyle behaviors on hospital utilization, there is also research on their impact on healthcare utilization:

A study conducted in Taiwan found that individuals with healthy lifestyle behaviors used preventive healthcare services more. However, there was no significant decrease in outpatient visits among individuals with healthy lifestyle behaviors; the number of outpatient visits was observed to increase, particularly among those who exercise regularly and who have blood pressure measurements (Lee, et al., 2017). Another study conducted in Taiwan found a reduction in healthcare costs among nonsmokers who maintained an optimal body weight. Individuals who adopted all five healthy lifestyle factors experienced a 28.12% reduction in average annual healthcare costs compared to those who adopted one or none of the healthy lifestyle behaviors (Lo, et al., 2024).

Adopting a healthy lifestyle in middle-aged individuals has been associated with avoiding major chronic diseases and a longer life expectancy (Li, et al., 2020).

High levels of physical activity have been associated with a 20–40% lower risk of developing cardiovascular disease compared to never smoking (men) and normal weight, low physical activity, current smoking, and obesity (Nusselder, et al., 2009).

Widespread adoption of healthy lifestyle behaviors can contribute to disease prevention and, consequently, reduced demand for healthcare services. This improves individual quality of life, particularly by reducing the incidence of chronic diseases, and alleviates the burden on the healthcare system. Studies in the literature indicate that individuals who exercise regularly, eat healthily, and avoid risky health behaviors are less likely to seek hospital care. This relationship also highlights the potential impact of preventive health behaviors on healthcare expenditures and hospitalization rates.

The mechanisms by which healthy lifestyle behaviors influence hospital utilization are multidimensional. Individuals' socioeconomic status, education level, health literacy, and access to healthcare services may play a determining role in this relationship. For example, individuals with high health literacy can prevent hospitalization by recognizing their symptoms early and utilizing primary healthcare services. Similarly, individuals with a high propensity to adopt healthy lifestyle behaviors are more likely to utilize preventive healthcare services, reducing the need for therapeutic services.

In conclusion, healthy lifestyle behaviors are a key factor in improving individual health outcomes and increasing the efficiency of the healthcare system. Therefore, prioritizing programs that promote healthy lifestyle behaviors in public health policies will contribute to the sustainability of the healthcare system by reducing hospital utilization rates at both the individual and societal levels.

POLICY AND PRACTICE RECOMMENDATIONS

The promotion and sustainability of healthy lifestyle behaviors is possible not only through individual efforts but also through effective health policies and systematic implementation strategies. To capitalize on the impact of healthy lifestyle behaviors in reducing hospital utilization, policymakers and healthcare administrators should adopt a holistic, multi-level approach.

Because of the key role healthcare professionals play in promoting healthy lifestyle behaviors and the care process in healthy individuals and adults with chronic diseases, it is recommended that they prioritize effective patient education in primary healthcare, community health services, and

hospitals. This can support patients' weight management, increase physical activity, and improve their self-efficacy, physical, and mental health (Kivela et al., 2014). This, in turn, can reduce healthcare utilization, particularly hospital utilization.

Developing healthy lifestyle behaviors, such as maintaining a high level of physical activity, maintaining a normal weight, and not smoking, has been cited as an effective way to prevent cardiovascular disease, extend life expectancy, and increase the number of years lived free of cardiovascular disease (Nusselder et al., 2009). The long-term, effective and efficient management of multiple comorbidities is one of the greatest health challenges facing patients, healthcare professionals, society, and policymakers in the financing of healthcare services. Multimorbidity, incomplete information, an aging population, and increasingly undesirable societal lifestyles pose significant challenges to resource allocation decision-making processes and healthcare policy formulation (McPhail, 2016).

Intersectoral collaboration is crucial in combating NCDs (Sharma, 2013). Health promotion programs, strengthening health messages, and encouraging individuals to demand more information can be considered to encourage the adoption of healthy lifestyles (WHO, 1988).

For the success of implemented programs, robust surveillance, monitoring, and evaluation systems are essential. Furthermore, healthcare institutions providing preventive healthcare services must strengthen screening, early diagnosis, and treatment services within the healthcare delivery system (Sharma, 2013).

Mass communication, the use of multimedia tools, and direct political lobbying, among others, can be used to promote healthy lifestyle behaviors in society. Creating living conditions that support health and the achievement of a healthy lifestyle through tools such as social mobilization should be prioritized. In this context, the following policies and practices can be implemented to encourage the adoption of healthy lifestyle behaviors and reduce the risk of developing NCDs:

1. Health Education and Awareness Programs

Continuous and accessible health education programs for all segments of society play a key role in encouraging the adoption of healthy lifestyle behaviors. Awareness campaigns conducted in schools, workplaces, and community centers can increase knowledge on topics such as healthy eating, physical activity, stress management, and avoiding harmful habits. Disseminating such programs through media, digital platforms, and local government-supported projects contributes to creating a social environment that supports behavioral change.

2. Strengthening Primary Health Care Services

Promoting healthy lifestyle behaviors is directly related to the effective implementation of preventive health services. Focusing on preventive health services in primary health care institutions allows individuals to contact healthcare professionals before illness develops. Expanding and/or strengthening practices such as lifestyle counseling, regular screening programs, and personal health monitoring within the family health system can contribute to reducing hospitalizations.

3. Economic and Social Policies Supporting Behavior Change

To maintain healthy behaviors, individuals' environmental and economic conditions need to be supported. For example, facilitating access to healthy foods, implementing urban developments that encourage physical activity (such as bike paths and walking paths), and tax policies targeting tobacco and alcohol can be used for this purpose. Furthermore, employee wellness programs and workplace health incentives can increase individuals' inclinations toward healthy behaviors.

4. Increasing Health Literacy

Health literacy is a fundamental element determining individuals' capacity to understand, evaluate, and apply health-related information. Increasing the level of health literacy in society enables individuals to make informed decisions regarding both disease prevention and the proper use of healthcare services. For this purpose, incorporating health literacy courses into educational curricula and making digital health applications user-friendly are crucial.

5. Data-Driven Policy Development

To ensure the efficient use of resources in the healthcare system, data-driven policies should be developed that monitor the impact of healthy lifestyle behaviors on hospital utilization. Studies analyzing the relationship between individual lifestyle indicators and hospitalizations in national health data systems will provide a scientific basis for policy planning. In this context, strengthening the digital infrastructure that facilitates data sharing among healthcare institutions and establishing regular monitoring mechanisms are recommended.

6. Community-Based Intervention Programs

Culturally sensitive and participatory approaches appropriate to the local dynamics of the community should be adopted. Community-based healthy lifestyle projects, conducted in collaboration with local governments, civil society organizations, and universities, enable individuals to more easily adapt to behavioral change. Such projects not only increase public

health awareness but also reduce the need for healthcare services, easing the burden on the system.

In conclusion, the long-term effects of policies that support healthy lifestyle behaviors not only improve individuals' quality of life but also strengthen the efficiency and sustainability of healthcare systems. Therefore, developing multisectoral and comprehensive policies focused on preventive health to reduce hospital utilization rates should be considered a strategic priority.

RESULTS AND DISCUSSION

As explained above, considering the positive effects of healthy lifestyle behaviors on healthcare services and, in particular, hospital utilization, developing health policies that include interventions targeting healthy lifestyle behaviors in many resource-limited countries could help control future healthcare expenditures. Furthermore, reductions in hospital utilization rates will also lead to higher quality healthcare services and increased health-related well-being.

Many genetic risks that cause diseases can be reduced through a healthy lifestyle. Promoting healthy lifestyle behaviors, such as avoiding smoking, preventing obesity, regular physical activity, and a healthy diet, constitute key strategies for improving chronic diseases such as cardiovascular disease and diabetes in the general population.

Interventions aimed at promoting healthy lifestyle behaviors can help improve health by increasing the use of preventive healthcare services and alleviate the burden of rising healthcare costs for countries. Therefore, further research into the relationship between healthy lifestyle behaviors and healthcare utilization, particularly hospital utilization, will reduce the knowledge gap in this area. Furthermore, developing strategies to promote healthy lifestyle behaviors should be a priority for policymakers. Conducting research that determines the relationships between individuals' healthy lifestyle behaviors and hospital utilization rates will be beneficial for researchers and healthcare providers, and will also enable policy makers to make better predictions and plans regarding future healthcare utilization.

REFERENCES

AlQuaiz, A. M., & Tayel, S. A. (2009). Barriers to a healthy lifestyle among patients attending primary care clinics at a university hospital in Riyadh. *Annals of Saudi Medicine*, *29*(1), 30-35.

Bourbeau, J., Julien, M., Maltais, F., Rouleau, M., Beaupré, A., Bégin, R., ... & Chronic Obstructive Pulmonary Disease axis of the Respiratory Network Fonds de la Recherche en Santé du Québec. (2003). Reduction of hospital utilization in patients with chronic obstructive pulmonary disease: a disease-specific self-management intervention. *Archives of Internal Medicine*, *163*(5), 585-591.

Bozhüyük A, Özcan S, Kurdak H, Akpınar E, Saatçı E, & Bozdemir N. (2012). Healthy Life Style and Family Medicine. *TJFMPC*, *6*, 13-21.

Budapest Declaration. 1991. Budapest Declaration on health promoting hospitals. Budapest: Health Promoting Hospitals Network; https://www.hphnet.org/wp-content/uploads/2020/03/Budapest-Declaration.pdf, accessed 8 July 2021.

Chia, F., Huang, W. Y., Huang, H., & Wu, C. E. (2023). Promoting healthy behaviors in older adults to optimize health-promoting lifestyle: An intervention study. *International Journal of Environmental Research and Public Health*, *20*(2), 1628.

Dahodwala, M., Geransar, R., Babion, J., de Grood, J., & Sargious, P. (2018). The impact of the use of video-based educational interventions on patient outcomes in hospital settings: a scoping review. *Patient Education and Counseling, 101*(12), 2116-2124.

Esin, N. (1999). Adaptation of the "Healthy Lifestyle Behaviors Scale" into Turkish. *Nursing Bulletin*, *7* (45), 87-96.

Gate, L., Warren-Gash, C., Clarke, A., Bartley, A., Fowler, E., Semple, G., ... & Rodger, A. (2016). Promoting lifestyle behaviour change and well-being in hospital patients: a pilot study of an evidence-based psychological intervention. *Journal of Public Health*, *38*(3), e292-e300.

Hamar, G. B., Rula, E. Y., Wells, A., Coberley, C., Pope, J. E., & Larkin, S. (2013). Impact of a chronic disease management program on hospital admissions and readmissions in an Australian population with heart disease or diabetes. *Population Health Management*, *16*(2), 125-131.

Hamar, G. B., Rula, E. Y., Coberley, C., Pope, J. E., & Larkin, S. (2015). Long-term impact of a chronic disease management program on hospital utilization and cost in an Australian population with heart disease or diabetes. *BMC Health Services Research*, *15*(1), 174.

Hernandez-Aceituno, A., Perez-Tasigchana, R. F., Guallar-Castillon, P., Lopez-Garcia, E., Rodriguez-Artalejo, F., & Banegas, J. R. (2017). Combined healthy behaviors and healthcare services use in older adults. *American Journal of Preventive Medicine*, *53*(6), 872-881.

Jemna, D. V., David, M., Depret, M. H., & Ancelot, L. (2022). Physical activity and healthcare utilization in France: evidence from the European Health Interview Survey (EHIS) 2014. *BMC Public Health*, *22*(1), 1355.

Khera, A. V., Emdin, C. A., Drake, I., Natarajan, P., Bick, A. G., Cook, N. R., ... & Kathiresan, S. (2016). Genetic risk, adherence to a healthy lifestyle, and coronary disease. *New England Journal of Medicine*, *375*(24), 2349-2358.

Kim, E. S., Strecher, V. J., & Ryff, C. D. (2014). Purpose in life and use of preventive health care services. *Proceedings of the National Academy of Sciences*, *111*(46), 16331-16336.

Kivela, K., Elo, S., Kyngas, H., & Kaariainen, M. (2014). The effects of health coaching on adult patients with chronic diseases: a systematic review. *Patient Education and Counseling, 97*(2), 147-157.

Lee, I. C., Chang, C. S., & Du, P. L. (2017). Do healthier lifestyles lead to less utilization of healthcare resources? *BMC Health Services Research*, *17*(1), 243.

Li, Y., Schoufour, J., Wang, D. D., Dhana, K., Pan, A., Liu, X., ... & Hu, F. B. (2020). Healthy lifestyle and life expectancy free of cancer, cardiovascular disease, and type 2 diabetes: prospective cohort study. *BMJ*, *368*:l6669. http://dx.doi.org/10.1136/bmj.l6669.

Li, C. L., Sheu, J. T., Wang, T. A., Wen, Y. P., Chao, M., & Chang, H. Y. (2015). The relationship between healthy lifestyle and hospital utilization among adults with diabetes: Results from a national cohort in Taiwan. *Asia Pacific Journal of Public Health, 27*(3), 303-313.

Lo, W. C., Hu, T. H., Shih, C. Y., Lin, H. H., & Hwang, J. S. (2024). Impact of healthy lifestyle factors on life expectancy and lifetime health care expenditure: nationwide cohort study. *JMIR Public Health and Surveillance*, *10*(1), e57045.

McPhail, S. M. (2016). Multimorbidity in chronic disease: impact on health care resources and costs. *Risk Management and Healthcare Policy*, 143-156.

Ministry of Health. (2025). Turkey Healthy Nutrition and Active Life Program, Fight Against Obesity and Physical Activity Action Plan 2025-2028. Republic of Turkey Ministry of Health, General Directorate of Public Health, Publication No: 1313 Ankara, Turkey.

Muros, J. J., Salvador Pérez, F., Zurita Ortega, F., Gámez Sánchez, V. M., & Knox, E. (2017). The association between healthy lifestyle behaviors and health-related quality of life among adolescents. *Jornal de Pediatria*, *93*(4), 406-412.

Nusselder, W. J., Franco, O. H., Peeters, A., & Mackenbach, J. P. (2009). Living healthier for longer: comparative effects of three heart-healthy behaviors on life expectancy with and without cardiovascular disease. *BMC Public Health*, *9*(1), 487.

Sharma, K. (2013). Burden of non communicable diseases in India: Setting priority for action. *Int J Med Sci Public Health*, *2*(1), 7-11.

Sungur, C., Kar, A., Kıran, Ş., & Macit, M. (2019). Evaluation of healthy lifestyle behaviours: A research on hospitalized patients. *Balkan J Soc Sci*, *8*(15), 43-52.

Tountas, Y., Manios, Y., Dimitrakaki, C., & Tzavara, C. (2007). Relationship between basic protective health behaviours and health related quality of life in Greek urban hospital employees. *International Journal of Public Health*, *52*(6), 341-347.

van den Heuvel, W. J., & Olaroiu, M. (2017). How important are health care expenditures for life expectancy? A comparative, European analysis. *Journal of the American Medical Directors Association*, *18*(3), 276-e9.

WHO. (1986). *Ottawa Charter for Health Promotion*. World Health Organization, Geneva.

WHO. (1988). *Adelaide Recommendations on Healthy Public Policy*. World Health Organization, Geneva.
WHO. (1997). Our common future: Report of the World Commission on Environment and Development (WCED). Health and Environment in Sustainable Development. Five years after the Earth Summit. World Health Organization. Geneva.
WHO. (1998). *Health promotion glossary*. World Health Organization. Geneva.
WHO. (2005). *Global Health Promotion. Unedited Working Paper, 14-07-2005.* WHO Secretariat Background Document for the 6th Global Conference on Health Promotion in Bangkok, Thailand 7-11 August 2005.
WHO. (2006). *Gaining health: the European strategy for the prevention and control of noncommunicable diseases*. World Health Organization. Copenhagen, Denmark.
WHO. (2009). 2008-2013 *Action plan for the global strategy for the prevention and control of noncommunicable diseases: Prevent and control cardiovascular diseases, cancers, chronic respiratory diseases and diabetes*. World Health Organization. Geneva, Switzerland.
WHO. (2021). *Health promotion glossary of terms 2021.* World Health Organization. Geneva.
WHO. (2025). *Noncommunicable diseases*. 25 September 2025. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases Retrieved November 10, 2009.
Zapka, J. M., Lemon, S. C., Magner, R. P., & Hale, J. (2009). Lifestyle behaviours and weight among hospital-based nurses. *Journal of Nursing Management*, *17*(7), 853-860.

Quantile-Based Panel Evidence on the Relationship Between Military Expenditures and Economic Growth in Peace and Conflict Across 104 Countries

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ABSTRACT

This study investigates the relationship between military expenditure and economic growth across 104 countries over the period 2007–2022 using a bootstrap-based panel quantile regression framework. The analysis incorporates conflict intensity through an interaction term to examine how defence spending affects growth under different security conditions and income levels. Preliminary diagnostics indicate cross-sectional dependence and heterogeneity among countries, warranting the use of second-generation panel techniques. The results confirm significant distributional heterogeneity, justifying the quantile-based approach. The findings reveal that the defence–growth relationship is neither uniform nor constant but varies systematically with countries' income levels, institutional capacities, and conflict environments. Military expenditure exhibits a predominantly negative effect across most quantiles, consistent with the bulk of empirical evidence and reflecting the substantial opportunity costs faced by developing and emerging economies. However, the positive interaction between conflict intensity and defence spending suggests that wartime conditions can generate short-run demand-driven growth effects, though these gains are temporary and dissipate in the long term. Overall, the study underscores that defence spending is generally growth-reducing, with its impact contingent on structural and institutional contexts, thereby emphasising the need for differentiated and context-sensitive policy frameworks.

Keywords – Military Expenditures, Economic Growth, Panel Quantile Regression, Peace, Conflict

I. INTRODUCTION

Economic growth remains a fundamental indicator of improvements in social welfare, labour market expansion, and rising living standards. However, global growth trajectories continue to be highly sensitive to a wide range of external shocks, including financial crises, pandemics, geopolitical frictions, and long-term structural vulnerabilities. The 2008 global financial crisis caused severe contractions particularly in advanced economies, while many developing and emerging countries demonstrated comparatively stronger resilience. Likewise, the Covid-19 pandemic led to a 4.3% fall in global output in 2020, generating disruptions across global supply chains, trade networks, and employment structures. Although expansionary fiscal interventions in 2021 supported a partial rebound, subsequent disruptions—including sustained inflationary pressures, energy market volatility, and the Russia–Ukraine conflict—once again constrained the pace of global recovery. In 2024, world GDP grew by 3.2%, indicating moderate

stabilisation, yet high inflation, increasing public debt, and persistent geopolitical tensions continued to dampen the global economic outlook (IMF, 2024).

Against this backdrop, public expenditure plays a critical countercyclical role. Keynesian theory suggests that government spending can support aggregate demand and stabilise output during downturns. However, the long-run growth implications of public spending depend heavily on its composition. Within this portfolio, military expenditure occupies a distinctive position, shaped by national security concerns and strategic competition. Over the past two decades, rising geopolitical uncertainty—including the Arab Spring, the U.S.–China strategic rivalry, intensifying tensions in East Asia, and especially the Russia–Ukraine war—has reinforced upward pressure on global defence budgets. As a result, military expenditure reached USD 2.71 trillion in 2024, equivalent to 2.5% of global GDP and the highest share recorded since the Cold War (SIPRI, 2025).

The growing allocation of resources toward defence reflects a dual dynamic: escalating global security threats and the increasing use of defence industries as engines of industrial upgrading, technological innovation, and national prestige (Visual Capitalist, 2024). Yet the surge in military expenditure also raises important economic and social concerns. In many high-income countries, sustained increases in defence budgets risk reinforcing inflationary pressures and limiting fiscal space for social investment. In developing and emerging economies, higher defence outlays may exacerbate fiscal constraints, crowd out productive investment, and divert resources from critical development priorities. These tensions underscore the long-standing policy dilemma of balancing national security imperatives with sustainable and inclusive growth trajectories.

This debate is also reflected in the empirical literature, where findings remain markedly inconsistent. Some studies highlight the potential of defence spending to stimulate aggregate demand, foster technological innovation, and generate employment (Smith, 2020; OECD, 2022). Others argue that high military expenditure can crowd out private investment and social spending, ultimately constraining long-run economic performance (Dunne, 2005). The heterogeneity of these outcomes largely reflects differences in institutional quality, income levels, geopolitical exposure, and fiscal structure across countries. As such, a comprehensive, global perspective is needed to understand how military expenditure affects economic growth under diverse economic and security environments.

This study addresses this gap by examining the defence–growth nexus across a global panel of 104 countries over the period 2007–2022. Two research questions guide the analysis:

(1) Does military expenditure exert a statistically significant effect on economic growth across countries at different income levels?

(2) How do varying conflict intensities shape or moderate this relationship across the global sample?

To answer these questions, the study adopts an augmented Solow-type growth framework (Solow, 1956; Dunne, 2005) and employs a Panel Quantile Regression (PQR) methodology (Solar, 2022). This approach captures heterogeneous and asymmetric effects of military expenditure across different points of the conditional income distribution, allowing for a richer and more nuanced understanding of how defence spending influences growth in countries with diverse structural and geopolitical characteristics.

The contribution of this research is threefold. First, it provides new comparative evidence on the distributional effects of military expenditure across a broad global sample, surpassing the regional or bloc-specific analyses of previous studies. Second, it incorporates conflict intensity into the analytical framework, enabling an assessment of how security conditions transform the economic returns to defence spending. Third, it offers policy-relevant insights into how governments worldwide can align rising defence commitments with fiscal sustainability, technological development, and social welfare objectives. The remainder of the study is organised as follows: Section 2 reviews the empirical literature; Section 3 outlines the methodology, model, and data; Section 4 presents and discusses the empirical findings; Section 5 concludes with policy recommendations.

II. BACKGROUND AND EMPIRICAL LITERATURE

The link between military expenditure and economic growth has remained one of the most prominent and contested subjects within defence economics (Sandler & Hartley, 1995) since the 1970s. Scholarly interest persists because defence spending affects macroeconomic activity through multiple, often conflicting channels. Two principal theoretical approaches dominate the debate: the Keynesian paradigm and the Classical/Neoclassical perspective.

From a Keynesian standpoint, military expenditure is conceptualised as a fiscal tool capable of stimulating aggregate demand and mobilising underutilised resources. Benoit's (1973, 1978) pioneering cross-country studies on 44 developing economies (1950–1965) reported a positive association between defence spending and growth, attributing the effect to employment creation, infrastructure development, and research and development activities. Lloyd (1983) expanded this view by showing, through macro-simulation methods, that defence spending can raise capacity utilisation and consumption via multiplier effects. Chan (1988) underscored the technological dimension, documenting how military R&D produced dual-use innovations—such as radar and jet propulsion—that later diffused into civilian sectors. Subsequent studies reinforced this bidirectional relationship: Dunne and Watson (2005) introduced the notions of "spin-in"

and “spin-off” effects, illustrating technology flows between defence and civilian industries; Hirnissa et al. (2009) found that increased defence spending stimulated short-term output in ASEAN countries through domestic demand and investment channels and Mayer (2018) provided recent evidence from U.S. innovation systems showing that defence-origin technologies such as the Internet and GPS generated substantial spillover benefits for the broader economy.

However, Classical, Neoclassical and endogenous growth frameworks emphasise the opportunity costs associated with higher defence spending. Eisenhower’s (1953) early warning about the “military–industrial complex” encapsulated the fundamental “guns versus butter” dilemma, highlighting the tension between defence commitments and social welfare needs. De Grasse (1983) and Goertzel (1985) argued that large military budgets redirect scarce capital and labour away from productive sectors like education, health, and infrastructure. Building on Feder’s (1983) dual-sector model, Biswas and Ram (1986) showed that defence expenditure can crowd out private investment, thereby constraining capital accumulation. Huang and Mintz (1990) demonstrated that tax burdens required to finance defence budgets can weaken private-sector incentives for productivity and innovation, while Barro (1991) provided cross-country evidence that persistent defence spending lowers investment efficiency and long-run growth. Poole and Bernard (1992) further documented that heavy reliance on arms imports exacerbates external debt and trade imbalances in developing economies. Ulaş (2010) reached similar conclusions for Türkiye, finding negative fiscal and growth effects linked to high defence expenditure. Koch (2012) revisited the post–Cold War “peace dividend” argument, suggesting that redirecting defence resources towards human capital and infrastructure yields superior long-term developmental outcomes.

The empirical evidence on the defence–growth nexus remains highly heterogeneous, largely due to variations in sample selection, methodological approaches, temporal coverage and institutional contexts. A concise overview of the major empirical contributions is presented in Table 1.

Table 1: An Overview of the Recent Literature on Military Expenditures and Economic Growth

Author(s)	Country	Period	Methodology	±
Benoit (1973, 1978)	44 LDCs	1950-1965	Traditional Reg. & Correlation	+
Smith (1980)	14 OECD	1954-1973	Keynesian Inv. Demand Reg.	-
Lim (1983)	54 LDCs	1965-1973	Harrod-Domar Growth	-
Faini et al. (1984)	69 Cntrs.	1952-1970	Demand-Side Traditional	-
Biswas and Ram (1986)	58 LDCs	1960-1970	Feder-type 2-Sector	N/A
Biswas & Ram (1986)	58 LDCs	1970-1977	Feder-type 2-Sector	N/A
Değer (1986)	50 LDCs	1965-1973	Traditional 3-Equation Simultaneous	-
Landau (1986)	65 LDCs	1960-1980	Multivariate Traditional	N/A
Lebovic & Ishaq (1987)	20 LDCs	1973-1982	Traditional 3-Equation Simultaneous	-

Alexander (1990)	9 DCs	1974-1985	Feder-type 4-Sector	N/A
Landau (1993)	71 LDCs	1969-1989	Traditional Growth	+
Kusi (1994)	77 LDCs	1985-1990	Granger Causality	N/A
Ram (1995)	71 LDCs	1965-1990	Feder-type 2-Sector	-
Mintz & Stevenson (1995)	103 Cntrs.	1950-1985	Feder-type 3-Sector	N/A
Brumm (1997)	119 Cntrs.	1974-1989	Barro Reg., LISREL Reg.	-
Bayoumi et al. (1998)	LDCs	1980-1990	Variance-Covariance (VCA)	-
Dunne & Vougas (1999)	LDCs	1987-1989	Variance-Covariance (VCA)	-
Mylondis (2006)	NATO	1951-1998	Keynesian Model	-
Hirnissa (2009)	5 Cntrs.	1965-2006	ARDL and Dynamic OLS	N/A
Esgin (2010)	70 Cntrs.	1993-2005	Panel Data	+
Chang et al. (2011)	90 Cntrs.	1992-2006	Granger Causality, Dyn. Panel Data	-
Yıldırım et al. (2011)	90 Cntrs.	1992-2006	Panel Data	+
Dunne & Nikolaidou (2012)	15 EU	1961-2007	Panel Data, Solow-Swan Model	-
Chen et al. (2014)	137 Cntrs.	1988-2005	Panel Data	+
Korkmaz (2015)	10 Cntrs.	2005-2012	Panel Data	-
Dunne & Tian (2015)	106 Cntrs.	1988–2010	Panel Data	-
Karadam et al. (2016)	11 Cntrs.	1988-2012	Nonlinear Panel Data	+
Mangır&Kabaklarlı (2016)	16 Cntrs.	1991-2013	Panel Data	-
Arshad et al. (2017)	61 Cntrs.	1988-2015	Cross-Sectional &Panel Data	-
Tuncay (2017)	8 Cntrs.	1996-2014	Panel Data	-
Eroglu (2018)	NATO	2005-2016	Dynamic Panel Data	+
Sağdıç et al. (2019)	EU	2005-2017	Cointegration and Causality	+
Solar (2022)	DCs&D_ing	2001-2019	Panel Quantile Regression	N/A.
Raifu et al. (2023)	14 MENA	1981-2019	MM-QR	+
Bran (2023)	46 Cntrs.	1960-2014	Panel Data	N/A
Demirci & Ayyıldız (2023)	MIST	1990-2021	Panel Cointegration and Causality Test	+
Geng et al. (2023)	48 Muslim	1990-2018	Panel Data	-

Note: The abbreviations are as follows: VCA; Variance-Covariance Analysis, FMOLS; Fully Modified Ordinary Least Squares, ECM; Error Correction Model, VAR; Vector Autoregression, LDCs; Less Developed Countries, DCs; Developed Countries, D_ing; Developing Countries, MENA; Middle East and North Africa, ARDL; Autoregressive Distributed Lag Model, GMM; Generalized Method of Moments, GLS; Generalized Least Squares, OLS; Ordinary Least Squares, QRM; Quantile Regression Model and MM-QR; Moment Quantile Regression, ±; Findings, +; Positive, -; Negative, N/A; Neutral.

III. MODEL, DATASET AND METHODOLOGY

3.1. Model

Understanding the economic effects of military expenditure remains challenging, as no single theory fully explains its interaction with growth. Approaches from Keynesian demand-side models to neoclassical and Feder–Ram production frameworks provide only partial insights. For global sample—where defence coordination meets diverse economic capacities and security risks—a unified framework is needed. Accordingly, this study applies an augmented Solow growth model integrating economic and security dynamics. This model isolates the impact of military spending from other public outlays and accounts for conflict intensity, capturing the

asymmetric effects of defence expenditure arising from differing threat environments and alliance-based burden-sharing.

The empirical specification builds on the Solow (1956) model, later augmented by Mankiw, Romer, and Weil (1992) through the inclusion of human capital alongside physical capital and labour to better explain cross-country income differences.

$$Y = f(K, H, L, A) \tag{1}$$

Further, it was included defence and public spending (except military expenditures) as distinct components of government activity, then included trade openness as well. The baseline model for country i, at time t can be expressed as:

$$Y_{i,t} = C + \beta_1 ME_{i,t} + \beta_2 GE_{i,t} + \beta_3 CAP_{i,t} + \beta_4 LAB_{i,t} + \beta_5 T_{i,t} + \beta_6 TO_{i,t} + \varepsilon_{i,t} \tag{2}$$

To capture the conditional nature of defence spending under varying security conditions, the model incorporates an interaction term of conflict between military expenditure and conflict intensity:

$$Y_{i,t} = C + \beta_1 (Conf * ME)_{i,t} + \beta_2 GE_{i,t} + \beta_3 CAP_{i,t} + \beta_4 LAB_{i,t} + \beta_5 T_{i,t} + \beta_6 TO_{i,t} + \varepsilon_{i,t} \tag{3}$$

Here, all variables are in natural logarithms except for the ME and interaction term of Conf*ME, allowing elasticities to be directly interpreted as percentage effects on economic growth.

$$lnY_{i,t} = C + \beta_1 ME_{i,t} + \beta_2 lnGE_{i,t} + \beta_3 lnCAP_{i,t} + \beta_4 lnLAB_{i,t} + \beta_5 lnT_{i,t} + \beta_6 lnTO_{i,t} + \varepsilon_{i,t} \tag{4}$$

$$lnY_{i,t} = C + \beta_1 (Conf * ME)_{i,t} + \beta_2 lnGE_{i,t} + \beta_3 lnCAP_{i,t} + \beta_4 lnLAB_{i,t} + \beta_5 lnT_{i,t} + \beta_6 lnTO_{i,t} + \varepsilon_{i,t} \tag{5}$$

3.2. Dataset

The dataset includes all countries with consistent data for 2007–2022. The dependent variable Y represents real GDP (constant 2015 USD), obtained from the World Development Indicators (WDI). The key independent variable, ME, denotes military expenditure—current and capital outlays on the armed forces, including peacekeeping—expressed as a share of GDP, sourced from SIPRI via WDI. Non-military government expenditure (GE) is calculated as total public spending minus military spending, representing civilian goods and services in constant 2015 USD. Real gross fixed capital formation (CAP) measures productive investment, while LAB captures the total labour force aged 15 and above, excluding unpaid and military personnel. Technological capability (T) by real high-technology exports, deflated using the UNCTAD export price index (2015=100). Trade openness (TO) equals the sum of exports and imports as a percentage of GDP, reflecting global integration. The conflict variable

(Conf) derives from the Global Peace Index (GPI), where higher values indicate greater conflict intensity. Finally, the interaction term (Conf*ME) assesses how the growth impact of military expenditure varies with security conditions across global economies. The descriptive statistics for the variables included in the model are presented in Table 2.

Table 2: Descriptive Statistics for All Variables

Statistics	lnY	ME	lnGE	lnCAP	lnLAB	lnT	lnTO	Conf	Conf * ME
Mean	25.47	1.87	23.55	23.99	15.75	20.14	4.33	1.93	3.81
Median	25.29	1.41	23.32	23.88	15.53	20.17	4.30	1.93	2.72
Max.	30.70	13.02	29.42	29.65	20.48	27.25	6.08	3.28	26.59
Min.	21.32	0.00	20.12	19.60	12.04	11.89	3.10	1.15	0.00
Std.Dev.	1.85	1.47	1.92	1.87	1.50	3.37	0.52	0.40	3.51
Skewness	0.32	2.54	0.40	0.36	0.43	-0.02	0.37	0.40	2.48
Kurtosis	2.50	12.32	2.44	2.56	3.42	2.08	3.15	2.91	10.78
Jarque-Bera	46.46	7824.08	66.75	49.45	62.90	58.92	39.33	45.77	5910.78
Prob.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Obs.	1664	1664	1664	1664	1664	1664	1664	1664	1664

Note: Statistical significance levels are denoted by ***, ** and * for 1%, 5%, and 10% significance levels, respectively.

Table 2 reveals substantial cross-country variation in both macroeconomic and defence-related variables within the expanded sample of 104 countries. While core macroeconomic indicators such as lnY, lnGE, lnCAP, and lnLAB exhibit relatively stable central tendencies, their wide minimum–maximum ranges—especially for lnGE, lnCAP, and lnT—indicate significant heterogeneity in government spending, capital accumulation, and technological efficiency. In contrast, lnTO and Conf display more limited dispersion, reflecting comparatively stable levels of trade openness and conflict intensity. Defence-related variables show far greater variability: ME ranges from 0 to 13.02, and the interaction term Conf*ME reaches a maximum of 26.59, signalling the presence of extreme observations driven by concentrated military spending and conflict episodes. Skewness and kurtosis values confirm these asymmetries, with ME and Conf*ME displaying pronounced right-skewness and highly leptokurtic distributions, in contrast to the more moderate distributional patterns of macroeconomic indicators. The Jarque–Bera statistics further indicate significant departures from normality for all variables at the 1% level, underscoring the non-normal distributional structure of the dataset and the need for robust estimation techniques in subsequent empirical analysis.

The correlation matrices for the variables included in Table 3.

Table 3: Correlation Matrix of the Variables

Variables	lnY	ME	lnGE	lnCAP	lnLAB	lnT	lnTO	Conf
lnY	1.00							
ME	0.20	1.00						
lnGE	0.99	0.20	1.00					
lnCAP	0.99	0.18	0.98	1.00				
lnLAB	0.85	0.36	0.83	0.86	1.00			
lnT	0.86	0.04	0.87	0.86	0.64	1.00		
lnTO	-0.42	-0.50	-0.42	-0.42	-0.64	-0.08	1.00	
Conf	-0.25	0.34	-0.28	-0.24	0.05	-0.47	-0.25	1.00

Table 3 reports the correlation structure among the variables and shows that the macroeconomic indicators exhibit exceptionally strong and near-perfect positive associations. lnY, lnGE, and lnCAP are almost perfectly correlated with one another ($r \approx 0.98–0.99$), indicating that output, government expenditure, and capital accumulation move very closely together across countries. lnLAB is also highly correlated with these core indicators (0.83–0.86), suggesting that labor input evolves consistently with other growth fundamentals. Likewise, lnT displays strong positive correlations with lnY, lnGE, and lnCAP (0.86–0.87), reflecting a tight linkage between technological progress and macroeconomic performance. In contrast, military expenditure (ME) shows only weak correlations with macroeconomic variables (around 0.18–0.20), while its moderate positive association with Conf (0.34) suggests that conflict intensity is partially related to defence spending. lnTO is negatively correlated with most variables, particularly lnLAB (–0.64), lnY and lnGE (–0.42), and Conf (–0.25), indicating that greater trade openness tends to align with lower labor intensity, reduced macroeconomic size, and lower conflict levels. Conf itself is negatively correlated with most macroeconomic indicators and lnT, reflecting the disruptive nature of conflict on economic activity and technological progress. Overall, the matrix reveals strong multicollinearity among macroeconomic fundamentals, whereas military expenditure, trade openness, and conflict intensity exhibit more independent and heterogeneous correlation patterns.

3.3. Methodology

This study examines the impact of military expenditure on economic growth within an augmented Solow framework, drawing theoretical inspiration from Mowlaei and Golkhandan (2015), Dunne (2005), and Arshad et al. (2017). The empirical analysis follows a sequential econometric strategy, with each methodological choice tailored to the statistical properties of the panel of 104 countries.

The first stage evaluates whether cross-sectional dependence is present by applying the Pesaran CD test (Pesaran, 2004) and the Breusch–Pagan LM statistic (Breusch & Pagan, 1980). These diagnostics determine

whether shocks in one country are correlated with disturbances in others. The null of cross-sectional independence is rejected in both cases, implying that the economies in the sample are influenced by common global factors and are not statistically isolated. This outcome necessitates the use of second-generation panel methods that explicitly account for such interdependencies (Pesaran, 2015; Chudik & Pesaran, 2015). To verify whether slope coefficients are homogeneous across units, the Pesaran–Yamagata (2008) test was employed. The rejection of the null confirms substantial heterogeneity in the behavioural responses of countries—an expected finding given the economic, institutional, and structural differences among the 104 economies. Given the presence of cross-sectional dependence, the stationarity of the variables was examined using the CIPS unit root test proposed by Pesaran (2007), which extends the IPS approach by incorporating cross-sectional averages. The results indicate that all series are stationary in levels.

For the estimation phase, the analysis employs Panel Quantile Regression (PQR), which builds on the quantile regression methodology introduced by Koenker and Bassett (1978). In contrast to OLS or ARDL-type models, PQR allows the estimated impact of military expenditure to vary across different points of the conditional income distribution, thereby capturing heterogeneous effects across countries at different stages of development. This technique is robust to deviations from normality, outliers, heteroskedasticity, and asymmetric error terms—characteristics commonly found in diverse international panels (Koenker, 2005; Lamarche, 2010). To obtain reliable inference, standard errors were generated through the bootstrap approach of Efron and Tibshirani (1993), which performs well in the presence of cross-sectional dependence and finite sample sizes (Buchinsky, 1995; Lamarche, 2010). The presence of distributional heterogeneity was further examined through the Quantile Slope Equality test, which evaluates whether slope coefficients differ across quantiles. Rejection of the null confirms statistically meaningful variation in the military-expenditure–growth relationship across the income distribution, validating the use of a quantile-based estimator (Koenker & Bassett, 1978). The modelling framework does not include explicit country or time fixed effects, since the focus is on differences across quantiles rather than within-country dynamics. The approach assumes a shared underlying production structure among the 104 countries—consistent with the augmented Solow growth model (Barro & Sala-i-Martin, 2004)—while permitting heterogeneity to emerge through the quantile dimension.

IV. FINDINGS

4.1. Testing Cross-sectional Dependence

In panel data analyses, cross-sectional dependence should be tested before examining the existence of cointegration. The choice of test depends on whether the cross-sectional units are assumed to be homogeneous or heterogeneous. This study employed the Pesaran CD (2007) and Breusch–Pagan (1980) Lagrange Multiplier (LM) tests to assess cross-sectional dependence. The null hypothesis (H_0) of both tests assumes no cross-sectional dependence among units. In these tests, N denotes the cross-sectional dimension of the panel, while T represents the time dimension. For the sample, the Pesaran CD (2007) test was applied because T (16) > N (104) in the dataset.

Table 4: Results of the Cross-Sectional Dependence (CD Test)

Variables	Pesaran CD (2007)	Breusch-Pagan LM (1980)
lnY	238.67***	64551.47***
ME	18.41***	17336.82***
lnGE	178.53***	51199.30***
lnCAP	121.80***	34002.64***
lnLAB	134.75***	53596.79***
lnT	8.70***	14912.45***
lnTO	59.07***	23854.53***
Conf*ME	16.53***	17373.01***

Note: Statistical significance levels are denoted by ***, ** and * for 1%, 5%, and 10% significance levels, respectively.

As shown in Table 4, the dataset exhibited cross-sectional dependence, as the null hypothesis of no dependence was rejected at the 1% significance level according to the Pesaran CD (2007) test.

4.2. Testing the Homogeneity of the Cointegration Coefficients

The slope homogeneity test proposed by Pesaran and Yamagata (2008) was employed to examine whether the slope coefficients are homogeneous across cross-sectional units in the panel data models, under the assumption that all regression coefficients are identical across 104 countries.

Table 5: Results of the Homogeneity of the Cointegration Coefficients Test

Variables	T-statistics	Prob.
Δ	59.87	0.00***
Δ_adj	87.93	0.00***

Note: Statistical significance levels are denoted by ***, ** and * for 1%, 5%, and 10% significance levels, respectively.

As shown in Table 5, the probability values from the slope homogeneity test indicate that the null hypothesis of homogeneous slope

coefficients was rejected at the 1% significance level. These results confirm that both the constant term and the slope coefficients in the cointegration equation are heterogeneous across cross-sectional units.

4.3. Panel Unit Root Test

The stationarity properties of the variables were examined using the Pesaran CIPS test (Pesaran, 2007), a second-generation unit root procedure designed to accommodate cross-sectional dependence and heterogeneity in variance structures. As an advancement of the IPS framework, the CIPS test improves the reliability of unit root inference in panels where countries are interconnected. Under the null hypothesis, H_0, all series are assumed to contain a unit root, while rejection of H_0 implies that the variables are stationary. The decision rules were based on the critical values provided by Pesaran (2007). The corresponding CIPS test results for the model are reported in Table 6.

Table 6: Results of Pesaran (2007) CIPS Test

T-statistics	lnY	ME	lnGE	lnCAP	lnLAB	lnT	lnTO	Conf * ME
Deterministic								
None	-1.82***	-1.96***	-1.57***	-1.70***	-1.10	-1.68***	-1.79***	-1.87***
Constant	-2.01	-2.03	-2.13***	-2.26***	-1.44	-1.77	-1.61	-2.10**
Constant and trend	-3.13***	-3.56***	-3.01***	-4.63***	-4.53***	-30.33***	-2.15	-2.85***

Note: The symbols ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The CIPS test was conducted using a maximum lag length of 7, with model selection based on the Akaike Information Criterion (AIC). For the level form, the critical values for the model without constant or trend are −1.66, −1.52, and −1.44 at the 1%, 5%, and 10% significance levels, respectively. For the model with constant, the corresponding critical values are −2.19, −2.07, and −2.00, while for the model with constant and trend, the critical values are −2.74, −2.60, and −2.52 at the 1%, 5%, and 10% significance levels, respectively.

Table 6 reports the results of the Pesaran (2007) CIPS unit root test under three different deterministic specifications. In the model without constant or trend, most variables—including lnY, ME, lnGE, lnCAP, lnT, lnTO, and Conf*ME—reject the null hypothesis of a unit root at the 1% level, as their test statistics exceed the critical value of –1.66. Only lnLAB fails to reject the null, indicating non-stationarity in the absence of deterministic components. When a constant is introduced, lnGE and lnCAP remain strongly stationary at the 1% level, while Conf*ME becomes stationary at the 5% level. However, lnY, ME, lnLAB, lnT, and lnTO do not surpass their corresponding critical thresholds, suggesting that these series remain non-stationary under the constant-only specification. Once both constant and trend are included, the majority of the variables—lnY, ME, lnGE, lnCAP, lnLAB, lnT, and Conf*ME—become highly stationary at the 1% significance level, with test statistics more negative than the critical

value of –2.74. lnTO, however, does not reject the null in this specification, indicating a lack of stationarity even after controlling for trend dynamics. Overall, the findings show that incorporating deterministic components substantially strengthens evidence of stationarity, and all variables achieve stationarity.

4.4. Quantile Slope Equality Test for PQR

The quantile slope equality test, implemented as a parametric Wald-type procedure, was used to determine whether the coefficients obtained from the quantile regression models remain stable across different points of the conditional income distribution. Drawing on the quantile regression framework of Koenker and Bassett (1978) and the classical parameter restriction testing approach introduced by Wald (1943), the test examines the null hypothesis (H_0) that slope coefficients are identical across quantiles. The statistic follows a chi-square (χ^2) distribution and is computed by comparing the coefficient vectors estimated at various quantiles. A p-value below the conventional 5% threshold leads to the rejection of H_0, signalling that the estimated coefficients vary significantly across quantiles. This outcome indicates that the effects of the explanatory variables are not constant throughout the income distribution, underscoring the value of quantile regression in detecting distributional heterogeneity that cannot be observed through mean-based estimators. The full results of the test are presented in Table 7.

Table 7: Results of Quantile Slope Equality Test for PQR

Model	χ^2 statistic	Prob.
Model 1 (104 Countries) (ME)	43.05	0.00***
Model 2 (104 Countries) (Conf*ME)	54.77	0.00***

Note: Statistical significance levels are denoted by ***, ** and * for 1%, 5%, and 10% significance levels, respectively.

Table 7 presents the outcomes of the Quantile Slope Equality Test for the PQR models estimated for the panel of 104 countries. The χ^2 statistics for both Model 1 (ME) and Model 2 (Conf*ME) are highly significant at the 1% level, with values of 43.05 and 54.77, respectively. These strongly significant statistics lead to a decisive rejection of the null hypothesis that slope coefficients are equal across quantiles. The findings point to pronounced heterogeneity in the effects of military expenditure and the interaction between conflict and military spending across the conditional income distribution. This implies that the influence of ME and Conf*ME is not uniform across countries at different points of the distribution but instead varies systematically depending on the quantile considered. Such robust cross-quantile variation highlights the need to account for heterogeneous marginal effects when examining how military spending and conflict-related dynamics shape economic performance in a broad international context.

4.4.1. Model 1 (104 Countries) (ME)

The results of the estimation Model 1 are reported in Table 8.

Table 8: Results of Estimation Model 1

	τ	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
ME	Co.	-0.0227	-0.0157	-0.0127	-0.0096	-0.0098	-0.0097	-0.0105	-0.0102	0.0117
	S.E.	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	T-s.	-3.04	-2.94	-2.91	-2.51	-2.43	-2.37	-2.98	-2.71	-0.57
	Pr.	0.00***	0.00***	0.00***	0.01**	0.02**	0.02**	0.00***	0.01**	0.57
lnGE	Co.	0.20	0.24	0.28	0.29	0.28	0.28	0.27	0.28	0.31
	S.E.	0.04	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.02
	T-s.	4.41	6.50	9.93	13.98	11.42	13.03	18.94	20.78	14.70
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
lnCAP	Co.	0.72	0.66	0.63	0.62	0.63	0.64	0.65	0.64	0.63
	S.E.	0.05	0.04	0.03	0.02	0.03	0.02	0.01	0.02	0.03
	T-s.	13.08	16.99	21.86	27.11	25.01	30.05	47.56	36.07	19.74
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
lnLAB	Co.	-0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06
	S.E.	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	T-s.	-0.95	1.66	3.35	4.93	3.48	4.44	5.34	4.28	3.38
	Pr.	0.34	0.10	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
lnT	Co.	0.05	0.05	0.04	0.03	0.03	0.03	0.02	0.02	0.01
	S.E.	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01
	T-s.	9.00	8.57	7.06	6.77	7.09	6.70	5.60	4.29	2.23
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.03**
lnTO	Co.	-0.21	-0.18	-0.14	-0.14	-0.12	-0.09	-0.07	-0.06	-0.03
	S.E.	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	T-s.	-5.27	-7.68	-6.29	-7.28	-5.00	-4.70	-3.22	-2.85	-1.21
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.23
C	Co.	3.63	3.40	3.09	3.19	3.10	2.90	2.75	2.77	2.39
	S.E.	0.40	0.21	0.18	0.17	0.16	0.14	0.15	0.18	0.28
	T-s.	9.03	15.98	16.84	18.45	19.40	21.44	18.13	15.76	8.46
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***

Note: ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The abbreviations are as follows: τ; income quantile, Co.; Coefficient, S.E.; Standard Error, T-s.; T-statistics, Pr.; Probability.

Table 8 presents the Panel Quantile Regression results for Model 1, examining how military expenditure influences economic growth across the income distribution (τ = 0.1–0.9) for a global sample of 104 countries. The coefficients of military expenditure (ME) are negative and statistically significant across almost all quantiles up to τ = 0.8, with values ranging from –0.0227 to –0.0097. These findings indicate that higher military spending tends to reduce economic growth for the majority of countries, especially those situated at the lower and middle quantiles of the income distribution. Only at the highest quantile (τ = 0.9) does the coefficient become

statistically insignificant, suggesting that very high-income countries may be less affected by the growth-reducing impact of defence spending. This pattern implies that military expenditure may crowd out productive investment, divert public resources, or generate inefficiencies particularly in lower- and middle-income economies.

Among the control variables, lnGE is positive and highly significant across all quantiles, confirming that public spending plays a consistently supportive role in fostering economic growth across diverse income levels. lnCAP exhibits strong and stable positive effects in every quantile, with coefficients ranging from 0.62 to 0.72, underscoring its central importance as a driver of economic performance. The coefficient of lnLAB is negative and insignificant at the lowest quantile ($\tau = 0.1$) but becomes positive and statistically significant from $\tau = 0.3$ onwards, suggesting that labour input contributes more effectively to economic expansion in middle- and higher-income countries, where labour markets may be more efficient and better integrated into production processes. In contrast to many empirical expectations, lnT (high technology exports) shows consistently positive and significant coefficients throughout the entire distribution, indicating that improvements in technological capability stimulate growth regardless of a country's position in the global income spectrum. This suggests that technological progress yields broad productivity gains across the sample of 104 countries. lnTO, however, displays a uniformly negative relationship with growth across most quantiles, particularly at the lower end of the distribution ($\tau \leq 0.4$), where the negative and significant coefficients (from –0.21 to –0.14) suggest that openness may expose developing economies to external vulnerabilities, competitive pressures, or structural trade imbalances. Although the negative magnitude gradually weakens at higher quantiles and becomes statistically insignificant at $\tau = 0.9$, the overall pattern indicates that trade openness may not uniformly benefit all countries, especially those with less diversified economic structures. The constant term remains positive and highly significant across all quantiles, indicating a strong baseline growth level within the sample after accounting for the included explanatory variables.

Overall, the results from Table 8 reveal substantial distributional heterogeneity in the determinants of economic growth across 104 countries. Military expenditure appears to impose a growth-reducing effect for most of the income distribution, while capital accumulation, public expenditure, labour, and technology consistently promote growth. Trade openness shows a predominantly negative influence, highlighting the asymmetric structural conditions that shape its economic impact in the global context.

*4.4.2. Model 2 (104 Countries) (Conf*ME)*

The results of the estimation Model 2 are reported in Table 9.

Table 9: Results of Estimation Model 2

	τ	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
ME	Co.	-0.0946	-0.0991	-0.0814	-0.0709	-0.0749	-0.0735	-0.0818	-0.1024	0.0276
	S.E.	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.04	0.03
	T-s.	-3.77	-6.56	-5.81	-6.26	-6.85	-3.83	-3.30	-2.58	-5.70
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.01**	0.00***
Conf*ME	Co.	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.07
	S.E.	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.02	0.01
	T-s.	3.36	6.22	5.58	5.75	5.29	3.04	2.75	2.19	5.58
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.01**	0.03**	0.00***
lnGE	Co.	0.21	0.26	0.29	0.28	0.28	0.29	0.29	0.29	0.29
	S.E.	0.05	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.02
	T-s.	4.57	8.19	11.50	15.38	15.15	15.70	20.40	16.43	12.82
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
lnCAP	Co.	0.71	0.66	0.63	0.64	0.64	0.63	0.64	0.64	0.64
	S.E.	0.05	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.03
	T-s.	13.77	21.05	24.01	29.13	30.06	34.00	50.30	33.12	24.16
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
lnLAB	Co.	-0.02	0.01	0.02	0.02	0.02	0.04	0.05	0.05	0.05
	S.E.	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	T-s.	-1.22	0.82	2.44	3.24	2.61	3.78	4.45	4.30	2.80
	Pr.	0.22	0.42	0.01**	0.00***	0.00***	0.00***	0.00***	0.00***	0.01**
lnT	Co.	0.05	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02
	S.E.	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
	T-s.	7.44	8.75	7.63	6.17	7.40	4.90	4.67	3.07	3.27
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
lnTO	Co.	-0.20	-0.16	-0.13	-0.12	-0.11	-0.08	-0.06	-0.05	-0.01
	S.E.	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
	T-s.	-5.60	-7.91	-7.91	-6.82	-5.92	-3.43	-2.66	-2.02	-0.48
	Pr.	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.01**	0.04**	0.63
C		3.58	3.25	3.06	3.03	3.09	2.80	2.71	2.67	2.39
		0.37	0.18	0.15	0.16	0.17	0.18	0.18	0.19	0.28
		9.71	18.35	20.98	18.47	18.33	15.57	15.32	14.22	8.57
		0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***

Note: ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The abbreviations are as follows: τ; income quantile, Co.; Coefficient, S.E.; Standard Error, T-s.; T-statistics, Pr.; Probability.

Table 9 presents the Panel Quantile Regression results for Model 2, which incorporates both military expenditure (ME) and its interaction with conflict intensity (Conf*ME) across income quantiles (τ = 0.1–0.9). Similar to Model 1, the coefficient of ME is negative and highly significant across nearly all quantiles, ranging from –0.0991 to –0.0709 up to τ = 0.8. These results indicate that higher military expenditure is generally associated with lower economic growth, particularly among low- and middle-income countries where budgetary constraints, inefficient allocation of defence resources, and institutional weaknesses may intensify the growth-reducing effects. At the highest quantile (τ = 0.9), however, the ME coefficient

becomes positive but statistically insignificant, suggesting that economic structures in the highest-income group may be sufficiently robust to absorb or offset the adverse effects of defence spending.

In contrast, the interaction term Conf*ME displays positive and significant coefficients across all quantiles, increasing in magnitude toward the upper quantiles and reaching 0.07 at $\tau = 0.9$. This result indicates that in contexts where military expenditure occurs alongside conflict exposure, its effect on economic growth becomes less negative or even growth-enhancing, likely due to increased security-related investment, reconstruction spending, and mobilization of domestic industries during conflict episodes. The consistent positive sign across the distribution shows that the interaction between conflict and defence spending systematically alters the growth dynamics, especially in higher-income countries that may possess stronger institutional capacity to channel defence spending into productive sectors during conflict situations.

The control variables largely match the expected patterns in growth theory. lnGE remains positive and highly significant across all quantiles, reinforcing the stabilizing and growth-supportive role of fiscal spending in diverse economic settings. lnCAP continues to be the strongest predictor of growth, with coefficients consistently around 0.63–0.71 and extremely high significance. This highlights the centrality of investment and capital deepening for long-term economic expansion. The effect of lnLAB varies across the distribution: it is statistically insignificant and slightly negative at the lowest quantile ($\tau = 0.1$) but becomes positive and significant from $\tau = 0.3$ onward. This suggests that labour contributes more effectively to growth in mid- and high-income countries, likely reflecting differences in labour productivity, human capital, and labour market efficiency. lnT remains positive and strongly significant across all quantiles, indicating that technological improvements exert a uniform and robust growth-enhancing influence across the entire distribution of countries. Finally, lnTO remains negative across nearly all quantiles, with the largest negative effects concentrated at the lower end of the distribution (–0.20 at $\tau = 0.1$ and –0.16 at $\tau = 0.2$). Although the magnitude of the negative effect diminishes as income increases and becomes insignificant at $\tau = 0.9$, the overall pattern suggests that trade openness may expose lower-income countries to external vulnerabilities, competitive pressures, and structural trade inequalities. Higher-income countries, however, may be better positioned to manage and benefit from integration into global markets.

Overall, the results of Model 2 demonstrate substantial heterogeneity in the economic effects of military expenditure and conflict. While military spending alone tends to depress economic growth for most countries, its interaction with conflict appears to mitigate or reverse this effect. The strong and consistent significance of capital, public expenditure, labour, and

technology underscores their central role in shaping growth outcomes across the 104-country sample.

V. RESULTS AND DISCUSSION

This chapter analyses the relationship between military expenditure, conflict intensity, and economic growth across 104 countries using a Panel Quantile Regression (PQR) approach. Preliminary diagnostics revealed strong cross-sectional dependence and slope heterogeneity, indicating that countries are interconnected and structurally diverse. These findings justified the use of second-generation panel tests and a quantile-based estimation strategy capable of capturing distributional heterogeneity. The quantile slope equality tests further confirmed that the coefficients differ significantly across quantiles, reinforcing the appropriateness of the PQR method in analysing the non-uniform nature of the defence–growth relationship.

The results of Model 1 show that military expenditure exerts a negative and statistically significant impact on economic growth across nearly all income quantiles (τ = 0.1–0.8), turning insignificant only at the highest quantile (τ = 0.9). This implies that defence spending tends to constrain growth particularly in low- and middle-income countries, where the fiscal space is limited, and the opportunity cost of military investment is high. These findings contradict the early "Benoit Hypothesis" (Benoit, 1973; 1978), which claimed positive growth effects from military expenditure in developing countries but strongly align with the dominant empirical evidence documenting negative outcomes. Studies such as Lim (1983), Faini et al. (1984), Deger (1986), Ram (1995), Brumm (1997), Bayoumi et al. (1998), Dunne & Vougas (1999), Chang et al. (2011), Arshad et al. (2017), and Geng et al. (2023) similarly report that military expenditure crowds out productive public investment, limits capital formation, and reduces long-run output growth. Thus, the large global sample used in this study supports the modern consensus that military expenditure is generally growth-reducing rather than growth-enhancing.

The behaviour of the control variables in Model 1 is fully consistent with the augmented Solow framework. lnGE is positive and significant in all quantiles, confirming results from studies that emphasise the growth-promoting role of productive fiscal spending. lnCAP is the strongest contributor to growth across the entire distribution, echoing classical findings by Barro (1991) and Mankiw, Romer & Weil (1992). lnLAB becomes growth-enhancing only from the middle quantiles upward, a pattern that mirrors development literature showing that labour productivity and human capital matter more at higher levels of income. lnT exerts a uniformly positive effect, aligning with evidence that innovation and technological upgrading are critical determinants of global growth performance. Finally, lnTO has a negative impact in lower quantiles, consistent with arguments by

Rodrik (1998) that premature liberalisation can harm developing economies lacking competitive industries, although this effect weakens in higher-income segments. Overall, Model 1 suggests that while core growth determinants operate as expected, military expenditure remains a major constraint on economic performance for most countries.

Model 2 incorporates the interaction between military expenditure and conflict intensity, revealing that conflict significantly alters the defence–growth relationship. The direct effect of military expenditure remains negative and highly significant across almost all quantiles, consistent with Model 1 and the broader literature documenting the adverse growth consequences of defence spending. However, the interaction term Conf*ME is positive and statistically significant in every quantile, increasing toward the upper end of the distribution. This indicates that under higher levels of conflict, the negative impact of military expenditure becomes less severe and can even generate short-term growth effects. These results are consistent with Dunne & Nikolaidou (2012) and Dunne & Tian (2013), who argue that conflict-period defence expenditure may create temporary increases in output through demand, mobilisation, emergency procurement, and reconstruction activities, though such effects are not sustainable. Thus, Model 2 confirms that while military spending is detrimental to growth in peacetime, conflict conditions can modify—though not reverse—the overall negative relationship by temporarily stimulating economic activity.

The control variables in Model 2 maintain the same patterns observed in Model 1, underscoring the robustness of the estimation. lnGE and lnCAP remain strong and significant growth determinants across all quantiles, consistent with long-standing evidence on their foundational role in economic performance. lnLAB input again contributes positively from middle quantiles upward, reflecting productivity differences across countries. lnT continues to exhibit a universally positive impact, supporting literature that emphasises innovation as a cross-cutting driver of growth. lnTO remains negative at lower quantiles, weakening as income rises and becoming insignificant for the highest quantile, suggesting that integration into global markets is more beneficial for countries with stronger industrial and institutional structures.

When combined, the results of Models 1 and 2 demonstrate that the defence–growth relationship is neither uniform nor constant but varies systematically with countries' income levels, institutional capabilities, and conflict environments. The negative effect of military expenditure observed across most quantiles aligns with the overwhelming majority of empirical studies conducted over the past four decades, reinforcing the view that defence spending imposes substantial opportunity costs for developing and emerging economies. The divergence from Benoit's early positive findings suggests that the global economy has shifted: modern defence sectors are capital-intensive, technologically complex, and frequently import-dependent,

reducing their capacity to generate broad-based growth. At the same time, the positive interaction effect between conflict and military expenditure is consistent with studies that document short-run stimulatory effects of wartime spending, while recognising that such gains dissipate in the long term. As such, this study supports the contemporary view that defence spending is growth-reducing in general but can have transient, conflict-driven effects that temporarily alter the relationship.

Overall, the findings of this chapter show that military expenditure cannot be assumed to promote economic growth; its impact is negative for most countries and most points of the income distribution. Conflict intensity modifies this relationship, but only by providing temporary demand-driven relief rather than sustainable long-run gains. The results highlight the need for differentiated, context-sensitive defence policy frameworks. Low-income economies face high opportunity costs and should prioritise fiscal sustainability and productive public investment. Middle-income countries must integrate defence spending with industrial upgrading and dual-use innovation policies to avoid reinforcing structural traps. High-income economies, by contrast, can leverage advanced defence industries for technological spillovers. For conflict-affected states, defence budgets should remain temporary and rule-based, with clear post-conflict adjustment mechanisms. In sum, this chapter demonstrates that the defence–growth relationship is heterogeneous, conditional, and deeply shaped by structural and institutional contexts—echoing, extending, and clarifying the mixed findings in the existing literature.

VI. REFERENCE

Alexander, W. R. J. (1990). The impact of defence spending on economic growth. Defence Economics, 2(1), 39.

Arshad, A., Syed, S. H., & Shabbir, G. (2017). Military expenditure and economic growth: A panel data analysis. Forman Journal of Economic Studies, 13, 161-175.

Barro, R. J., & Sala-i-Martin, X. (2004). *Economic growth* (2nd ed.). MIT Press.

Barro, R. J. (1991). *Economic growth in a cross section of countries. Quarterly Journal of Economics*, 106(2), 407–443. https://doi.org/10.2307/2937943

Bayoumi, T., Hewitt, D., & Symansky, S. (1998). The impact of worldwide military expenditure cuts on developing countries. *Journal of Policy Modeling, 20*(3), 261–303. https://doi.org/10.1016/S0161-8938(96)00088-9

Benoit, E. (1973). *Defense and economic growth in developing countries*. Lexington, KY: Lexington Books.

Benoit, E. (1978). Growth and defense in developing countries. *Economic Development and Cultural Change*, 26(2), 271-280. https://doi.org/10.1086/451015

Biswas, B., & Ram, R. (1986). Military expenditures and economic growth in less developed countries: An augmented model and further evidence. *Economic Development and Cultural Change*, 34(2), 361-372.

Bran, A.C. (2023). The efficiency of defence policies in terms of military expenditure in the context of the war in Ukraine. *Romanian Society for Economic Science, Revista Economica*, issue 01, March.

Breusch, T. S., & Pagan, A. R. (1980). *A simple test for heteroscedasticity and random coefficient variation. Econometrica*, 47(5), 1287–1294. https://doi.org/10.2307/1911963

Brumm, H. J. (1997). Military spending, government disarray, and economic growth: A cross-country empirical analysis. *Journal of Macroeconomics*, 19(4), 827–838.

Buchinsky, M. (1995a). *Estimating the asymptotic covariance matrix for quantile regression models: A Monte Carlo study.* Journal of Econometrics, 68(2), 303–338.

Chan, S. (1988). Defense burden and economic growth: Unraveling the Taiwanese enigma. *American Political Science Review*, 82(3), 913–920.

Chang, H.C., Huang, B.-N., & Yang, C.-W. (2011). Military expenditure and economic growth across different groups: A dynamic panel Granger-causality approach. *Economic Modelling*, 28(6), 2416-2423. https://doi.org/10.1016/j.econmod.2011.06.001

Chen, P. F., Lee, C. C., & Chiu, Y. B. (2014). The nexus between defense expenditure and economic growth: New global evidence. *Economic Modelling*, 36, 474-483.

Chudik, A., & Pesaran, M. H. (2015). *Common correlated effects estimation of heterogeneous dynamic panel data models with weakly exogenous regressors. Journal of Econometrics*, 188(2), 393–420. https://doi.org/10.1016/j.jeconom.2015.03.007

Degrasse, R. T. W. Jr. (1983). Military expansion, economic decline: The impact of military expenditure on U.S. economic performance. In M. A. Tepper, R. N. MacVicar, ve N. Karrer (Eds.), *Military expansion economic decline* (pp. 1-73). New York: M. E. Sharpe.

Değer, S. (1986). Economic development and defense expenditure. *Economic Development and Cultural Change*, 35(1), 179-196.

Demirci, O., & Ayyıldız, F. V. (2023). Jeopolitik Risklerin ve Savunma Harcamalarının İktisadi Büyümeyle İlişkisi: MIST Ülkeleri Örneği. *Fiscaoeconomia*, 7(3), 1929-1947. https://doi.org/10.25295/fsecon.1277050

Dunne, J. P. (2005). Military expenditure and development. In J. P. Dunne & E. Sköns (Eds.), *Understanding development: A global perspective on theory and practice* (pp. 220–241). Palgrave Macmillan.

Dunne, J. P., & Nikolaidou, E. (2012). Defence spending and economic growth in the EU15. *Defence and Peace Economics*, 23(6), 537-548.

Dunne, J. P., & Tian, N. (2013). Military expenditure and economic growth: A survey. *Economics of Peace and Security Journal*, 8(1), 5–11

Dunne, J. P., & Tian, N. (2015). Military expenditure, economic growth and heterogeneity. *Southern Africa Labour and Development Research Unit, Working Paper Series*, 95, 1-23.

Dunne, P., & Vougas, D. (1999). Military expenditure and economic growth in South Africa: A causal analysis. *The Journal of Conflict Resolution*, 43(4), 525-536.

Dunne, P., & Watson, D. (2000). Military expenditure and employment in South Africa. *Defence and Peace Economics*, 11(4), 587-596.

Efron, B., & Tibshirani, R. J. (1993). *An introduction to the bootstrap* (xvi, 436 pp.). Chapman & Hall. https://doi.org/10.1201/9780429246593

Eisenhower, D. D. (1953). *Annual Message to the Congress on the State of the Union* (State of the Union address). Washington, DC: U.S. Government.

Eroğlu, E. (2018). Savunma harcamalarının ekonomik büyümeye etkisi: NATO ülkeleri için dinamik panel veri analizi (Yayımlanmamış Doktora Tezi). *Çanakkale Onsekiz Mart Üniversitesi*, Çanakkale.

Esgin, Y. (2010). Savunma harcamaları ve ekonomik gelişme arasındaki ilişki: Silah ihracatçısı ve ithalatçısı ülkeler için panel veri yöntemi ile bir analiz (Yüksek Lisans Tezi). *Ege Üniversitesi Sosyal Bilimler Enstitüsü,* İzmir.

Faini, R., Annez, P., & Taylor, L. (1984). Defense spending, economic structure, and growth: Evidence among countries and over time. *Economic Development and Cultural Change*, 32(3), 487-498.

Feder, G. (1983). On exports and economic growth. *Journal of Development Economics*, 12(1-2), 59–73.

Geng, L., Abban & O. J., Hongxing, Y., et al. (2023). Do military expenditures impede economic growth in 48 Islamic countries? A panel data analysis with novel approaches. *Environmental Development and Sustainability*, 26, 18725–18759. https://doi.org/10.1007/s10668-023-03413-8

Goertzel, T. G. (1985). *Militarism as a sociological problem: The political sociology of U.S. military spending, 1951-1983.* In R. Braungart (Ed.), *Research in Political Sociology* (pp. 119-140). Greenwich, CT: JAI Press.

Hirnissa, M. T., Habibullah, M. S., & Baharom, A. H. (2009). Military expenditure and economic growth in ASEAN-5 countries. *Journal of Sustainable Development*, 2(2), 192-202.

Huang, C., & Mintz, A. (1990). Ridge regression analysis of the defense-growth tradeoff in the United States. *Defense and Peace Economics*, 2(1), 35-40.

IMF. (2024). *World Economic Outlook: Policy Pivot, Rising Threats.* Washington, DC: International Monetary Fund. https://www.imf.org/en/Publications/WEO

Karadam, D. Y., Yıldırım Öcal, J., & Öcal, N. (2017). *Military expenditure and economic growth in Middle Eastern countries and Turkey: A non-linear panel data approach.* Defence and Peace Economics, 28(6), 719-730. https://doi.org/10.1080/10242694.2016.1195573

Koch, S. J. (2012). The presidential nuclear initiatives of 1991-1992 (Technical report). *National Defense University*, Fort McNair, DC, Center for the Study of Weapons of Mass Destruction.

Koenker, R. (2005). *Quantile regression.* Cambridge University Press.

Koenker, R., & Bassett, G. (1978). *Regression quantiles. Econometrica*, 46(1), 33–50. https://doi.org/10.2307/1913643

Korkmaz, S. (2015). The effect of military expenditure on economic growth and unemployment in Mediterranean countries. *International Journal of Economics and Financial Issues*, 5(1), 273-280.

Kusi, N. K. (1994). Economic growth and defense spending in developing countries: A causal analysis. *The Journal of Conflict Resolution*, 38, 152-159.

Lamarche, C. (2010). *Robust penalized quantile regression estimation for panel data. Journal of Econometrics*, 157(2), 396–408. https://doi.org/10.1016/j.jeconom.2010.01.003

Landau, D. L. (1986). Government and economic growth in the less developed countries: An empirical study for 1960-1980. *Economic Development and Cultural Change*, 35(1), 35-75.

Landau, D. L. (1993). The economic impact of military expenditures (Vol. 1138). World Bank Publications.

Lebovic, J. H., & Ishaq, A. (1987). Military burden, security needs, and economic growth in the Middle East. *Journal of Conflict Resolution*, 31(1), 106–138.

Lim, D. (1983). Another look at growth and defense in less developed countries. *Economic Development and Cultural Change*, 31, 377-384.

Lloyd, P. J. (1983). The economic effects of military expenditures. *The Economic Journal*, 93(369), 679-693.

Mangır, F., & Kabaklarlı, E. (2016). The relationship between public sector revenues and expenditures in Turkey. *Journal of Life Economics*, 3(4), 143-150. https://doi.org/10.15637/jlecon.155

Mankiw, N. G., Romer, D., ve Weil, D. N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics, 107*(2), 407-437. https://doi.org/10.2307/2118477

Mayer, M. (2018). *The global military-industrial complex*. Cham, Switzerland: Palgrave Macmillan.

Mintz, A., & Stevenson, R. T. (1995). Defense expenditures, economic growth, and the "peace dividend": A longitudinal analysis of 103 countries. *Journal of Conflict Resolution*, 39(2), 283-305. https://doi.org/10.1177/0022002795039002004

Mowlaei, M., & Golkhandan, A. (2015). Dynamic analysis of the impact of military expenditure on economic growth in oil and non-oil countries in the Middle East. *Iranian Economic Review*, 19(2), 238–250.

Mylonidis, N. (2006). Revisiting the nexus between military expenditure and growth in the European Union. Working paper.

http://www.econ.uoi.gr/working_papers/Military%20Spending%20and%20Growth.pdf

OECD. (2022). *The economic impact of defence expenditure.* OECD Publishing.

Pesaran, M. H., & Yamagata, T. (2008). Testing slope homogeneity in large panels. *Journal of Econometrics*, 142(1), 50–93. https://doi.org/10.1016/j.jeconom.2007.05.010

Pesaran, M. H. (2007). *A simple panel unit root test in the presence of cross-section dependence. Journal of Applied Econometrics*, 22(2), 265–312. https://doi.org/10.1002/jae.951

Pesaran, M. H. (2015). *Testing weak cross-sectional dependence in large panels. Econometric Reviews*, 34(6–10), 1089–1117. https://doi.org/10.1080/07474938.2014.956623

Poole, E., & Bernard, J. T. (1992). *Defence innovation stock and total factor productivity.* The Canadian Journal of Economics, 25(2), 440.

Raifu, I. A., & Aminu, A. (2023). The effect of military expenditure on economic growth in MENA: Evidence from method of moments quantile regression. *Future Business Journal*, 9(7). https://doi.org/10.1186/s43093-023-00181-9

Ram, R. (1995). Defence expenditure and economic growth. In T. Sandler (Ed.), *Handbook of Defence Economics*. Amsterdam: Elsevier.

Sağdıç, E. N., Tekin, A., & Yıldız, F. (2019). Savunma harcamalarının ekonomik büyüme üzerindeki etkisi: Seçilmiş AB ülkeleri üzerine eşbütünleşme ve nedensellik analizi. *Avrasya Bilimler Akademisi Sosyal Bilimler Dergisi*, 5(27), 104-124.

Sandler, T., & Hartley, K. (1995). *The economics of defense*. London: Cambridge University Press.

SIPRI. (2025). Military Expenditure Database. https://www.sipri.org/databases/milex/definitions.

Smith, R. P. (1980). Military expenditure and investment in OECD countries 1954–73. *Journal of Comparative Economics*, 4(1), 19–32.

Smith, J. (2020). *National security and defence economics: The role of military expenditure in modern states.* Cambridge University Press.

Solar, C. (2022). Thinking beyond averages: Quantile regression modelling and military expenditure. *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique*, 155(1), 82-105. https://doi.org/10.1177/07591063221103352

Solow, R. M. (1956). *A contribution to the theory of economic growth. Quarterly Journal of Economics*, 70(1), 65–94. https://doi.org/10.2307/1884513

Tuncay, Ö. (2017). Finansal serbestleşme sonrası dönem savunma harcamalarının ekonomik analizi. *Uluslararası Ekonomik Araştırmalar Dergisi*, 3(1), 23-37.

Ulaş, M. (2010). Savunma harcamalarının ekonomik etkisi (Yüksek Lisans Tezi). *Manas Üniversitesi Sosyal Bilimler Enstitüsü*, Bişkek.

Visual Capitalist. (2024). *Visualized: Global military expenditure as a share of GDP in 2024.* Visual Capitalist. https://www.visualcapitalist.com/visualized-global-military-spending-as-a-share-of-gdp-in-2024

Wald, A. (1943). *Tests of statistical hypotheses concerning several parameters when the number of observations is large.* Transactions of the American Mathematical Society, 54(3), 426-482. https://doi.org/10.1090/S0002-9947-1943-0012401-3

Yıldırım, J., Ocal, N., & Keskin, H. (2011). Military expenditures, economic growth and spatial spillovers: A global perspective. *The 5th World Conference of the Spatial Econometrics Association*, July 6-8, 2011, Toulouse, France.

Non-Enzymatic Sensors Based on Conductive Polymer Nanocomposites for Pesticide Detection

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ABSTRACT

Chemical waste can pollute water, soil, and air through factories, farms, wastewater treatment, and stormwater runoff. All forms of life are endangered due to this effect. The European Union has established criteria for pollutant levels in different kinds of waters to reduce and control water pollution. The analytical methods used to determine these criteria are expected to be fast and reliable. However, the most important requirement is the capacity to detect even the lowest levels of these chemical substances. One of the most critical groups of chemical substances that need to be identified are pesticides, which are used in agricultural applications to combat diseases, insects, and weeds. While some of the pesticides used are effective for their intended purpose, the remainder seep into the soil, harming groundwater and surface water. There is a need for real-time, on-site, simple, low-cost, highly accurate, and precise methods to monitor pesticide levels. Traditional methods used for pesticide determination impose limitations in terms of selectivity, efficiency, and sustainability. Due to the growing interest in methods capable of analyzing pesticides in the field, electrochemical sensors have begun to attract attention as an alternative to these methods. The selection and optimization of electrode surface modification materials for electrochemical sensors are also of great importance. Among the numerous existing modification materials, conductive polymers (CPs) and their (nano)composites not only possess conductivity but also retain the three-dimensional structural properties unique to polymers. Their large surface areas increase active sites for pesticide detection while facilitating rapid and efficient electron transfer. This study summarizes research on pesticide sensors that utilize CP composites, developed in recent years, as electrode modification materials due to their remarkable properties.

Keywords – Conducting Polymer, (Nano)Composite, Sensor, Pesticide.

INTRODUCTION

Proper treatment and removal of all types of pollutants, industrial and non-industrial, is a problem in the world. Some chemical substances such as dyes, pesticides and heavy metals found in water pose a significant problem due to their disease-causing effects on living organisms. Pesticides are a group of chemical substances that protect against and control the effects of certain diseases caused by weeds, insects and pests. As the world's population grows, so too has the need for food. The use of pesticides in agricultural production contributes significantly to meeting food needs [1]. Pesticides are classified into two categories based on their application and chemical structure. They are classified as herbicides, insecticides,

fungicides, and rodenticides based on their application areas [2], and they are classified as carbamates, neonicotinoids, organophosphates, organochlorines, and pyrethroids based on their chemical structure [3].

While pesticides offer numerous advantages in meeting food needs, their disadvantages are also significant. Pesticides play a vital role in agricultural production, particularly due to their high effectiveness and easy degradability. When used uncontrolled and without proper procedures, they can leave residues in soil, air, water resources, and especially in food, posing a serious threat to the environment and living health. Pesticides can cause chronic or acute poisoning, especially when they enter the human body while they are dangerous for all living things [4]. Excessive use of pesticides causes irreversible damage to human health by causing significant pesticide residues in the environment.

Pesticides, even in low doses, negatively affect many body systems. Once ingested, they can exhibit carcinogenic, mutagenic, and teratogenic effects [5]. For example, lipophilic pesticides have been reported to be transmitted to infants through breast milk [6].Pesticides can also cause many diseases, including cancer, neurotoxicity, Alzheimer's, Parkinson's, infertility, leukemia, diabetes, and asthma. Their presence in foods should be carefully checked before consumption to prevent human exposure to these toxic chemicals. The effects of pesticide residues, which pose such negative environmental and human health risks, are a global concern. Policies have been developed to determine daily doses at which pesticide residues entering the body through food will not cause problems [7]. For these policies to be applicable, sensitive detection of pesticides in food, environmental, and water is essential. Commonly used rapid detection methods and commercial chromatographic methods lack certain analytical requirements, such as high sensitivity, stability, portability and long term usage.

To date a wide variety of methods have been developed for the detection and determination of pesticides. Among these, chromatography methods such as gas chromatography [8], high performance liquid chromatography [9], and liquid chromatography-mass spectrometry are the most commonly used. These methods generally demonstrate high sensitivity and accuracy to pesticides. They are considered the gold standard detection methods for analyzing pesticide residue levels [10]. However, these methods require complex and expensive equipment. However, sample preparation processes and the need for specialized personnel constitute disadvantages for on-site applications [11]. Some commonly used methods provide the desired sensitivity for pesticide determination. These include electrophoresis, Raman scattering, and ELISA. However, these methods also have some disadvantages, including short storage times and instability in solution [12].

Consequently, to monitor pesticide levels and obtain reliable results, real-time, simple, economical, accurate, and sensitive methods are needed [13]. Electrochemical sensors play an important role in various sectors such as biomedical fields and environmental detection, thanks to their exceptional sensitivity, selectivity, stability, fast response time, user-friendly operation, and easy miniaturization and integration.

This study discusses studies using sensors prepared using electrochemical systems modified with conductive polymer composites, without the aforementioned instrumental techniques, for pesticide determination. These studies utilize the unique physical, chemical, and electrochemical properties of nanomaterials useful in the creation of electrochemical sensors.
In recent years, the use of carbon nanotubes and graphene has attracted considerable interest. The high conductivity of these materials increases the sensitivity of pesticide sensors by increasing electron transfer rates. Similarly, the combination of various metals with conductive polymers has been investigated due to their synergistic sensitivity-enhancing effects and perfect electrocatalytic properties. These materials include metals, their oxides and alloys.

Conducting polymer (nano)composite materials are used for modification of electrodes to develope new sensor systems due to their compatibility, ease of synthesis, and high selectivity. Nanostructures with specific selectivity and unique properties are enabling the widespread development and development of pesticide sensors. Enzymatic electrochemical sensors, due to their biological material structure, are easily affected by environmental conditions such as temperature and pH. This necessitates more detailed studies and development of alternative non-enzymatic pesticide sensors. Many non-enzymatic sensors for pesticide detection directly redox pesticides. Others use metal oxides to obstruct other redox reactions in the material. The electrochemical signal can be obtained in response to the pesticide concentration by taking into account the inhibition of the electrochemical response of modification material. Besides, non-enzymatic sensor systems have narrower detection ranges. It also has some drawbacks, such as low selectivity for structurally similar pesticides. This can lead to the determination of total pesticide amounts in mixed solutions. As a result of this, the following suggestions should be taken into consideration when fabricating a novel non-enzymatic material:

First of all, a controlled synthesis process in terms of shape and size must be carried out in order to create suitable and efficient electroactive regions on the material. First, their size and shape must be controlled during synthesis to create the optimal amount of electrochemically active sites with

suitable properties. Secondly, the structure and composition of the polymer composite and the specific binding with the pesticide molecule must be determined to provide the best desired selectivity.Third, in order to achieve high sensor performance, the polymer composite is expected to have high conductivity, good mechanical and chemical resistance, and a large surface area. Studies in this area are scarce. Considering all these, it can be evaluated that conductive polymer composites have a long way to go as non-enzymatic pesticide sensor technology develops.It is estimated that these expectations can be met in the future. Thus, the widespread use of pesticide sensors based on non-enzymatic polymer composite nanomaterials is expected to enable more convenient and rapid detection of pesticide residues, In this way, both the damage to the environment and the health of living beings are reduced. Of course, simply addressing these challenges is not enough. Furthermore, sensors must be further developed in terms of miniaturization, flexibility, adaptability, and intelligence.

Recent studies

Polymers are generally non-conductive. Conductive polymers are driven by their backbones containing conjugated double bonds and the charge carriers formed after doping. Conductive polymers offer advantages such as ease of synthesis, corrosion resistance, light weight, and low cost. This allows them to replace metals and semiconductors in many applications. Conductive polymers have a lot of application areas such as, transistors, adsorption studies, electrochromic devices, solar cells and light-emitting diodes. Recently, intrinsic conductive polymer (nano)composites have attracted increasing interest among electrochemical pesticide sensors due to their excellent properties. Some pesticide sensors developed in recent years using composites prepared with conductive polymers are summarized below.

Abraham and Vasantha developed a hollow shaped polypyrrole composite film modified sensor for the toxic herbicide 1,1-dimethyl-3-phenylurea (fenuron)[14]. The interaction between the phosphate anions trapped in the film and the nitrogen atoms present in fenuron was exploited. The sensor response was monitored by cyclic voltammetric technique. It was observed that during the formation of the hollow/porous composite films. Because the alkyl aryl compounds are larger, they changed the places by smaller phosphate ions. The porosity and ion exchange behaviour of the film were characterized by field-emission scanning electron microscopy and elemental analysis. Fenuron working conditions such as film thickness and pH, were optimized using a glassy carbon (GC) electrode. The hollow polymer composite film increased fenuron sensitivity by over five times compared to GC. The authors stated that the suggested sensor has potential applications in agricultural groundwater samples.

Elamin and co-workers developed a novel pesticide sensor based on molecularly imprinted conducting polymer nanocomposite including copper nanoparticles and hyperoxidized polypyrrole for the detection of sulfadiazine [15]. After optimizing the operating conditions of the electrochemical sensor, a low detection limit of 3.1×10^{-10} mol L^{-1} and a wide working range between 10^{-9} and 10^{-5} mol L^{-1} were achieved. This sensor was used succesfully for real milk samples. The combination of the electrical conductivity properties of copper nanoparticles and the properties of molecularly imprinted polypyrrole composite material allows the detection of sulfadiazine even in real milk samples with high sensitivity.

In another study, non-enzymatic malathion sensors were prepared by preparing phytic acid (PA) doped overoxidized polyaniline (oPANI) and polyaniline (PANI) with a perfect nanorod structure of (in the range of 60 and 100 nm) and modified onto a glassy carbon electrode (GCE) [16]. The structural and morphological properties of the PA electrode materials significantly affected the conductivity and sensing performance. Both developed electrodes showed properties such as good recovery, stability, resistance to interferences and high sensitivity when studied with real samples. Also these electrodes had very low detection limits for PA-PANI (1.58 ppt) and PA-oPANI (2.23 ppt) and a wide range of working concentrations (0.01–200 ppb) for malathion.

A non-enzymatic sensor for chlorpyrifos (CPF) was developed by a structurally functionalized ternary bio nanocomposite based electrode containing copper oxide and sodium alginate onto polyaniline (CuO/SA-g-PANI) by using a potentiometric measurent system by Kushwaha et al. [17]. The synthesized composite film was used as electrode material for non-enzymatic potentiometric determination of chlorpyrifos in some samples such as cabbage, mango, soil and tap water. The sensor exhibited an operating range of 1.0–120.0 μM. The sensitivity of sensor was calculated as 1.8790 $mV \cdot \mu M^{-1} \cdot cm^{-2}$. The detection limit was found as 0.375 μM for chlorpyrifos. The response time of the sensor was 120 s, recovery time of 16 s, accuracy of 99.80%, and stability of 72 days.

A new nanocomposite synthesized by Paneru and Kumar for the detection of paraoxon-ethyl (PE). CuO doped by Ag (Ag@CuO) nanoparticles were embedded into polyaniline (PANI) in this study. This nanocomposite was used as a sensing platform for the detection of paraoxon-ethyl (PE). The homogeneous dispersion of Ag@CuO nanoparticles on the PANI matrix provides a uniform and dense surface area, thereby accelerating the conduction of electrons. The synergistic effect of Ag@CuO and PANI matrix resulted in impressive conductivity, biocompatibility, and catalytic

power of the biosensor. The proposed biosensor exhibited a wide linear range between 5 and 100 pM and a low limit of detection (LOD) of 11.35 pM under optimized detection conditions. The electrochemical results confirmed that the proposed biosensor possesses high sensitivity (0.5536 μA (pM)-1 cm-2), high selectivity, good reproducibility, and acceptable stability. Moreover, the proposed biosensor was successfully applied in the detection of paraoxon-ethyl (PE) in three real samples [18].

In another study a fluorescent Ag-ZnO/PANI nanocomposite, an ultrasensitive material prepared using polyaniline, was synthesized for the detection of malathion [19]. The synthesized Ag-ZnO/PANI was characterized by scanning electron microscopy (SEM), fourier transform infrared spectroscopy (FT-IR), UV-visible spectroscopy (UV-vis), X-Ray diffraction (XRD), and fluorescence spectroscopic techniques. The fluorescence intensity of the nanocomposite has yielded results proportional to the amount of malathion. This results were proportional to the malathion concentration in the range of 0–1000 nM. The detection limit was calculated to be 13.2 nM. The proposed method was selective, sensitive, easily applicable and can be designed. As a result of this, it has been efficiently applied for the determination of malathion in agricultural products with good recovery values.

The study published by Şen Gürsoy and Kahraman in 2024, a new nonenzymatic pesticide sensor was presented with polythiophene/TiO_2 composite deposited on a glassy carbon (GC) electrode [20]. The developed conducting polymer composite sensor was used for the selective and sensitive detection of malathion in water. The PTh/TiO_2 composite was characterized by various methods. In addition, both the characterization of the composite film and the malathion sensor studies were carried out by the cyclic voltammetry (CV) method. Under optimized operating conditions, the response of the pesticide sensor due to the electrooxidation of malathion was measured by CV in the range of -1 to 2.3 V against an Ag/AgCl reference electrode. The PTh/TiO_2 composite film showed a wide range of linear range between 9.9 ppm to 436 ppm for malathion. The sensitivity was obtained as 57.5 μA/ μM cm^2. The detection limit of sensor was calculated as 7.45 μM. The developed sensor showed resistance to interferences and it also had also good reproducibility. The nonenzymatic polymer composite modified pesticide sensor was used to successfully detection of malathion in tap water with at least 90% recovery.

CONCLUSION

Pesticides pose a significant threat to living organisms due to their toxicity. Based on standards set by various countries, maximum limit values for pesticides in fruits and vegetables are in the ppm range. Electrochemical sensors still require research to identify pesticides in complex solutions with lower detection limits and a wider linear range. Electrochemical sensors are considered simple, time-saving, and cost-effective compared to other detection methods. It is crucial to produce more materials with excellent performance to modify electrodes in electrochemical methods. Conductive polymer composites have recently attracted attention and demonstrated high performance in this field. This study summarizes some conductive polymer composites used in recent years to modify non-enzymatic electrochemical sensors used in pesticide detection and identification. Electrochemical sensors using non-enzymatic conductive polymer composites offer a potential tool that can utilize highly sensitive analytical methods to ensure compliance with the maximum limits set by various countries.

REFERENCES

[1] Gao, P., Tan, J., Peng, X., Qu, M., & Chen, M (2024). Key residues involved in the interaction between chlorpyrifos and a chemosensory protein in Rhopalosiphum padi: Implication for tracking chemical residues via insect olfactory proteins. *Science of the Total Environment, 928*, Article 172361,

[2] Zamora-Sequeira, R.; Starbird-Pérez, R.; Rojas-Carillo, O.; Vargas-Villalobos, S. (2019). What Are the Main Sensor Methods for Quantifying Pesticides in Agricultural Activities? A Review. Molecules, 24, 2659.

[3] Bose, S.; Kumar, P.S.; Vo, D.-V.N.; Rajamohan, N.; Saravanan, R. (2021). Microbial Degradation of Recalcitrant Pesticides: A Review. Environ. Chem. Lett. 19, 3209–3228.

[4] Chang, Q., Wu, J., Zhang, R., Wang, S., Zhu, X., Xiang, H., Wan, Y., Cheng, Z., Jin, M., Li, X., Xu, P., Jin, F., & Wang, J. (2024). Optimizing single-atom cerium nanozyme activity to function in a sequential catalytic system for colorimetric biosensing. *Nano Today, 56*, Article 102236

[5] Ahmad, M.F.; Ahmad, F.A.; Alsayegh, A.A.; Zeyaullah, M.; AlShahrani, A.M.; Muzammil, K.; Saati, A.A.; Wahab, S.; Elbendary, E.Y.; Kambal, N. (2024). Pesticides impacts on human health and the environment with their mechanisms of action and possible countermeasures. Heliyon 10, e29128.

[6] Torres-Moreno, A.C.; Mejia-Grau, K.; Puente-DelaCruz, L.; Codling, G.; Villa, A.L.; Ríos-Marquez, O.; Patequiva-Chauta, L.; Cobo, M.; Johnson-Restrepo, B. (2023). Polybrominated diphenyl ethers (pbdes), polychlorinated biphenyls (pcbs),

organochlorine pesticides (ocps) in human breast milk from colombia: A probabilistic risk assessment approach. Chemosphere, 339, 139597.
[7] Zikankuba, V.L.; Mwanyika, G.; Ntwenya, J.E.; James, A. Pesticide (2019). Regulations and Their Malpractice Implications on Food and Environment Safety. Cogent Food Agric. 5, 1601544.
[8] Abdulra'uf, Lukman Bola, et al. (2025). Determination of pesticide residues in beans using QuEChERS technique coupled to gas chromatography-mass spectrometry: Multivariate optimization of CEN and AOAC methods. *Food Chemistry* 463, 141464.
[9] Ahmed, Hassan Elzain Hassan, et al. (2025). Magnetic solid phase extraction of methiocarb pesticide from food samples prior to HPLC analysis with magnetic activated carbon cloth/zinc aluminate (magnetic ACC@ $ZnAl_2O_4$) composite. *Journal of Liquid Chromatography & Related Technologies* 48.1-5, 1-10.
[10] Muenster, Helmut, Andreas Wieghaus, and Lester Taylor. (2009). Rapid Screening of Pesticides Using U-HPLC/MS. The Application Notebook-06-01-2009, Volume 0 Issue 0.
Development.
[11] Samsidar, A.; Siddiquee, S.; Shaarani, S.M. (2018). A Review of Extraction, Analytical and Advanced Methods for Determination of Pesticides in Environment and Foodstuffs. Trends Food Sci. Technol. 71, 188–201.
[12] Li, H.; Sheng, W.; Haruna, S.A.; Bei, Q.; Wei, W.; Hassan, M.M.; Chen, Q. (2023). Recent Progress in Photoelectrochemical Sensors to Quantify Pesticides in Foods: Theory, Photoactive Substrate Selection, Recognition Elements and Applications. TrAC Trends Anal. Chem. 164, 117108.
[13] Ding, R.; Li, Z.; Xiong, Y.; Wu, W.; Yang, Q.; Hou, X. (2023). Electrochemical (Bio)Sensors for the Detection of Organophosphorus Pesticides Based on Nanomaterial-Modified Electrodes: A Review. Crit. Rev. Anal. Chem. 53, 1766–1791.
[14] Daniel Arulraj Abraham and Vairathevar Sivasamy Vasantha, (2020). Hollow Polypyrrole Composite Synthesis for Detection of Trace-Level Toxic Herbicide, ACS Omega, 5, 21458−21467,
[15] Elamin, M.B.; Ali, S.M.A.;Essousi, H.; Chrouda, A.; Alhaidari, L.M.; Jaffrezic-Renault, N.; Barhoumi, H. (2023). An Electrochemical Sensor for Sulfadiazine Determination Based on a Copper Nanoparticles/Molecularly Imprinted Overoxidized Polypyrrole Composite. Sensors, 23, 1270.
[16] Chunming He, Ru Yan, Qingwang Xue, Shuxian Li, and Huaisheng Wang, (2023). Electrochemical malathion sensors based on phyticacid-doped polyaniline and overoxidized polyaniline nanorods, J Mater Sci, 58:1200–1213,
[17] Chandra Shekhar Kushwaha, N.S. Abbas, Saroj Kr Shukla, (2022). Chemically functionalized CuO/Sodium alginate grafted polyaniline for nonenzymatic potentiometric detection of chlorpyrifos, International Journal of Biological Macromolecules 217, 902–909.
[18] Saroj Paneru, Devendra Kumar, (2023). Ag-doped-CuO nanoparticles supported polyaniline (PANI) based novel electrochemical sensor for sensitive detection of paraoxon-ethyl in three real samples, Sensors & Actuators: B. Chemical 379, 133270
[19] Sintayehu Berhanu, Fikradis Habtamu, Yordanos Tadesse, Fantahun Gonfa and Tesfaye Tadesse, (2022). Fluorescence Sensor Based on Polyaniline Supported Ag-

ZnO Nanocomposite for Malathion Detection, Journal of Sensors, Article ID 9881935, 11 pages
[20] Songül Şen Gürsoy, Derya Kahraman, (2024). Nonenzymatic Sensor Based on Polythiophene/Titanium Dioxide (PTh/TiO_2) Composite for the Determination of Malathion in Water, Sains Malaysiana 53(1), 149-162.

A Study On The Conceptual Examination Of Workaholism And Workplace Happiness

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ABSTRACT

Workaholism is defined as the persistent urge and need to work, and it is stated as a concept that restricts workaholics' social, mental, physical, and emotional relationships with others. A more general definition of workaholism is an excessive and uncontrollable drive to work continuously to the point where it has a detrimental impact on social connections, happiness, and health. Workaholics are defined as people who work excessively, neglecting other activities as a result; are overly devoted to their work, even dependent on it; are distracted by work-related thoughts even when they are not working; have issues in their social relationships as a result of this dependence; and are overly organized and perfectionist.

Happiness, also known as personal well-being, is the numerical dominance of pleasant thoughts and sentiments about one's life. To put it another way, it establishes how satisfied people are overall and how happy they are with their life. The happiness addressed in this study is, in essence, workplace happiness since one aspect of our lives is made up of personal activities and another is made up of work activities. The current worldwide crises, in particular, have made it difficult to live in prosperity in every way. Longer workdays, fewer vacation days, and the need to stay in the economic cycle are all consequences of this circumstance. People are putting in more effort and dedicating a larger percentage of their lives to their jobs in order to deal with these difficulties. This circumstance is having a significant impact on people's feelings of satisfaction at work.

The primary goal of this research is to develop a conceptual framework for workaholism and how it affects workplace happiness as a result. To that purpose, workaholism and its conceptual framework are first discussed, followed by detailed literature evaluations on happiness and workplace happiness, and lastly the relationship between workaholism and workplace happiness is investigated.

Keywords: Workaholism, Happiness, Workplace Happiness, Organanisations, Turkey.

INTRODUCTION

Workaholism, while a fast emerging and explored topic in all institutions and organizations in recent years, has evolved into a notion that is stressed and valued not only by business owners and employees, but also by academic researchers. However, due to the concept's enormous breadth over such a lengthy period of 20 years, a general definition of workaholism has yet to be defined. The defining characteristic among the various definitions of workaholism, according to Aziz and colleagues (2009), is that

workaholism is a significant investment made by the employee in their job, future, and career growth. Based on the model of alcoholism, a different definition of workaholism has been put out that characterizes excessive emphasis on work and intense work (Schaufeli et al.,, 2009). Theologian and researcher Oates established the word "workaholism" in his 1971 book Confessions of a Workaholic. Oates characterizes workaholism as "a compulsive or uncontrollable need to work constantly." Researchers nowadays generally use the term "workaholism" to characterize people who work excessively, are disengaged from other facets of social life, are committed to their labor, and worry about their work even on days when they are not working.

Most research on workaholism is experimental in nature and looks at the connection between workaholism and work-related attitudes. Within this framework, research is being conducted to investigate the connection between workaholism and factors like job satisfaction (Wulandari ve Hafidz, 2023), work-family conflict (Zincirkıran ve Mete, 2014), burnout (Naktiyok ve Karabey, 2005; Schaufeli et al., 2008; Akın ve Oğuz, 2010), and work addiction (Schaufeli et al., 2008).

From the past to the present, happiness has been considered the ultimate purpose of human existence and is commonly considered to be the most important aspect of our lives (Fordyce, 1983; Buss, 2000). According to Gitmez and Morçöl (1994), happiness is the emotional state brought about by either good or bad experiences and events in people's life. We can say that happiness is an all-encompassing concept that reveals the degree of well-being that arises from people subjectively evaluating their lives from their own perspectives. Another definition of happiness focuses on why and how people evaluate the positive aspects of their lifestyles (Kangal, 2013). Happiness has taken on completely distinct connotations from earlier eras to the present. In an objective sense, it aligns with ideas like preserving one's happiness, satisfaction, love, and well-being (Goldman, 2018). There is no one definition for happiness, which varies depending on the academic field. The concept of happiness has been evaluated within disciplines such as sociology, psychology, and philosophy, and research has been conducted in this topic. Individuals have been described using notions such as well-being, objectivity, quality of life, life satisfaction, and contentment. In general, it is acknowledged that happiness is a multifaceted notion that includes a variety of elements, including contentment, life satisfaction, and well-being, about which no firm conclusion has been drawn. It is assessed according to the findings of studies carried out across a range of subjects and fields.

Happiness at work and workaholism, which has become a major part of our lives, may be viewed as beneficial developments in terms of organizations and enterprises' performance (as productivity rises from a business perspective), but they are negative concepts in terms of life in general. Workaholism offers advantages and disadvantages in this situation.

Positively evaluating workaholism, researchers (Cantarow, 1979; Friedmann ve Lobel, 2003) see it as a natural outcome of workaholics' love of their coworkers, workplace, and work life. Conversely, researchers that have a negative opinion of workaholism (Spence ve Robbins, 1992; Kanai ve Wakabayashi, 2001) describe it as people who feel under pressure to work because they believe they are not good enough. The goal of this study is to determine whether workaholism has any impact on job satisfaction because, as was already mentioned, there isn't a lot of thorough research on the subject.

LITERATURE REVİEW

1. A Conceptual Framework On Workaholism

The phenomena of workaholism is first explained in this section, along with its historical context. Next, the traits of workaholics, the prevalence of workaholism, its relationship to particular concepts, and related subjects are discussed. The results of several earlier workaholism investigations carried out in Turkey are presented in the last section.

1.1. The Definition of Workaholism

The term "workaholism" originated from the word "alcoholism," which was first used to characterize excessive drinking and excessive work commitment. In his book Confessions of a Workaholic, renowned religious scholar Oates coined the word "workaholism." Workaholism is described by Oates as "a compulsive or uncontrollable need for those who cannot stop working." In the 1980s, the idea of workaholism emerged as a phenomena that was thoroughly described and studied in worldwide literature. In the early 2000s, the idea of workaholism started to be studied and gained attention in our country. Oates' description of workaholism has been followed by several definitions and analyses proposed by scholars studying this issue (Scott et al., 1997; Buelens ve Poelmans, 2004).

Even though a lot of study has been done on the definition, causes, and effects of workaholism, there are still a lot of differing opinions on the subject at hand. While some academics explain that workaholism is a behavior that results in negative outcomes that are detrimental to organizations and individuals, other researchers view workaholism favorably from the standpoint of organizations and individuals.

Following are various definitions of workaholism that have been previously offered by researchers in order to better comprehend and analyze the subject.

- "Working over forty-eight hours a week" (Mosier, 1983),
- Put more effort and attention into your task than is necessary (Machlowitz, 1980)."
- "Excessive and compulsive work is an overemphasized topic" (Schaufeli et al., 2009),
- "Those who enjoy their work and are happy to be present" Cantarow (1979),
- “People who push themselves to work and end up working long hours" (Bakker et al., 2012).

As has been described.

The concept of workaholism has been explained in a number of ways, as can be seen above. Some of these explanations contradict one another, while others share the same meaning. Because of this, research on the idea of workaholism will help us come to more definitive conclusions about a deeper comprehension of the topic and more explanatory findings about its causes and effects.

1.2. A Brief History of Workaholism

The term "workaholism" first used in the mid-1950s to describe excessive behavior related to one's work environment (Machlowitz, 1980). Nowadays, nevertheless, workaholism is seen as a healthy mental condition that raises one's level of achievement. However, it is now evident that workaholism seriously harms people's social and physical well-being. As a result of this phenomena, workaholism is now considered a negative state (Porter, 1996).

1.3. The Characteristics of Workaholics

Researchers that have put forth several definitions of workaholism have come to a broad understanding of the term and, consequently, have discovered its essential shared traits. The traits of workaholism have been classified as follows after a thorough review of the literature on the subject (Cantraow, 1979; Machlowitz, 1980; Porter, 1996; Burke, 2000; Harpaz ve Snir, 2003; Bakker et al., 2013; Robinson, 2014).

1.3.1. Non-Realistic Goals

Rewarding oneself after completing a task is a challenge for workaholics. Furthermore, they immediately establish higher goals for themselves rather than relishing the satisfaction of a job well done. They concentrate on putting in more effort, which will eventually cause them to experience increased stress and strain.

1.3.2. Precisionism

In an attempt to get the best outcomes, workaholics put in a lot of time and effort in their pursuit of fame, authority, success, and superiority.

1.3.3. Being Busy With Business During Leisure Time

One of the main traits of workaholics is that they are still consumed with their work after hours.

1.3.4. The Disregard of Social Life

Workaholics disregard their family lives in addition to their social lives and pleasures, and the majority do not think about getting married, although married people frequently dispute about work and family.

1.3.5. Feeling under Pressure of Time

Workaholics consistently believe that the majority of their free time is wasted and superfluous. They always hurry around because they want to do other things quickly so they can work longer hours. Workaholics typically detest squandering their time.

1.3.6. Strained Behaviour

Workaholics exhibit tense behavior due to a variety of factors, including their mind being overwhelmed by too many duties, their perception that time is limited, their uneasiness about every moment squandered, and their lack of relaxation.

In general, if we look at the traits of workaholism, we can conclude that it is a bad situation because the reason someone works excessively is not because they do their work joyfully, lovingly, or enthusiastically, but rather because they become obsessed with it by focusing on it more than is necessary. This consequently has detrimental effects on the person, their family, and their social surroundings.

THE RELATIONSHIP BETWEEN WORKAHOLISM AND SPECIFIC VARIABLES

We need to look at how workaholism relates to other ideas like overworking, addiction, alcoholism, and work obsession in order to better and more clearly understand it.

1. Workaholism and Addiction

From the standpoint of workaholism, the person initially starts to prioritize their work in order to repress their psychological discontent and, concurrently, feel more at ease. Nevertheless eventually, a person's incapacity to manage how much time and effort they give to their profession causes them to disregard their social life and their physical health (Matuska, 2010). People develop addictions due to two major elements. The first is hedonistic experiences, which is defined as feeling joyful in every way and being lured to every behavioral event that offers benefits. Achieving spiritual fulfillment and psychological alleviation is another facet of addiction (Sussman, 2012). Addiction to one's job is typically caused by factors that alleviate psychological deprivation, such as acquiring authority, having one's viewpoint heard, and being valued.

2. Workaholism and Overworking

It seems that workaholism and being hardworking are quite similar behaviors. However, the motivation for working hard is where these two ideas differ fundamentally. Working hard and workaholism are two different things. While hardworking people prioritize themselves, their families, and their social lives, working hard entails allocating enough time to one's work (Vaziri et al., 2019).

3. Workaholism and Alcoholism

According to Oates (1971), the term "workaholism" was created by combining the words "work" and "alcoholic." Because they have nearly identical outcomes, workaholism and alcoholism are similar ideas. For instance, in both forms of addiction, the person frequently unintentionally ignores their social life and family circumstances. Likewise, the individual finds it challenging to exercise self-control in both situations (Airagnes et al., 2024).

4. Workaholism and Passion for Work

A person's appreciation of and reliance on work is revealed by workaholism. The primary distinction between work addiction and workaholism is that workaholics experience pressure to work continuously, even if they are not enjoying their jobs (Machlowitz, 1980). On the other hand, despite their lack of productivity, workaholics are unable to quit their employment since they love and enjoy what they do (Sussman, 2012). An empirical investigation looked at how the two ideas related to one another (Shimazu et al., 2015). They emphasized that there is a weak negative association between workaholism and work devotion, and that while workaholics have detrimental effects on the organization, work dedication benefits both the organization and the individual.

PREVIOUS STUDIES AND RESEARCH ON WORKAHOLISM IN TURKEY

Pekdemir and Koçoğlu investigated the distinctions between workaholism and work-life balance, as well as how personality factors mediate these distinctions. According to their research, there is a connection between workaholism and work-life balance, and personality factors do not act as a mediating factor in this relationship (2014).

Bardakçı (2007) investigated how education and teaching representatives' internet and social media usage was affected by workaholism. The attitudes of education and teaching representatives about the use of the internet and social media produced positive outcomes in terms of workaholic behavior in this study, which was carried out on a sample of 205 school representatives.

Akyüz (2012) investigated how burnout and workaholism are related. Research assistants, members of the company, and academic members from Istanbul Aydın University and Istanbul University participated in the study. 145 employees in all took part in the study. The study came to the conclusion that workaholism and burnout are positively correlated.

Metin (2010) investigated how coworkers and work intensity affected employees' work-related dependence and workaholism. The study began with 288 workers from five hospitals and ten hotels in Istanbul and Ankara. The findings indicated that job intensity had a beneficial impact on workaholism and work life.

Oğuz and Akın (2010) examined the possibility of a connection between burnout and workaholism among school instructors. This survey comprised 254 elementary and secondary school instructors. According to the study's findings, gender and educational position had little bearing on the degrees of burnout and workaholism among school teachers. Nonetheless, a strong and negative correlation between workaholism and instructors' levels of burnout was discovered.

We need to look at how workaholism relates to other ideas like overworking, addiction, alcoholism, and work obsession in order to better and more clearly understand it.

THE HISTORY OF HAPPINESS

It has been noted that the idea of happiness has changed over time in response to the opportunities and circumstances of the time. According to the options available at the time as well as the social norms and traditions,

individuals who lived in close proximity to agriculture and the natural world were happy in the past (Veenhoven, 2006). Simultaneously, it is acknowledged that individuals throughout that era created new interpretations of life and found contentment with their possessions. While spiritual pleasure was the general ultimate objective in medieval times, happiness, linked to the good quality of life and live satisfaction brought about by antiquity, was perceived as the general goal of human behavior patterns (Onions, 1966). Now that the contemporary period has arrived, the idea of happiness has shifted from being primarily focused on the hereafter. Since the beginning of human history, happiness—which fluctuates depending on the circumstances and opportunities of the time—has changed and evolved, influencing how societies function (Birand, 1958).

1. The Definition and Concept of Happiness

Researchers have been investigating information that will help individuals live fulfilling lives for years. Research on happiness has shown that one of the general prerequisites for a happy existence is to love oneself before loving one's life (Diener, 1984). From earlier times to the current moment, the idea of happiness has been thoroughly examined in disciplines like sociology, philosophy, economics, and religion (Behrani, 2017). There are numerous meanings for the notion of happiness because it has been extensively studied in the literature. According to Gitmez and Morçöl (1994), happiness is an emotional idea that results from people's experiences, both good and bad. Happiness and well-being, according to Aristo (1998), are the pinnacle, the greatest degree, and the achievement that people aim for in life. To put it another way, one of the main objectives of life is happiness, which is a subjective term for each individual (Potkay, 2010). Happiness is a combination of emotional and mental emotions. Happiness is cognitively associated with introspective assessments like enthusiasm and excitement. In contrast, emotional states are linked to sensory happiness (Warr, 2007). According to Diener (2000), the concept of happiness is people's cognitive and physiological awareness of their own lifestyles.

In general, individuals place happiness at the center of their life and subjectively care about it, which is the basic reason it is so important. Scollon et al. (2004) found that people prioritize happiness in their lives after conducting a large-scale survey with over 1,000 undergraduate students from 52 nations. Undergraduate students prioritized pleasure over values including health, wealth, love, affection, and joy as a consequence of this study.

2. The Definition of Workplace Happiness

According to Edmunds and Pryce-Jones (2008) and Stairs and Galpin (2010), owners of businesses who spend a significant portion of their lives in workplaces like corporate offices view their "workplace" as the most

significant setting where they can acquire positive life experiences, transform their lives, and gain respect. According to Lyubomirsky and Layous (2013), workplace happiness is the most significant way for people to get experience in this life, launch on life, and conquer whatever obstacles they face, hence increasing confidence in themselves. Suojanen (2012), on the other hand, concentrated on the broad underpinnings of workplace happiness and made an effort to explain it using two hypotheses. The first is the individual-centered view, which holds that cognitive traits and abilities that are thought to be subjective and particular to each individual are revealed by workplace pleasure. On the other hand, the situation-focused theory takes into account the amount of time spent at work as well as the elements, occasions, and group dynamics that contribute to happiness. However, Erdoğan along with other people associate workplace satisfaction with a number of similar factors, including job qualities, job idea, office atmosphere, and possibilities for career advancement (2012).

According to the aforementioned explanations, workplace happiness can be broadly characterized as a state of ongoing satisfaction created by individuals embracing positive emotions, which are made up of their overall levels of happiness, more than negative ones, and appreciating the optimistic conditions that a positive emotional state creates, like feeling hopeful.

3. The Importance of Workplace Happiness in Organisations and Institutions

Happiness is a term having philosophical, ethical, and psychological roots that is subject to significant change. As a result, numerous theories have been used to analyze people's pleasure levels from a variety of perspectives. The degree of contentment in one's career is the most important of these ideas. From an organizational and institutional standpoint, people can show their full potential for both their own advantage and the benefit of the company they work for (Cojocaru, 2014). According to Brief and Weiss (2002), organizational/institutional happiness is defined as a state in which employees' good feelings outweigh their negative situations. Put differently, according to this concept, people's degree of job and lifestyle satisfaction is reflected in their level of happiness (Wesarat et al., 2015).

4. Factors Affecting Workplace Happiness

According to Chaiprasit and Santidhiraku's (2011) research, there are five primary elements that impact happiness at work:

- A steady work life;
- Organizational cooperation;
- Shared objectives and connections at work;
- Inspiration and purpose at work;
- Leadership.

5. The Dimensions of Workplace Happiness

Pryce-Jones (2010) identified three sub-dimensions of job happiness. The following is a list of these dimensions:

•***Commitment:*** a feeling of inclusion in the workplace.

•***Contribution:*** the effort a person makes to help the organization they work for grow and succeed.

•***Trust:*** a person who believes that their position and the company they work for are appropriate for them.

PREVIOUS STUDIES AND RESEARCHES ON WORKPLACE HAPPINESS

In line with the person-centered workplace happiness hypothesis, de Waal (2018) investigates the relationship between higher organizational commitment and workplace satisfaction. According to this study, organizational commitment increases with subjective happiness.

In a study highlighting the significance of workplace happiness, Gavin and Mason (2004) came to the conclusion that working long hours is a significant contributor to higher happiness than the financial and spiritual components, and that one's dreams can come true at work.

Sexism has very little impact on workplace happiness, according to research using workplace happiness as a guiding concept for organizational personnel where behavioral patterns and attributes are thought to hold substantial value (de Neve ve Ward, 2017; Mousa et al., 2020).

In his study titled "Workplace Happiness Among Individuals Working in Sports Organisations," Güllü (2018) examined the connection between workplace happiness and specific characteristics among those employed by sports organisations. His research revealed that workers who were 25 years of age or older reported higher levels of satisfaction with their work.

Field and Buitendach (2011) carried out a study with 120 teaching staff members in southern African universities. The purpose of their research was to determine how job satisfaction, work commitment, and organizational commitment differed. The statistical analysis revealed that job dedication among teaching staff had a directly meaningful positive link with happiness at work.

SUMMARY

We can conclude that workaholism and job satisfaction have a constantly changing structure. Momentary occurrences, attitudes shaped by the workplace environment, and new behaviors can all have an impact on how happy individuals are at work (Fisher, 2010). In a different context, work addiction and workaholism can be directly impacted by elements like the opportunities and conditions that the organization provides for the individual and the degree to which the individual's expectations can be fulfilled (Renee Baptiste, 2008).

According to Carr (2023), workaholism and workplace happiness improve the work environment and provide employees a more flexible and linear perspective. Additionally, it significantly contributes to enhancing social life. People's life satisfaction has been found to be impacted by the strong relationships that workaholism creates in the workplace, which are founded on the pursuit of happiness (Bakker, 2008). Conversely, workaholism and job satisfaction, as well as working in a calm setting, guarantee productivity and continuity and boost motivation to attend work. To put it briefly, workaholism and happiness are a two-way system that supports and enhances one another.

REFERENCES

Airagnes, G., Fisk, D., Haddad, R. E., Le Faou, A. L., ve Limosin, F. (2024). Burnout Mediates the Association Between Workaholism and Substance Use: Findings from a French National Company. *Journal of Prevention*, *45*(3), 451-466.

Akın, U. ve Oğuz, E. (2010). Öğretmenlerin İşkoliklik ve Tükenmişlik Düzeylerinin İlişkisi ve Çeşitli Değişkenler Açısından İncelenmesi. *Kuram ve Uygulamada Eğitim Yönetimi, 16*(3), 309-327.

Akyüz, Z. (2012). *İşkoliklik ve tükenmişlik arasındaki ilişki: Hukukçular ve öğretim elemanları üzerindeki bir saha araştırması*. Yayınlanmamış Yüksek Lisans Tezi, İstanbul Aydın Üniversitesi, SBE, İstanbul.

Aristoteles (1998). *Nikomakhos'a etik* (Çev. Babür S.) Ankara: Ayraç Yayınevi.

Aziz, S., Adkins, C. T., Walker, A. G., ve Wuensch, K. L. (2009). Workaholism and work–life imbalance: Does cultural origin influence the relationship? *International Journal of Psychology*, *45*(1), 72–79.

Bakker, A. (2008). Building engagement in the workplace. In *The peak performing organization* (pp. 96-118). Routledge.

Bakker, A. B., Demerouti, E., Oerlemans, W., ve Sonnentag, S. (2013). Workaholism and daily recovery: A day reconstruction study of leisure activities. *Journal of Organizational Behavior, 34*(1), 87–107.

Bakker, A. B., Demerouti, E., ve Ten Brummelhuis, L. L. (2012). Work engagement, performance, and active learning: The role of conscientiousness. *Journal of vocational behavior*, *80*(2), 555-564.

Bardakçı, S. (2007). *Eğitim Yöneticilerinin İnternet Kullanımına İlişkin Tutumlarının İşkoliklik Eğilimleri Üzerine Etkilerinin Belirlenmesi.* Yayınlanmamış Yüksek Lisans Tezi, Gazi Osman Paşa Üniversitesi, SBE, Tokat.

Behrani P. (2017). Organisational justice and employee happiness. *International Journal of Research and Review, 4*(7), 123-129.

Birand, K. (1958). *İlk Çağ felsefesi tarihi*. Ankara: Ankara Üniversitesi İlahiyat Fakültesi.

Brief, A. P. ve Weiss, H. M. (2002). Organizational behavior: Affect in the workplace. *Annual Review of Psychology, 53*, 279-307.

Buelens, M., ve Poelmans, S. A. (2004), "Enriching the Spence and Robbins' Typology of Workaholism Demographic, Motivational and Organizational Correlates". *Journal of Organizational Change Management, 17*(5), 440-458.

Burke, R. J. (2000). Workaholism in organizations: Concepts, results and future research directions. *International Journal of Management Reviews*, *2*(1), 1-16.

Buss, D. M. (2000). The evolution of happiness. *Am. Psychol., 55*, 15-23.

Cantarow, E. (1979). Women workaholics. *Mother jones*, *6*(50), 16.

Carr, S. C. (2023). Well-being. In *Wage and Well-being: Toward Sustainable Livelihood* (pp. 37-64). Cham: Springer International Publishing.

Chaiprasit, K. ve Santidhiraku, O. (2011). Happiness at Work of Employees in Small and Mediumsized Enterprises. *Procedia Social and Behavioral Sciences, Thailand, 25,* 1- 454.

Cojocaru, C.L. (2014). Organizational well-being. Scientific Bulletin "Mircea cel Batran". *Naval Academy, 17*(2), 112-114.

de Neve, J. E., ve Ward, G. (2017). Happiness at work.

de Waal, A. (2018). Increasing organisational attractiveness: The role of the HPO and happiness at work frameworks. *Journal of organizational effectiveness: people and performance*, *5*(2), 124-141.

Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542–575.

Diener, E. (2000). Subjective well-being. *American Psychologist, 55*, 34-43.

Edmunds, L. D. ve Pryce-Jones, J. (2008). Relationships between happiness, overtime, sick leave and intention to stay or leave. *Selection and Development Review, 24*(1), 812.

Erdogan, B. B., T. N. Truxillo, D. M. ve Mansfield, L. R. (2012). Whistle while you work: A review of the life satisfaction literature. *Journal of Management, 38*(4), 1038-1083.

Field, L. K., ve Buitendach, J. H. (2011). Happiness, work engagement and organisational commitment of support staff at a tertiary education institution in South Africa. *SA Journal of Industrial Psychology*, *37*(1), 01-10.

Fisher, C. D. (2010). Happiness at Work. *International Journal of Management Reviews, 12*(4), 384-412.

Fordyce, M. W. (1983). A program to increase happiness: further studies. *J Couns Psychol, 30,* 483-498.
Friedman, S.D. ve Lobel, S. (2003). The happy workaholic: A model for employees. *Academy of Management Executive,17*(3), 87-98.
Gavin, J. ve Mason, R. (2004). The virtuous organization: The value of happiness in the workplace. *Organizational Dynamics, 33*(4), 379-392.
Gitmez, A. S. ve Morçöl, G. (1994). Socio-economic status and life satisfaction in Turkey. *Social Indicators Research, 31*, 77-98.
Goldman, A. H. (2018). *Life's values: Pleasure, happiness, well-being, and meaning*. Oxford University Press.
Güllü, S. (2018). Spor işletmelerinde çalışan mutluluğu. *International Journal of Social Sciences and Education Research, 4*(3), 547-559.
Harpaz, I. ve Snir, R. (2003). Workaholism: Its Definition and Nature. *Human Relations, 56*, 291-319.
Kanai, A., ve Wakabayashi, M. (2001). Workaholism among Japanese blue-collar employees. *International Journal of Stres Management, 8*(2), 129–145.
Kangal, A. (2013). Mutluluk üzerine kavramsal bir değerlendirme ve Türk hanehalki için bazi sonuçlar. *Elektronik sosyal bilimler dergisi*, *12*(44), 214-233.
Lyubomirsky, S. ve Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science, 22*(1), 57-62.
Machlowitz, M. (1980). *Workaholics: Living with them, working with them*. MA: Addison-Wesley, Reading.
Matuska, K.M. (2010). Workaholism, life balance, and well-being: A comparative analysis. *Journal of Occupational Science, 17*, 104-111.
Metin, Ü. B. (2010). *The antecedents and consequences of burnout, work engagement and workaholism*. Yayınlanmamış Yüksek Lisans Tezi, Orta Doğu Teknik Üniversitesi, SBE, Ankara
Mosier, S. K. (1983). '*Workaholics: an analysis of their stress, success and priorities*', Unpublished masters thesis, University of Texas, Austin.
Mousa, M., Massoud, H. K., ve Ayoubi, R. M. (2020). Gender, diversity management perceptions, workplace happiness and organisational citizenship behaviour. *Employee Relations: The International Journal*, *42*(6), 1249-1269.
Naktiyok, A., ve Karabey, C. N. (2005). İşkoliklik ve tükenmişlik sendromu. *Atatürk Üniversitesi İktisadi Ve İdari Bilimler Dergisi, 19*(2), 179-198.
Oates, W. (1971). *Confessions of a workaholic: The facts about work addiction*. New York: World.
Onions, C.T. (1966). *The Oxford dictionary of English etymology*. New York: Oxford University Press.
Pekdemir, I. ve Koçoğlu, M. (2014). İşkoliklik İle İş Yaşam Dengesi Arasındaki İlişkide Kişilik Özelliklerinin Aracılık Rolü Üzerine Bir Araştırma. *AİBÜ Sosyal Bilimler Enstitüsü Dergisi, 14*,1, 309-337.
Porter, G. (1996). Organizational impact of workaholism: Suggestions for researching the negative outcomes of excessive work. *Journal of Occupational Health Psychology, 1,* 70–84.
Potkay, A. (2010). Narrative possibilities of happiness, unhappiness, and joy. *Social Research, 77*(2), 523– 544.
Pryce Jones, J. (2010). *Happiness At Work*. Wiley: Blackwell. Rangganadhan.

Renee Baptiste, N. (2008). Tightening the link between employee wellbeing at work and performance: A new dimension for HRM. *Management decision*, *46*(2), 284-309.

Robinson, B. E. (2014). *Chained to the desk: A guidebook for workaholics, their partners and children, and the clinicians who treat them*. NYU Press.

Schaufeli, W. B., Bakker, A. B., Van der Heijden, F. M., ve Prins, J. T. (2009). Workaholism, burnout and well-being among junior doctors: The mediating role of role conflict. *Work ve Stress*, *23*(2), 155-172.

Scollon, C. N., E. Diener, S. Oishi ve R. Biswas-Diener (2004). "Emotions Across Cultures and Methods", *Journal of Cross-Cultural Psychology, 35*(3), 304-326.

Scott, K. S., Moore, K. S., ve Miceli, M. P. (1997). An exploration of the meaning and consequences of workaholism. *Human Relations, 50*, 287–314.

Shimazu, A., Schaufeli, W. B., Kamiyama, K., ve Kawakami, N. (2015). Workaholism vs. work engagement: The two different predictors of future well-being and performance. *International journal of behavioral medicine*, *22*(1), 18-23.

Spence, J. T., ve Robbins, A. S. (1992). Workaholism: Definition, measurement, and preliminary results. *Journal of personality assessment*, *58*(1), 160-178.

Sussman, S. (2012). Workaholism: A review. *Journal of addiction research ve therapy*, *1*, 4120.

Suojanen, I. (2012). *Work for your Happiness, defining and measuring happiness at work*. Unpublished master's thesis, University of Turku, Turun.

Vaziri, H., Benson, G. S., ve Salazar Campo, M. (2019). Hardworking coworkers: A multilevel cross-national look at group work hours and work–family conflict. *Journal of Organizational Behavior*, *40*(6), 676-692.

Veenhoven, R. (2006). *How do we assess how happy we are? Tenets, implications and tenability of three theories*. USA: Paper presented at conference on 'New Directions in the Study of Happiness: United States and International Perspectives.

Warr, P. (2007). *Work, happiness and unhappiness*. New Jersey: Lawrence Erlbaum Associates.

Wesarat, P. Sharif, M. Y. ve Majid, A. H. (2015). A conceptual framework of happiness at the *workplace. Asian Social Science, 11*(2), 78-88.

Wulandari, V. T., ve Hafidz, G. P. (2023). The Influence of Job Stress, Workaholism and Work Engagement on Job Satisfaction and Turnover Intention in the Garment Industry. *International Journal of Social Science, Education, Communication and Economics (SINOMICS JOURNAL)*, *2*(2), 341-354.

Zincirkıran, M. ve Mete, M. (2014). İşkoliklik İş-Aile Çatışması İlişkisinin Yapısal Eşitlik Modeli ile İncelenmesi: *Sağlık İşletmelerinde Bir Uygulama. Finans Politik ve Ekonomik Yorumlar, 51*, 590, 103-114.

The Treasure at Home: Paulo Coelho's The Alchemist in The Light of Islamic Mystic Literature

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ABSTRACT

Paulo Coelho's The Alchemist (1988) has become one of the most widely read novels of the modern era, celebrated as a fable of inspiration and self-discovery. Yet beneath its universalist language lies a narrative deeply indebted to Islamic mystic literature. This paper argues that The Alchemist revives one of the oldest parables of Sufism: the seeker who journeys far in pursuit of treasure only to discover it at home. By comparing Coelho's novel with "The Ruined Man Who Became Rich Again Through a Dream" in One Thousand and One Nights and Rumî's retelling in the Masnawî, the study demonstrates the structural continuity of the "treasure-at-home" motif across centuries. Additional comparisons with Attar's Conference of the Birds, Ibn Ṭufayl's Ḥayy ibn Yaqẓân, and Jamî's Salaman u Absal reveal how motifs of the guide, the trial, and the symbolism of fire, gold, and birds are preserved and transformed in Coelho's narrative. Methodologically, the paper combines folkloric motif analysis (ATU 1645) with Sufi hermeneutics, showing how Coelho secularizes and universalizes concepts such as ṭarîqah (the path), tawḥîd (unity), and dhawq (direct experience) into terms like "Personal Legend" and "Soul of the World." The findings suggest that The Alchemist should be understood not merely as inspirational fiction but as the latest link in a transhistorical chain of mystical storytelling that stretches from medieval Baghdad and Konya to Borges' Argentina and Coelho's Brazil. Thus, the paper argues that Coelho's novel embodies both continuity and transformation: continuity in preserving the structure and logic of Sufi parables, transformation in translating them into a universal idiom for contemporary global audiences. For the field of comparative mystic literature, this case highlights the enduring relevance of Islamic traditions in shaping world literature.

Keywords – Comparative Literature; Islamic Mystic Literature; Sufism; The Alchemist; Treasure-At-Home Motif (ATU 1645).

INTRODUCTION

When Paulo Coelho published The Alchemist in 1988, he could hardly have imagined that it would go on to become one of the most widely read novels in the world. Today it is a global phenomenon, translated into dozens of languages and embraced by readers as a story about hope, destiny, and the courage to follow one's dreams (Coelho, 1993). Yet behind its deceptively simple prose lies a story with very old roots. What seems like a modern fable of self-discovery is, in fact, built upon a much older tradition of mystical storytelling—one that reaches deep into the heart of Islamic literature.

At the center of Coelho's novel is a pattern as old as storytelling itself: the journey of the seeker who travels far in search of treasure, only to discover that what he longed for was waiting at home all along. This motif appears in medieval Arabic and Persian tales, where it carried strong spiritual meaning. In One Thousand and One Nights, a poor man from Baghdad dreams of treasure in Cairo; after hardship and humiliation, he returns home to find the wealth buried in his own garden (Haddawy, 1990). Rumî, in his Masnawî, retells almost the same parable: a man follows a dream to Cairo, only to discover that the true treasure lies within his own house (Rumî, trans. Whinfield, 1898). These stories are not just coincidences of plot—they are part of a Sufi way of seeing the world, in which truth is always close at hand, but we only recognize it after the journey transforms us.

Coelho's concept is not entirely original; it builds upon preexisting ideas and influences. In fact, the path from the Arabic Nights to The Alchemist passes through Jorge Luis Borges, who retold the "two dreamers" tale in his story collection Labyrinths (Borges, 1970). Borges' version, which fascinated Coelho, becomes a key link in a much longer chain of transmission: from medieval Baghdad to thirteenth-century Konya, from Persian Sufi poets to twentieth-century Latin America, and finally into the pages of a novel that readers across the globe now treat as a guidebook for the soul.

When we set The Alchemist next to other great works of Islamic mysticism, its kinship with this tradition becomes even clearer. In Attâr's Conference of the Birds, the hoopoe leads the birds through seven valleys of trial until they finally see that the king they sought, the Simurgh, is none other than their own reflection (Attar, 1989). Ibn Ṭufayl's Ḥayy ibn Yaqẓân (1929) tells of a child raised on a desert island who, through his own observation and reflection, reaches knowledge of the divine without teachers or books (Goodman, 1972). Jâmî's Salaman u Absâl uses the imagery of fire and alchemy to describe how the soul is purified until it shines like gold (Jâmî, trans. Fitzgerald, 1904). These stories share with Coelho's novel a sense that the path to wisdom is both outward and inward, that the journey changes the seeker, and that the real treasure is spiritual transformation.

Seen in this light, The Alchemist is more than a global bestseller or a piece of inspirational fiction. It is a retelling of Sufi truths for a modern audience. Coelho uses new terms such as "Personal Legend," "Soul of the World," and "Language of the World" but the structure remains the same: the dream, the journey, the guide, the trials, and the discovery that what we sought has been with us all along. By placing Santiago's story into dialogue with the Baghdadi dreamer, the flock of birds, the solitary Ḥayy, and the purified Salaman, we begin to see how old mystical parables continue to travel across time, culture, and language. They remind us that while the

settings change, from Baghdad to Andalusia, from Persia to the Sahara, the quest itself is timeless.

This paper will argue that The Alchemist should be read as part of this longer mystical tradition. In doing so, it not only broadens our understanding of Coelho's sources but also highlights the living influence of Islamic mysticism on world literature. The story of Santiago is, at its heart, the story of countless seekers before him: the journey outward, which leads us back home with new eyes.

LITERATURE REVIEW

The Alchemist

Since its publication, The Alchemist has attracted a broad and sometimes divided critical reception. Early commentators often dismissed the novel as belonging more to the self-help genre than to serious literature. Coelho's prose operates less as fiction and more as a narrative of instruction, where readers are encouraged to treat Santiago's journey as a spiritual manual (HarperCollins Publishers, n.d.; Sebastian, 2022). Samad (2019) highlighted the book's global popularity, noting that its appeal lies in its ability to bridge literary storytelling with motivational discourse. This reception reflects the novel's extraordinary commercial success: readers were less concerned with formal literary innovation than with its message of hope, destiny, and transformation.

More recent studies, however, have begun to reposition The Alchemist within broader intertextual traditions. Resheq (2017) shows that The Alchemist shares key Sufi doctrines—privileging intuition over rationalism, renunciation of worldliness, and the oneness of being—framed through recurring metaphors of journey, discipleship, and alchemy; within this lens, Santiago's "Personal Legend" reads like a secularized ṭarîqah (path) toward knowledge and illumination. To the same point, Harb (2015) traces the novel's central "treasure-at-home" arc directly to a classical Arabic dream-treasure tale transmitted by al-Ṯanûkhî, mapping close correspondences in motive, plot, and circular return. Sebastian (2023) analyzes Coelho's use of maktub and the "Soul of the World" as the novel's metaphysical vocabulary of interconnectedness and destiny, documenting how these terms organize Santiago's reading of omens and his trust in the world's meaningful order. Read alongside Islamic materials, Coelho's "omens" motif echoes the Qurʾânic idea of âyât, signs in nature that invite discernment, outlined by Kamali (2018/2006) in his study of "reading the

signs." These studies open the door to reading Coelho not only as a popular novelist but also as a transmitter of mystical motifs, even if in highly universalized form (See Nicholson, 1914/2002 for other motifs and terms of Sufism).

Borges' influence has also drawn scholarly attention. Borges' short story "The Tale of the Two Dreamers" (Borges, 1970) is widely acknowledged as a source for Coelho's plot, and Fishburn (2004) traces how The Thousand and One Nights permeates Borges's fiction and critical imagination, clarifying the "Nights" as a structural and thematic matrix for his work. Borges's own lecture on the Nights explicitly recounts the "two dreamers" treasure tale, the same narrative skeleton later echoed in Coelho's The Alchemist. Building on this chain, Harb (2015) maps close plot correspondences between Coelho's novel and a classical Arabic "dream-of-treasure" narrative recorded by al-Tanûkhî.

The "Treasure-at-Home" Motif in Folklore and Literature

The story pattern at the heart of The Alchemist is far older than Coelho. Folklorists have long identified ATU 1645, the "Dream of Treasure" motif, as a widespread narrative type (Thompson, 1961). The basic structure involves a dream that compels the protagonist to travel to a distant place, only to discover, often through hardship and humiliation, that the sought-after treasure was at home all along. The earliest and most influential versions appear in the Arabic One Thousand and One Nights. Mahdi's (1984) critical edition and Haddawy's (1990) accessible English translation both include the story of "The Ruined Man Who Became Rich Again Through a Dream," in which a poor Baghdadi makes the arduous trip to Cairo on the strength of his dream. After being mocked and beaten, he finally learns that his treasure is buried in his own garden.

This tale is significant not simply as folklore but as spiritual allegory. As Schimmel (1975) observes, the paradox of searching far for something already present is central to Sufi pedagogy, where the journey is necessary not because the treasure is absent but because the seeker must undergo transformation to see it. Borges' retelling (1970) helped reintroduce this parable to modern audiences, and scholars such as Fishburn (2004) and Harb (2015) have shown how Coelho inherits not only the story itself but also Borges' fascination with the infinite play of stories across cultures.

Allegorical Journeys in Sufi Literature

Beyond the treasure-at-home tale, Sufi literature is replete with allegorical journeys that provide a wider context for Coelho's narrative. Annemarie Schimmel's Mystical Dimensions of Islam (1975) remains a cornerstone in this field, documenting how metaphors of travel, exile, and pilgrimage recur throughout Sufi poetry and prose. In this context, Rumî's Masnavî is especially relevant. Lewis (2008) describes the Masnavî as a

"textbook of Sufism," weaving together parables that dramatize the stages of spiritual development. The dream-of-treasure story in Book VI is one among many where outward travel mirrors inward awakening. Rumî's retelling underscores the idea that divine truth is not elsewhere but within, though the recognition of that truth requires the humility of experience.

Attar's Conference of the Birds expands this allegory onto a cosmic scale. In Darbandi and Davis' (1984) celebrated translation, the hoopoe guides the birds through seven valleys, representing successive stages of spiritual purification. The climactic revelation that the Simurgh is the reflection of the thirty birds themselves has been widely studied as a Sufi expression of self-annihilation (fanâ) and subsistence in God (baqâ). Santiago's realization at the end of The Alchemist mirrors this: what he sought abroad was already bound to his origin, but only by journeying could he see it anew.

Ibn Ṭufayl's Ḥayy ibn Yaqẓân (Goodman, 1972) provides another instructive parallel. While not a journey outward, Ḥayy's solitary ascent from sense perception to intellectual and finally mystical knowledge dramatizes a quest that is entirely inward. Ziai (1990) emphasizes how the narrative affirms the possibility of attaining truth without intermediaries, a theme echoed in Santiago's learning to "read the omens" of nature without institutional authority. Both works insist that divine knowledge is accessible to human beings through direct experience.

Finally, Jâmî's Salaman u Absal (Fitzgerald, 1904) contributes the alchemical symbolism that Coelho makes literal in his novel. The fire that purifies Salaman until he emerges as gold parallels Santiago's training under the Alchemist, who insists that true alchemy is not the transmutation of metals but the transformation of the soul. Although less frequently studied than Rumî or Attâr, Jâmî's allegory underscores the continuity of alchemical imagery across mystical traditions and its reemergence in Coelho's narrative.

Modern Comparative Approaches

Al-Sudeary (2009) offers an Arab-world critique of The Alchemist through an Orientalist lens, evidencing regional scholarly engagement with the novel. Rahaleh (2022) analyzes its religious discourse and representations of Arab/Muslim identity in a Jordanian journal, while Harb (2015) traces direct narrative correspondences between Coelho's plot and a classical Arabic "dream-treasure" tale. For contemporary readership evidence, Qatar National Library (2024) lists the Arabic translation among its most borrowed books, indicating sustained popularity in the Gulf. This growing body of scholarship demonstrates that The Alchemist can no longer be read only as a Western "self-help" phenomenon; it must also be appreciated as part of a global chain of mystical storytelling that stretches across centuries.

METHODOLOGY

This paper adopts a comparative literary methodology, focusing on both narrative motifs and mystical symbolism in order to situate Paulo Coelho's The Alchemist within the broader context of Islamic mystic literature. The approach is qualitative and interpretive rather than quantitative, aiming to trace intertextual echoes, thematic resonances, and symbolic continuities across cultural and historical boundaries.

Comparative Framework

The comparative framework builds on two overlapping traditions:

Folklore studies, particularly the classification of tale-types such as ATU 1645 ("The Dream of Treasure"), which provides a structural template for analyzing similarities between Coelho's novel and medieval Arabic tales (Thompson, 1961).

Mystical hermeneutics, as developed in Sufi scholarship (Schimmel, 1975; Lewis, 2008), which emphasizes symbolic readings of journeys, dreams, and transformations as allegories of the soul's progress toward divine knowledge.

By weaving these traditions together, the analysis avoids treating parallels as mere coincidences of plot and instead foregrounds the shared spiritual logic that underpins them.

Primary Texts

The study examines five primary texts:

Paulo Coelho's The Alchemist (1988/1993).

"The Ruined Man Who Became Rich Again Through a Dream" from One Thousand and One Nights (Mahdi, 1984; Haddawy, 1990).

Jalâl al-Dîn Rumî's Masnavî-yi Ma'navî, especially Book VI (Rumî, trans. Whinfield, 1898).

Farîd al-Dîn Attâr's Conference of the Birds (Attar, trans. Darbandi & Davis, 1984).

Ibn Ṭufayl's Ḥayy ibn Yaqẓân (Goodman, 1972).

Jâmî's Salaman u Absâl (Jâmî, trans. Fitzgerald, 1904).

These texts were chosen because they each contain either the treasure-at-home motif or a structurally similar mystical quest for self-knowledge. Together they represent a spectrum of Islamic mystical allegory, from folkloric parables to philosophical fictions.

Analytical Procedures

The analysis proceeds in three stages:

Motif Analysis: Identify the structural similarities between The Alchemist and earlier parables, focusing on the dream that initiates the quest,

the role of the journey, the presence of guides or intermediaries, and the ultimate discovery of the treasure.

Symbolic Reading: Interpret key symbols such as treasure, desert, birds, fire, and gold, through the lens of Sufi hermeneutics, drawing on Schimmel (1975) and Lewis (2008) to understand how these images function in Islamic mysticism and how Coelho adapts them.

Contextualization: Situate Coelho's novel in the chain of transmission that runs from Arabic folktales through Persian Sufi poetry to Borges' modern retelling, highlighting how motifs shift meaning across contexts while retaining their spiritual core.

Scope and Limitations

This study does not attempt an exhaustive survey of Sufi literature, nor does it claim that Coelho had direct knowledge of all the texts discussed. Rather, it treats The Alchemist as part of a broader intertextual web, where motifs travel across languages and centuries. The focus is on the structural and symbolic resonances rather than on questions of direct influence.

Contribution

By combining folkloric motif analysis with Sufi hermeneutics, this methodology offers a way to read The Alchemist not only as a modern spiritual fable but as a continuation and transformation of Islamic mystical storytelling. This approach foregrounds the universality of the quest motif while also honoring its specific cultural and religious origins.

ANALYSIS AND RESULTS

The "Treasure-at-Home" Motif: Journeying to Return

At the structural heart of The Alchemist lies the ancient motif of the seeker who travels afar for treasure, only to discover it at home. Santiago, a shepherd in Andalusia, is compelled by a recurring dream in which a child tells him to seek treasure at the base of the Egyptian pyramids:

"And a child said to him, 'If you come here, you will find a hidden treasure.' But just as she was about to show him the exact location, he woke up" (Coelho, 1993, p. 13).

This vision initiates his odyssey across the Mediterranean, through Tangier, into the Sahara, and finally to the pyramids, only for him to realize

that the treasure lies buried beneath the sycamore tree where his journey began.

This narrative trajectory mirrors almost exactly the story "The Ruined Man Who Became Rich Again Through a Dream" in One Thousand and One Nights:

"So he dreamt that in Cairo, by such and such a quarter, was a house, in the court of which was a fountain, beneath which lay a vast treasure… and there a watchman said, 'O man of little wit!… I saw in my sleep a house in Baghdad… and in the court thereof is a fountain, under which lieth a vast hoard. Go thou thither and take it'" (Haddawy, 1990, p. 225).

Rumî retells this story in the Masnavî (Book VI), using it as a parable for the nearness of divine presence:

"In Baghdad was the treasure all the time, yet he wandered to Cairo in folly.

The object of his desire was in his own house, but the vain man sought it from strangers" (Rumî, trans. Whinfield, 1898, p. 326).

For Rumî, the journey outward represents the soul's blindness; it cannot perceive that God dwells within until the trials of exile awaken inner sight. Coelho secularizes this parable: Santiago's treasure is not divine presence but literal gold. Yet the lesson is unmistakably spiritual: the journey itself was necessary to transform him into someone capable of recognizing the treasure at home. As Schimmel (1975) observes, this paradox, the nearness of the beloved, the blindness of the seeker, is central to Sufi storytelling.

The Guide and the Master: Mediating Revelation

Another consistent feature of mystical quest literature is the presence of a guide or master (murshid) who assists the seeker. In Attâr's Conference of the Birds, the hoopoe exhorts the flock:

"This is no journey for the indolent. Whoever would be with us must forsake all he has… But if you persist, you will see wonders, and at the end, the Simurgh will reveal himself" (Attar, trans. Darbandi & Davis, 1984, p. 51).

In The Alchemist, Santiago's path is marked by a succession of guides: Melchizedek, the king of Salem, who teaches him about the "Personal Legend"; the crystal merchant, who models fear and resignation; the Englishman, who embodies bookish learning; and finally the Alchemist, who serves as Santiago's true spiritual master. Each functions like a Sufi shaykh, offering not solutions but lessons that awaken insight.

When Santiago asks why he cannot remain in the oasis, the Alchemist responds:

"Listen to your heart. It knows all things, because it came from the Soul of the World, and it will one day return there" (Coelho, 1993, p. 134).

This echoes Rumî's dictum:

"The teacher leads the disciple to the door of the house, but it is he alone who must enter" (Rumî, trans. Whinfield, 1898, Book I, p. 72).

Thus, the findings show that the master-disciple dynamic in Coelho's novel is structurally identical to the Sufi pedagogical model. The guide's role is less about instruction than transformation, a theme noted by Schimmel (1975) in her analysis of Sufi educational practices.

Symbols of Transformation: Fire, Gold, and Birds

Mystical narratives rely heavily on symbols, and The Alchemist is no exception. Coelho saturates his novel with imagery of fire, gold, and birds, each of which has deep roots in Islamic mysticism.

Fire and Gold: In Salaman u Absâl, Jâmî describes how Salaman is purified through fire until he emerges "as pure gold":

"They plunged him into fire, and from the flame he issued like pure gold, purged of all dross" (Jâmî, trans. Fitzgerald, 1904, p. 46).

In The Alchemist, the desert itself functions as a fiery crucible: Santiago faces fear, loss, and uncertainty, but each trial refines him. The Alchemist tells him:

"This is why alchemy exists… so that everyone will search for his treasure, find it, and then want to be better than he was in his former life" (Coelho, 1993, p. 127).

Here, alchemy is less about metal than about the soul, echoing Jâmî's allegory.

Birds: In Conference of the Birds, the allegory culminates with the revelation that the thirty birds (si-murgh) are the Simurgh themselves:

"They saw the Simurgh, there and then
They saw the Simurgh was the thirty birds" (Attar, 1984, p. 235).

In The Alchemist, Santiago interprets the flight of hawks as an omen:

"Suddenly, one of the hawks made a flashing dive through the sky, attacking the other. A sudden fleeting image came to him: an army, with its swords at the ready, riding into the oasis" (Coelho, 1993, p. 105).

Here, birds serve as mediators between visible and invisible realms, echoing the Sufi idea of âyât (divine signs in creation) (Ramadan, 2017).

Together, fire, gold, and birds create a symbolic network that bridges Coelho and the Sufi tradition. In both, material symbols carry spiritual meaning: transformation, purification, revelation.

Experiential Knowledge and Direct Perception

Ibn Ṭufayl's Ḥayy ibn Yaqẓân (1929) dramatizes the journey of a child raised in isolation who, through reason and contemplation, attains knowledge of the divine:

"By constant observation of the heavens and the earth, he learned that all things had an Author… At last, his contemplation became so intense that

he was absorbed altogether in the vision of that Author" (Goodman, 1972, p. 97).

Santiago's learning process mirrors this epistemology. He begins by tending sheep, observing their habits, and listening to the rhythms of nature. Later, he learns to read omens in stones, wind, and stars. The Alchemist advises:

"You will never be able to escape from your heart. So it is better to listen to what it has to say" (Coelho, 1993, p. 136).

Both narratives affirm that truth is accessible through direct perception of nature and self, not merely through inherited doctrine. As Schimmel (1975) notes, Sufis often contrasted "borrowed knowledge" with "taste" (dhawq), immediate, experiential insight (p. 109). Santiago embodies the latter, transforming knowledge into lived wisdom.

Contextualizing Coelho in a Chain of Transmission

The cumulative findings point to The Alchemist as part of a genealogy of stories spanning centuries. Beginning with Arabic folktales in The Arabian Nights (1885), passing through Rumî's Sufi parables, crystallized in Attâr's collective allegory, mirrored in Ibn Ṭufayl's philosophical narrative, symbolized by Jâmî's alchemical allegory, refracted through Borges' retelling, and finally reaching Coelho's global bestseller, the motif of the seeker's journey has traversed cultures, languages, and religions.

This genealogy reveals two important findings:

Continuity of Structure: The essential pattern, dream, journey, guide, transformation, return, is remarkably consistent across texts.

Shift in Vocabulary: Coelho strips the narrative of overt Islamic references, replacing them with universal terminology: "Personal Legend," "Soul of the World," "Language of the World." Yet, the underlying mystical logic is recognizably Sufi.

Thus, The Alchemist is not merely a modern novel with a spiritual flavor. It is the latest link in a long chain of mystical storytelling, adapted for a global, plural readership.

DISCUSSION

The analyses above demonstrate that Paulo Coelho's The Alchemist is not an isolated instance of modern inspirational fiction but a reworking of one of the most enduring motifs of Islamic mystic literature. By placing Santiago's journey alongside the Baghdadi dreamer of The Arabian Nights, Rumî's parables, Attâr's allegorical flock, Ibn Ṭufayl's solitary seeker, and

Jâmî's alchemical imagery, a genealogy emerges that highlights both continuity and transformation. The discussion here will consider three key implications of these findings: (1) the universality and persistence of mystical motifs; (2) the translation of Sufi hermeneutics into globalized language; and (3) the significance of Coelho's novel for comparative mystic literature and world literature.

The Universality and Persistence of Mystical Motifs

The persistence of the "treasure-at-home" motif across cultures and centuries illustrates the universal resonance of mystical storytelling. That a Baghdadi's dream in a medieval Arabic tale, a parable in Rumî's Masnavî, and Santiago's dream in Coelho's novel all converge on the same paradox; that what is sought abroad is already at home, underscores the transhistorical appeal of this structure. Mystical literature thrives on paradox: nearness discovered through distance, presence revealed through absence, treasure uncovered through loss. As Schimmel (1975) reminds us, such paradoxes are not literary embellishments but core pedagogical strategies in Sufi teaching, meant to unsettle the seeker and guide them toward deeper perception.

That Coelho employs the same structure in a contemporary novel suggests that these motifs retain their power to speak across religious and cultural divides. What makes Santiago's story compelling for modern readers is not merely its novelty but its rootedness in a time-tested narrative form. The findings thus show that the endurance of mystical motifs is itself a form of universality, bridging medieval Baghdad and modern Sao Paulo, the Sufi lodge and the global marketplace.

Translating Sufi Hermeneutics into Global Language

The second implication concerns the way Coelho translates Sufi hermeneutics into a vocabulary accessible to modern, plural audiences. Classical Sufi literature speaks of tarîqah (the path), tawḥîd (divine unity), and ma'rifa (direct knowledge). Coelho replaces these terms with "Personal Legend," "Soul of the World," and "Language of the World." Yet the underlying structures remain intact. Santiago's reliance on omens echoes the Qur'anic concept of âyât, signs of God in creation; his submission to guidance parallels the Sufi disciple's reliance on the murshid; and his final recognition that the treasure was at home reflects the Sufi paradox of divine nearness.

This transformation is not mere simplification but a form of cultural translation. By reframing mystical concepts in universal terms, Coelho makes them legible to readers unfamiliar with Islamic traditions. This accounts for the novel's extraordinary global appeal. However, as scholars such as Harb (2015) and Sebastian (2023) point out, the cost of universality is the loss of theological specificity. What remains is the form and logic of Sufi storytelling, but not its explicitly Islamic framing. This raises questions

about cultural appropriation versus transmission, but it also highlights the permeability of mystical motifs, which have always traveled across linguistic and religious borders.

Implications for Comparative Mystic Literature and World Literature

Finally, situating The Alchemist within Islamic mystic literature highlights the necessity of including Sufi texts in discussions of comparative mysticism and world literature. Too often, global literary comparisons privilege Western sources, tracing Coelho back only to Borges or Spanish folk tradition. Yet the deeper genealogy traced here demonstrates how Islamic mysticism has shaped world literature in ways that remain underacknowledged.

Reading The Alchemist as part of this chain of transmission challenges the idea that mystical motifs are confined to one tradition. Instead, it suggests that world literature is best understood not as a collection of isolated texts but as a web of motifs, symbols, and parables that migrate across time and space. The Baghdadi's dream became Rumî's parable, Borges' modernist tale, and Coelho's bestseller. Attâr's Simurgh echoes in Santiago's recognition of the world's unity. Ibn Ṭufayl's epistemology of direct perception reappears in Santiago's reliance on omens. These continuities reveal not only literary inheritance but also the shared human fascination with the paradox of seeking.

Thus, the findings underscore a larger claim: comparative mystic literature is not only about cataloguing similarities but about tracing how motifs function pedagogically across contexts. In Sufi literature, the parables are meant to awaken the seeker. In Coelho's novel, they serve a similar purpose for contemporary readers, though in secularized form. The continuity suggests that mystical storytelling remains an active force in shaping how human beings imagine the quest for meaning.

In light of these findings, The Alchemist emerges as a novel that is both ancient and modern: ancient in its reliance on Sufi motifs, modern in its translation of these motifs into a universal idiom. It affirms that Islamic mystic literature is not a closed tradition but one that continues to reverberate across global literature. For the study of comparative mysticism, this case shows how enduring parables of the treasure-at-home, the guide, and the journey continue to inspire seekers in every age. For the field of world literature, it illustrates how stories migrate, adapt, and resurface in new guises, carrying with them the wisdom of centuries.

CONCLUSION

Paulo Coelho's The Alchemist is often celebrated as a modern tale of inspiration, yet when examined closely it reveals itself as a reworking of one of the oldest and most profound motifs of Islamic mystic literature. Santiago's dream, his arduous journey, the guidance he receives, the symbolic language of fire, gold, and birds, and his eventual discovery that the treasure lies at home all place the novel squarely within a lineage that stretches from the One Thousand and One Nights and Rumî's Masnavî to Attâr's Conference of the Birds, Ibn Ṭufayl's Ḥayy ibn Yaqẓân, and Jâmî's Salaman u Absâl. These parallels demonstrate that Coelho's narrative is not merely coincidentally similar to Sufi parables but structurally indebted to them.

The analysis has shown that Coelho universalizes Sufi hermeneutics by reframing them in accessible language; "Personal Legend" for tarîqah, "Soul of the World" for tawḥîd, and the reading of omens for Qur'anic âyât. This translation of mystical structures into secular vocabulary has allowed The Alchemist to resonate with a global readership, while still preserving the spiritual logic of its sources. As the discussion emphasized, what is gained is universality, though at the cost of theological specificity. What remains is the form of the mystical journey: dream, departure, guide, trial, revelation, and return.

In this light, The Alchemist should be read as both ancient and modern: ancient in its reliance on enduring motifs of Sufi storytelling, modern in its adaptation for a plural audience in the late twentieth century. For the field of comparative mystic literature, this case highlights how Islamic mystical texts continue to inform global narratives, often invisibly. For world literature studies, it underscores the necessity of tracing not only Western influences but also the deep and persistent echoes of Islamic traditions that shape global literary production.

Finally, the story of Santiago is the story of countless seekers before him: the treasure is near, but it is only through the trials of the journey that we learn to see it. This paradox of distance that reveals nearness remains the enduring gift of Sufi storytelling, and Coelho's novel ensures that it continues to speak powerfully to readers around the world today.

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REFERENCE

Attar, F. u.-D. (1889). The conference of the birds (E. FitzGerald, Trans.). HolyBooks. https://www.holybooks.com/wp-content/uploads/The-Conference-of-the-Birds.pdf

Borges, J. L. (1970). Labyrinths (D. A. Yates & J. E. Irby, Eds.). New Directions. https://pages.sandpoints.org/ubu50/library/Jorge%20Luis%20Borges/Labyrinths_%20Selected%20Stories%20and%20Other%20Writings%20(155)/Labyrinths_%20Selected%20Stories%20and%20Other%20Wri%20-%20Jorge%20Luis%20Borges.pdf

Borges, J. L. (1984). The Thousand and One Nights (E. Weinberger, Trans.). The Georgia Review, 38(3), 564–574. Open-access copy: https://resources.finalsite.net/images/v1621713246/smsdorg/saf9l0dk7gumenx007ze/SeniorIBEng--BORGESTheThousandandOneNights.pdf

Coelho, P. (1993). The alchemist (A. R. Clarke, Trans.). HarperCollins. (Original work published 1988). Preview available at Google Books: https://books.google.com/books?id=FzVjBgAAQBAJ

Darbandi, A., & Davis, D. (1984). Introduction. In F. u.-D. Attar, The conference of the birds (pp. vii–xxiv). Penguin Classics.

Al-Sudeary, M. (2009). The alchemy of literature: Orientalist perspectives in Coelho's The Alchemist. Association of Arab Universities Journal for Arts, 7(2), 243–258. https://aauja.yu.edu.jo/IMAGES/DOCS/V7N2/V7N2R11.PDF

Fishburn, E. (2004). Traces of the "Thousand and One Nights" in Borges. Variaciones Borges, 17, 143–158. https://www.borges.pitt.edu/bsol/documents/1707.pdf

Goodman, L. E. (1972). Ḥayy ibn Yaqẓân: A philosophical tale (Trans. with introduction and notes). Twayne Publishers.

Haddawy, H. (Trans.). (1990). The Arabian nights (Based on the text edited by Muhsin Mahdi). W. W. Norton.

Harb, M. M. (2015). The influence of classical Arabic narrative on Paulo Coelho's The Alchemist. International Journal of Humanities and Social Science, 5(7[1]), 127–131. https://www.ijhssnet.com/journals/Vol_5_No_7_1_July_2015/14.pdf

HarperCollins Publishers. (n.d.). A teacher's guide to Paulo Coelho's The Alchemist. https://files.harpercollins.com/HarperAcademic/AlchemistTG.pdf

Ibn Ṭufayl, A. (1929). The history of Ḥayy ibn Yaqẓân (S. Ockley, Trans.; A. S. Fulton, Rev. ed.). Internet Archive. https://archive.org/details/historyofhayyibn00ibnu

Jâmî, N. (1904). Salaman & Absal: An allegory (E. FitzGerald, Trans.). Sacred Texts. https://sacred-texts.com/isl/saab/index.htm

Kamali, M. H. (2018). Reading the signs: A Qur'anic perspective on thinking (rev. & expanded from 2006). International Institute of Islamic Thought. https://iiit.org/wp-content/uploads/Reading-the-Signs-OP-Complete.pdf

Lewis, F. (2008). Rumi: Past and present, east and west. Oneworld Publications.

Mahdi, M. (1984). The Thousand and One Nights (Alf Layla wa-Layla): From the earliest known sources. Brill. https://archive.org/details/kitabalflaylahwa0000unse_f6d7/mode/2up

Nicholson, R. A. (1914/2002). The mystics of Islam. Routledge; reprint (public-domain scans available). https://archive.org/details/in.ernet.dli.2015.218338

Qatar National Library. (2024, December 24). Top reads among our members in 2024 (Arabic translation of The Alchemist ranked #2). https://www.qnl.qa/en/blogs/13861

Rahaleh, A. Z. (2022). Discourse analysis of The Alchemist by Paulo Coelho. Jordanian Journal of Arabic Language and Literature. https://dsr.mutah.edu.jo/index.php/jjall/article/view/326/331

Resheq, R. A. (2017). Jalalu'd-Din Rumi's The Masnavi and Paulo Coelho's The Alchemist: A study of mystical analogy. Dirasat: Human and Social Sciences, 44(3), 237–247. https://eservices.ju.edu.jo/HSS/Article/FullText/10431?issue=3&volume=44

Rumî, J. a.-D. (1898). The Masnawi, or spiritual couplets of Jalal al-Dîn Rumî (E. H. Whinfield, Trans.). Internet Archive. https://archive.org/details/masnaviimanavi

Samad, S. (2019). Symbolism in Paulo Coelho's The Alchemist. The Criterion: An International Journal in English, 10(1), 1–7. https://www.the-criterion.com/V10/n1/AM01.pdf

Schimmel, A. (1975). Mystical dimensions of Islam. University of North Carolina Press.

Sebastian, R. (2023). Rethinking fate or "maktub" in Paulo Coelho's The Alchemist through Taoism. Cogent Arts & Humanities, 10(1), 2257018. https://www.tandfonline.com/doi/full/10.1080/23311983.2023.2257018

The Arabian Nights (Burton, R. F., Trans.). (1885). The book of the thousand nights and a night (Vol. 4). Project Gutenberg. https://www.gutenberg.org/files/53254/53254-h/53254-h.htm#THE_RUINED_MAN_WHO_BECAME_RICH_AGAIN_THROUGH_A_DREAM

Thompson, S. (1961). Motif-index of folk-literature (Vols. 1–6). Indiana University Press. https://archive.org/details/Thompson2016MotifIndex/mode/2up

Ziai, H. (1990). Knowledge and illumination: A study of Suhrawardî's Ḥikmat al-Ishrâq. Scholars Press.

“Teaching-Stories in Space”: Sufi Motifs and Methods in Doris Lessing’s Later Fiction

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ABSTRACT

This paper argues that Doris Lessing's later fiction is not merely "Sufi-coloured" but Sufi-shaped at the level of narrative method. Building on Lessing's public reflections about Idries Shah and on contemporaneous reception, I treat the speculative architectures of Re: Colonised Planet 5, Shikasta and The Marriages Between Zones Three, Four and Five, together with the "inner-space" novels (Briefing for a Descent into Hell and The Memoirs of a Survivor), as experiments in the pedagogy of the Sufi teaching-story. Methodologically, the study uses qualitative, comparative close reading guided by a codebook (guide–disciple dynamics; indirection and framing; exercises in attention; reversal/rupture; unlearning; collective attunement), triangulated with paratexts and open-access reception documents. Findings show that Lessing consistently operationalizes teaching-story mechanics: dossier and chronicle frames that defer closure; guide figures who catalyze recognition rather than preach; staged ordeals that train attention; reversals that force unlearning; and a unitive ethic dramatized as communal "we-feeling" (SOWF) or the "marriage of contraries." These devices scale from psyche to polity, rendering speculative form a laboratory for ethical perception rather than an escape from politics. The analysis clarifies how Lessing mediates Sufi method through a cosmopolitan lexicon, maintaining compatibility with Islamic mystical valuations while avoiding doctrinal claims. The paper contributes a formal account of Lessing's late style as pedagogy, a historically grounded explanation of its Sufi mediation, and a motif map that links narrative technique to ethical training. It concludes that Lessing adapts an older technology of transformation to modern fiction; crafting "teaching-stories in space" that aim to change what readers can notice, and therefore how they might live with one another.

Keywords – Doris Lessing; Sufi Teaching-Stories; Canopus In Argos; Shikasta; Narrative Pedagogy; Comparative Mysticism; Speculative Fiction.

INTRODUCTION

Doris Lessing's much-discussed "turn" from social realism to visionary and speculative modes in the 1970s–80s is best understood through her sustained engagement with Sufism, above all via her long association with Idries Shah. Lessing publicly called The Sufis "the most surprising book I had read" and said that meeting Shah "changed [her] life," later describing him as a "good friend and teacher" for three decades (Lessing, 1996). Archival finding-aids corroborate an extended correspondence between Lessing and Shah that includes discussion of religion and Sufism, indicating that this was not an incidental influence but an ongoing, dialogic

relationship (University of East Anglia Archives, n.d.). These primary traces already suggest that Lessing's formal experiment, what she once dubbed "space fiction", was not merely ornamented with "Eastern" motifs but retooled by Sufi methods: indirection, teaching-stories, a guide–disciple pedagogy, and a discipline of attention.

Early criticism recognized the shift. Nancy Shields Hardin's classic essay (1973) first tied Lessing's work to "the Sufi way," but the most widely cited formulation appears in Nancy Topping Bazin's chapter on the early-1970s novels. Reading Briefing for a Descent into Hell (1971), The Summer Before the Dark (1973), and The Memoirs of a Survivor (1974), Bazin characterizes them as "literally Sufi fables," symbolic narratives whose aim is not the communication of doctrine but the illumination of truth through a re-education of perception; ethically, the books press the reader toward "oneness" rather than catastrophe (Bazin, 1999, pp. 33–42). Bazin's emphasis on form; parable, framing, layered instruction, sets the agenda for later scholarship.

Two book-length studies consolidate this insight. Shadia S. Fahim's Doris Lessing: Sufi Equilibrium and the Form of the Novel (1994) argues that Lessing achieves a formal "equilibrium" once Sufi epistemology (ways of knowing) and pedagogy shape her fiction; she traces how the novels shift from ideological combat to the disciplining of attention and self-knowledge (Fahim, 1994). Müge Galin's Between East and West (1997) surveys the full arc from the "inner-space" works to the Canopus in Argos cycle, detailing how Sufi motifs such as journey, guidance, and transformation structure plot, narration, and address to the reader (Galin, 1997). Together, these studies establish a consensus: Lessing's late fiction is Sufi-shaped, not merely Sufi-colored.

Contextual histories help explain the mechanism of that shaping. Mark Sedgwick shows how Shah popularized Sufi material for Anglophone readers through teaching-stories (e.g., Nasruddin tales), presented as instruments to act on the reader's habits of attention rather than as doctrinal propositions; Sedgwick also documents Lessing's public championship of Shah's project (Sedgwick, 2018). From this vantage, signature features of the later novels; indirection, abrupt reversals, layered frames, guide figures, read as literary transpositions of the shaykh–murîd pedagogy into secular narrative form. Lessing's own essays align with this picture: in A Small Personal Voice she defends a writer's responsibility to educate perception and feeling, an ethos consonant with Sufi aims of training awareness rather than advancing creeds (Lessing, 1975, pp. 3–7).

The "inner-space" trilogy can thus be read as staged exercises in unlearning. Briefing for a Descent into Hell dismantles ordinary cognition so that a broader awareness may re-cohere, a procedure critics read as didactic in the classical, Sufi sense (Bazin, 1999; Fahim, 1994). The Memoirs of a Survivor trains the reader to read signs: to sustain attention across unstable

surfaces and discern pattern beneath flux, precisely the perceptual discipline Lessing associates elsewhere with Sufism (Bazin, 1999). Far from abandoning politics, these novels relocate ethical work upstream of ideology, at the level of perception and responsibility.

The Canopus in Argos sequence (1979–1983) refracts the same pedagogy across civilizational scales. Its emissaries, tutors, and "education" programs model guidance as world-making; the Canopeans' "Substance-of-We-Feeling" allegorizes a cultivated, transmissible awareness, akin to baraka in Sufi vocabulary, that can erode or be replenished (Fahim, 1994, chap. 5; Galin, 1997, pp. 205–228). Contemporary reception already heard the Sufi undertone: a 1980 review of Shikasta noted that the series "slightly echoes the sound of Sufi … with its acceptance of the unity of all religions and myths" (Coldwell, 1980, p. 1). In this frame, the science-fictional apparatus functions as a teaching-story system: parables nested in reports, letters, and dossiers whose juxtapositions ripen insight over time (Sedgwick, 2018; Shah, 1977).

Open-access theses and recent essays broaden the picture and press further questions. Mary Louise Waarvik's MA thesis (1986) explicitly reads Canopus as a "Sufist science-fiction series," cataloguing recurrent motifs; guides, exercises in perception, layered realities, and linking them to Lessing's engagement with Shah (Waarvik, 1986). Md. Mahmudul Hasan (2016) argues that Lessing's valuation of responsibility and education converges with Islamic ethics and situates her attraction to Sufism within a broader "humanist" project; among his primary exhibits are Lessing's own statements about Shah and her enthusiastic introduction to a work on Râbi'a al-'Adawiyya (Hasan, 2016, pp. 17–19). David Sergeant (2021) reframes the late turn in terms of utopian form and readerly training; conclusions compatible with, though not reducible to, the Sufi account (Sergeant, 2021). Finally, S. Kiaei (2011) returns to the teaching-story as a comparative tool, arguing that Lessing's short-form parabolic units function like Shah's anthologized tales: they are designed to work on the reader's stance rather than to be decoded as symbols.

A broader critique must also register debate over Shah's "universalist" Sufism. Sedgwick (2018) describes it as a modern "neo-Sufism" that sometimes distances itself from Islamic institution and law; Teruaki Moriyama's response nuances this picture, distinguishing scholarly uses of "neo-Sufism" and noting that Sufi traditions have always oscillated between strict confessional embeddedness and more syncretic, universalizing currents (Moriyama, 2018). Hasan (2016) likewise emphasizes Lessing's explicit respect for Islamic sources and argues that her Sufism is neither escapist nor quietist, but oriented to ethical responsibility. Taken together, these perspectives locate Lessing at a crossroads: engaging a Sufism mediated by Shah's modern program while remaining animated by a recognizably Islamic ethical imaginary (education, self-purification, justice).

Synthesis and gap: The literature, spanning primary statements, archival records, peer-reviewed chapters, monographs, theses, and contextual religious-studies essays, converges on three claims. First, Lessing appropriates Sufi methods (teaching-stories; guide–disciple dynamics; training of perception) rather than merely Sufi content (Bazin, 1999; Fahim, 1994; Galin, 1997). Second, this method is mediated by Shah's Anglophone "teaching-story" project and is affirmed by Lessing's own testimony (Lessing, 1996; Sedgwick, 2018; Shah, 1977). Third, the late novels function as instruments of ethical and perceptual recalibration, from the unlearning dramas of the "inner-space" works to the civilizational pedagogy of Canopus (Fahim, 1994; Galin, 1997; Coldwell, 1980). What remains underdeveloped is a motif-by-motif cartography: systematic mapping between specific Sufi story clusters (for example, Attar's guide logic in Mantiq al-Tayr or Nasruddin paradoxes) and discrete episodes in Lessing's fiction. The present study takes up that task, arguing that Lessing's "space" fiction does in English what classical Sufi narratives long claimed to do: retrain attention; and, by doing so, reorient the reader toward unity and responsibility.

METHODOLOGY

This study investigates how Doris Lessing's later fiction operationalizes Sufi methods, especially the "teaching-story," indirection, the guide–disciple pedagogy, and the disciplining of attention, rather than merely borrowing Sufi imagery. The approach is qualitative, comparative, and text-centered, with triangulation from paratexts (essays, interviews), archival finding-aids, and existing scholarship.

Research questions

1. By what narrative means do Lessing's "inner-space" novels and the Canopus in Argos cycle enact Sufi pedagogical aims (training of perception, unlearning, transformation)?

2. Which teaching-story features (as disseminated in Idries Shah's Anglophone program) are most consistently transposed into Lessing's fiction, and how are they adapted to secular/speculative frames?

3. How do these formal choices intersect with contemporaneous reception and with Lessing's own stated commitments?

These questions are motivated by primary testimony (Lessing's statements on Shah) and a critical consensus that her later work is Sufi-shaped at the level of form (Bazin, 1999; Fahim, 1994; Galin, 1997; Lessing, 1996).

Corpus and sampling

To capture both phases highlighted in the literature, the corpus comprises:

"Inner-space" phase: Briefing for a Descent into Hell (1971) and The Memoirs of a Survivor (1974), frequently cited as Sufi "fable-like" narratives aimed at re-educating perception (Bazin, 1999; Fahim, 1994).

"Outer-space" / Canopus phase: Re: Colonised Planet 5, Shikasta (1979) and The Marriages Between Zones Three, Four and Five (1980), where emissaries, guides, and "education" programs dramatize a pedagogy scaled to civilizations (Fahim, 1994; Galin, 1997).

Paratexts and context sources used for triangulation include: Lessing's essays on the writer's educative responsibility (Lessing, 1975), her obituary note on Shah (Lessing, 1996), the UEA Archives finding-aid documenting Lessing–Shah correspondence (University of East Anglia Archives, n.d.), Shah's Anglophone teaching-story collections (Shah, 1977), and reception/context studies (Hardin, 1973; Sedgwick, 2018; Waarvik, 1986; Coldwell, 1980).

Access note: Wherever possible, editions available in open repositories (Archive.org, institutional repositories) are consulted for pagination and citation integrity (e.g., Bazin, 1999; Fahim, 1994; Galin, 1997; Lessing, 1975; Shah, 1977; Sedgwick, 2018; Waarvik, 1986).

Theoretical frame

Two linked frames guide the analysis:

Sufi hermeneutics as method: Following scholarship that reads Lessing's later fiction as organized by Sufi epistemology and pedagogy, not merely themes (Fahim, 1994; Galin, 1997), the study treats "teaching-story" devices as operational features (parable structure, abrupt reversals, guided attention, nested frames) rather than as symbols to decode (Bazin, 1999).

Reception and mediation: Shah's Anglophone "teaching-story" program is taken as Lessing's principal mediator, shaping how Sufi methods enter English-language fiction (Sedgwick, 2018; Shah, 1977). The analysis remains attentive to debates around Shah's "neo-Sufism" and its universalist rhetoric (Sedgwick, 2018; Moriyama, 2018), and to scholarship that situates Lessing's ethical commitments in conversation with Islamic/Sufi values (Hasan, 2016).

Operational definitions and coding scheme

A codebook derived from Shah's teaching-story practice and the critical literature (Bazin, 1999; Fahim, 1994; Galin, 1997; Sedgwick, 2018; Shah, 1977) structures close reading. Key operational categories include:

Guide–disciple dynamic: presence/function of a guide, tutor, emissary, or master figure who prompts rather than "tells."

Indirection and framing: parables, reports, dossiers, dreams, and layered narratives that defer "message" and work on readerly stance.

Exercises in perception: scenes that stage attention training (e.g., reading signs, sustaining awareness across flux).

Reversal/rupture: sudden perspectival flips that reconfigure prior understanding (teaching-story "turn").

Unlearning/emptying: plot devices that strip characters (and readers) of habitual cognitive frames.

Collective attunement: textual analogues of baraka or "Substance-of-We-Feeling," where a transmissible, cultivated awareness is thematized.

Ethical vector: movement toward unity/responsibility (often named in criticism as "equilibrium," "oneness," or recalibration of perception).

Each text is read line-by-line with codes applied to episodes; co-occurrences (e.g., guide + reversal + exercise) are charted to identify recurrent teaching-story modules.

Procedures

Close reading & motif mapping: For each novel, teaching-story features are identified, excerpted, and mapped against the codebook. Particular attention is paid to nested frames in Shikasta (reports, letters) and to visionary/didactic scenes in the "inner-space" novels (Bazin, 1999; Fahim, 1994; Galin, 1997).

Comparative alignment with Shah's stories: Select episodes are compared with teaching-story patterns documented in Shah's collections (brevity, reversal, non-closure, stance-shifting), treating Shah as a historically specific bridge between classical Sufi pedagogy and Lessing's English-language practice (Shah, 1977; Sedgwick, 2018).

Paratextual triangulation: Interpretive claims are tested against Lessing's essays (writerly responsibility as perceptual education: Lessing, 1975), her public testimony about Shah (Lessing, 1996), archival cataloguing of the relationship (University of East Anglia Archives, n.d.), and early reception noting Sufi resonances in Canopus (Hardin, 1973; Coldwell, 1980).

Contextual cross-checks: Where the reading risks over-ascription to Sufism, counter-accounts from utopian/speculative-fiction studies are consulted (Sergeant, 2021) and integrated into the analysis to avoid reductionism.

Validity and reliability

Triangulation: Claims must be supported by at least two of the following: textual evidence (coded episodes), Lessing's own statements/archival records, and peer-reviewed scholarship (Bazin, 1999; Fahim, 1994; Galin, 1997; Sedgwick, 2018).

Negative case analysis: Episodes that resist the teaching-story reading (e.g., purely satirical or documentary stretches) are documented to delimit scope.

Source transparency: Only verifiable sources are cited; page ranges are supplied from accessible editions (Archive.org scans or institutional repositories).

Reflexivity about mediation: The study explicitly distinguishes between Sufism as Islamic tradition and Shah's modern Anglophone mediation (Sedgwick, 2018; Moriyama, 2018), acknowledging how that mediation shapes what is legible in Lessing.

Limits and scope

The analysis does not argue for direct derivation from classical Persian/Arabic texts; it traces Sufi methods as they reach Lessing primarily via Shah's program and her documented engagement.

The paper focuses on four novels (two "inner-space," two Canopus) to allow depth; other works are referenced selectively.

Access to private correspondence is limited to catalogue descriptions; no claims are made beyond what the finding-aid warrants (University of East Anglia Archives, n.d.).

ANALYSIS AND RESULTS

The seeker's journey and the Sufi "return": Shikasta as a bridge text

Lessing's Shikasta repeatedly stages the mystical paradox of traveling outward to recover an inward, already-present wholeness, a pattern central to Sufi parable. The novel's cosmic sociology names the lost connective force SOWF ("substance-of-we-feeling"), a phrase that literalizes unity (tawhîd) at the level of a planetary commons. In a key summary of the great collapse, Lessing writes:

"Within a couple of decades, of the billions upon billions of Shikasta perhaps 1 percent remained. The substance-of-we-feeling, previously shared among these multitudes, was now enough to sustain, and keep them all sweet, and whole, and healthy." (Lessing, 1979/1980, as quoted in Coldwell, 1980, p. 111).

Placed alongside Arabic and Persian "treasure-at-home" tales, SOWF functions like an allegorical shorthand for the near-at-hand beloved who is not recognized until loss and exile teach the seeker to see. Coldwell's contemporaneous review already heard the Sufi resonance—"SOWF …

slightly echoes the sound of Sufi"—and ties Lessing's ethic of planetary pity to that lexicon of unity and self-work.

A second Shikasta passage captures the catastrophe that precipitates the return-logic (journey → insight → re-membering). In the mock-trial chronicle, the narration shifts from political blame to metaphysical diagnosis:

"A mechanism went wrong, and major cities were blasted into death-giving dusts … In a short time, nearly the whole of the northern hemisphere was in ruins." (Lessing, 1979/1980, as quoted in Coldwell, 1980, p. 111).

Read against the Arabian Nights dream-treasure tale and Rumî's Masnavî retelling, Lessing's move is to universalize the spiritual economy: the lost "sustenance" is not private gnosis but a shared field. That interpretive shift helps explain why Coelho could translate the same grammar of quest into a mass-market parable (The Alchemist) without the doctrinal framing; both borrow the older structure, but Lessing keeps its explicitly metaphysical stakes visible.

The figure of the guide and narrative self-discipline: Marriages as a chronicle of tutelage

In The Marriages Between Zones Three, Four and Five, the "Providers" conscript two sovereigns—Al'Ith and Ben Ata—into a corrective pedagogy. Lessing opens her book with an address from a recorder whose voice constantly checks its own power, an ethical self-binding that mirrors the Sufi master's refusal to over-determine the disciple's path. The widely cited line reads:

"We Chroniclers do well to be afraid when we approach those parts of our histories (our natures) that deal with evil, the depraved, the benighted." (Lessing, 1980, excerpted in Barbican, Brave New Words page, para. 1; see also Le Guin, 2018, Chapter 12, Quotes From Pages 183–201).

Two things matter here for comparative mysticism: (a) the performative caution; "describing, we become" echoes the Sufi sense that language can conjure states and must therefore be handled as praxis, not display; and (b) the polyphonic chronicle (a narrator who is also a moral subject) resembles inward-directed âdâb (discipline/etiquette) in Sufi instruction manuals, where the teacher's authority is circumscribed by humility.

Coldwell's review (written the year Marriages appeared) also captures the book's symbolic pedagogy; zones like "layers of an onion," ascents and descents, and a ritual pavilion whose boundaries admit others only when the protagonists' inner work ripens, elements that map neatly onto Sufi progress metaphors (maqâmât/ahwâl).

Symbols and Sites of Transformation: From SOWF to the Marriage Pavilion

Lessing's symbol system moves between an inner ethic of mutuality and outward ritual spaces where that ethic is practiced. In Shikasta, the Canopean "Lock" that once linked Canopus to Earth ("Rohanda") feeds the planet with SOWF, the "substance-of-we-feeling," figuring a love that is at once cosmological and ethical. Johor names the Lock "the silvery cord of our love" (Lessing, 1979/1981, p. 90, as cited in Siltaoja, 2012), and later the narrative glosses SOWF as the precious atmosphere that "would keep them from falling back to animal level… They must reverence SOWF" (Lessing, 1979/1981, pp. 96–97, as cited in Siltaoja, 2012, p. 15). These pages anchor a consistent value: flourishing comes from a consciously sustained we-orientation, not from atomized striving.

If Shikasta names the ethic, The Marriages Between Zones Three, Four and Five stages it. Contemporary reception noticed that the novel literalizes transformation as an architecture of union: only the monarchs may enter the "marriage pavilion," a strictly specified precinct where "a drum-beat announces the marriage of contraries and the power of well-being begins to flow through the realms" (Coldwell, 1980, p. 2). Coldwell's review also captures the pavilion's rule-set, geometrically ordered gardens, imaginal provisioning, which dramatizes how form channels affect (pp. 2–3).

Inside that precinct, sexual practice becomes a pedagogy of reciprocity. A sustained scene registers Ben Ata's progress from conquest to mutual attunement: he learns "the answer and question, the mutual response and counter-response of lovemaking between equals (88)," until their union achieves "a lightness, an impulsiveness… a grace" (Lessing, 1980/1981, p. 227, as cited in Unity in Diversity, 2012, pp. 132–33). The same study ties this erotic reciprocity to political integration: as Al-Ith, Ben Ata, and later Vahshi change, their lands change; union of persons becomes union of zones (pp. 133–35).

Lessing also thematizes the risk of representation that accompanies such "marriages of contraries." A Chronicler warns: "We Chroniclers do well to be afraid when we approach those parts of our histories (our natures) that deal with evil, the depraved, the benighted. Describing, we become" (Lessing, 1980, Marriages, quoted on Barbican's "Brave New Words," para. 1). The line doubles as method: to narrate mixture of good and harm, of self and other is already to be implicated in its effects.

Inner Instruction and Human Limits at Cosmic Scale: Briefing for a Descent into Hell

If Marriages models reciprocity in a shared space, Briefing for a Descent into Hell (BDH) radicalizes the site of instruction as interiority itself. Lessing labels the book "Inner Space Fiction. For there is never anywhere to go but in" (Lessing, 1971/1995, p. 9, quoted in Méndez García,

2003). Watkins's voice figures the movement as katabasis and anabasis: "plunge like a diver to the ocean floor where it is as dark as a fish's gut and there's nowhere to go but up" (Lessing, 1971/1995, p. 36, quoted in Méndez García, 2003). The novel keeps pressing on the limits of language as a vehicle for such experience: "Doctor, I can't talk to you… All these words you say, they fall into a gulf" (Lessing, 1971/1995, p. 141, quoted in Méndez García, 2003); and on the institutional pressures that push hard awakenings back into sedation: "I never learned to live awake… then for God's sake… give me drugs and put me back to dreaming again" (p. 129, quoted in Méndez García, 2003).

The "briefing" also sketches an esoteric sociology of guidance. Rosemary Baines and Frederick Larson are "people… who know" and "keep quiet… saving the people who know they are in the trap" (Lessing, 1971/1995, p. 249, quoted in Méndez García, 2003). Yet the novel remains unsentimental about outcomes: after shock treatment, Watkins writes that he is "fully recovered again" (p. 250), a line the thesis reads as a sober admission of reintegration into the consensus trance rather than a cure (Méndez García, 2003). The book's wager, then, is not clinical but ethical: it asks what forms of care can midwife interior travel without foreclosing it with diagnostic control.

Reception Cross-Checks: What the Record Shows

Open-access reception documents corroborate this Sufi-adjacent, initiatory reading without forcing Lessing into a single doctrinal frame. Coldwell's early review (1980) already hears the SOWF/Sufi resonance, "The abbreviation SOWF… slightly echoes the sound of Sufi", and situates Shikasta within "the unity of all religions and myths," where love sustains the world and perception can be educated (pp. 1–2). The same review reads Marriages as a myth of healing by "marriage of contraries," noting how sexual reciprocity catalyzes civic regeneration and how the pavilion's strict specifications stage transformation as practice (pp. 2–3).

A contemporaneous scholarly review in LINQ (Frost, 1981) likewise characterizes Shikasta and Marriages as experimental fictions that retool form to carry moral vision; Lessing's "archives" as vehicles for diagnosing civilizational decline and rehearsing modalities of repair. Frost underlines the series' doubleness: it is speculative yet ethically directive, "breakdown and regeneration" as twinned themes.

Finally, later critical syntheses read Marriages' erotics as a structural metaphor: "between equals (88)" and finally "a lightness, an impulsiveness… a grace" (227) are not flourishes but signs that equality has become felt and therefore politically efficacious so that integration spreads beyond the couple to the zones (Unity in Diversity, 2012, pp. 132–35). That is: Lessing's late fiction asks readers to test, in body and polity, whether love

as practice; SOWF's we-feeling, pavilion's pedagogy, inner descent's courage, can be scaled.

DISCUSSION

This study set out to determine whether Doris Lessing's later fiction is merely "Sufi-coloured" (borrowing symbols) or decisively Sufi-shaped at the level of method. The findings, drawn from close reading, reception documents, and Lessing's own testimony, support the stronger claim. Across the "inner-space" novels and the Canopus in Argos cycle, Lessing systematically deploys the teaching-story logic that Idries Shah popularized in English: indirection, framed narration, reversal/rupture, staged exercises in attention, and a guide–disciple pedagogy that catalyzes recognition rather than dispensing doctrine (Shah, 1977; Sedgwick, 2018). This aligns with Lessing's public acknowledgments of Shah as a long-term "friend and teacher" and with her essays arguing that a writer's task is to educate perception and feeling (Lessing, 1996; Lessing, 1975).

Method vs. doctrine: locating Lessing on the Sufi map

A first implication is conceptual. Read with Bazin's description of the 1970s novels as "literally Sufi fables" that "illuminate truth" and insist that "life is One," Lessing's later work looks less like thematic borrowing and more like the import of a pedagogy; stories designed to change the reader's stance (Bazin, 1999). Fahim's notion of "Sufi equilibrium" describes the formal result of this import: the novels move away from ideological didacticism toward the disciplining of attention that Sufi training aims at (Fahim, 1994). Galin's mapping of Sufi signatures across Canopus confirms that the same method scales from psyche to polity (Galin, 1997).

This framing also clarifies a recurrent debate. Sedgwick characterizes Shah's program as a modern, universalizing "neo-Sufism" that sometimes loosens overt Islamic moorings (Sedgwick, 2018). Moriyama cautions that "neo-Sufism" names several distinct phenomena and notes that Sufi history has long oscillated between confessional embeddedness and universalizing address (Moriyama, 2018). Lessing's novels sit precisely at this crossroads: they dramatize Sufi pedagogy in secular diction. Hasan's analysis from within Islamic studies reinforces that this does not flatten the tradition; rather, Lessing's ethical emphases (responsibility, self-discipline, education) are recognizably compatible with Islamic/Sufi valuations even where doctrinal language is muted (Hasan, 2016). In short, the books model

methodological Sufism (how one learns), not doctrinal Sufism (what one must profess).

Genre and form: why speculative architectures matter

A second implication concerns form. Contemporary reception already heard the spiritual undertone of Canopus. Coldwell describes Shikasta as a mosaic of "reports and analyses 'personal, historical and psychological'," a dossier-form that lets readers "dip in at any point", exactly how story cycles in teaching collections work, ripening insight by juxtaposition rather than argument (Coldwell, 1980, pp. 110–111). The same review hears the Sufi echo in the planet's connective force ("SOWF … slightly echoes the sound of Sufi") and glosses the series' ethic as the world "sustained by love" and the belief that "everyone is capable of expansion" beyond ordinary perception (Coldwell, 1980, pp. 111, 113). Frost, writing from another venue, likewise treats Shikasta/Marriages as experimental architectures designed to carry a moral vision of breakdown and regeneration (Frost, 1981). Sergeant's later account of Lessing's shift "from realism to utopia" dovetails with this: speculative form is not escape but a training ground for new cognitive-ethical habits (Sergeant, 2021).

Ethics of attention, pedagogy of contraries

A third implication is ethical-practical. The analyses showed that Lessing turns reading into practice. In Shikasta, SOWF literalizes a communal "we-feeling" that rehabilitates the remnant after catastrophe; in Marriages, the ritual pavilion and the Chronicler's caution ("We Chroniclers do well to be afraid… Describing, we become") establish rules of attention and speech for approaching darkness, a concern shared with Sufi âdâb (Barbican, 2017; Coldwell, 1980). At the level of character, the Blakean pedagogy of contraries; "Without contraries is no progression", becomes an experiential curriculum: Al-Ith and Ben Ata descend and ascend through each other until reciprocity is felt as "lightness… grace," with political consequences as union expands from persons to zones (Coldwell, 1980, p. 113). Briefing for a Descent into Hell pushes the same lesson inward: awakening requires timing, ordeal, and care; institutions that force premature closure (shock, sedation) short-circuit instruction (Méndez García, 2003, pp. 249–250). Siltaoja's ecocritical reading of Shikasta helps tie these strands together by anchoring SOWF in a concrete page-localized ethics of interdependence (Siltaoja, 2012, pp. 90, 96–97).

Reception as evidence, not noise

A fourth implication is methodological. Because Lessing's novels remain under copyright and full OA text is limited, reception documents do double duty. They are not merely opinions; they are historical witnesses to how the books were first read. Coldwell's and Frost's reviews, Bazin's

synthesis of early British responses, and Taubman's LRB essays supply triangulating testimony that readers immediately perceived the series as spiritually ambitious, formally daring, and ethically instructive, even when they disagreed about its success (Bazin, 1999; Coldwell, 1980; Frost, 1981; Taubman, 1979). Le Guin's later praise of the Chronicler's warning shows that the ethical seriousness of Marriages remained legible to major writers long after publication (Le Guin, 2018).

Limits of this study and avenues forward

Two limitations bear noting. First, although we anchored quotations in verifiable OA locations (e.g., Coldwell's paginated review; OA theses that reproduce Lessing's wording with page numbers), future work should align passages to specific printings of the novels used in publication or defense copies to avoid pagination drift (Siltaoja, 2012; Méndez García, 2003). Second, our claims about Lessing–Shah exchange are based on Lessing's public statements and the UEA Archives finding-aid; direct access to correspondence could nuance the account of mediation, but falls outside our present access (University of East Anglia Archives, n.d.; Lessing, 1996).

With those limits stated, three extensions are promising. (1) Motif cartography: a systematic, scene-level mapping between specific teaching-story patterns in Shah's collections and discrete moments in Canopus would refine the method claim (Shah, 1977). (2) Comparative reception: bringing Hardin's early "Sufi way" article into closer dialogue with later monographs (Fahim, 1994; Galin, 1997) could chart how the Sufi frame matured in criticism (Hardin, 1973). (3) Form and ethics: building on Sergeant's and Hasan's arguments, a study of Lessing's reader training as a form of ethical pedagogy legible within Islamic thought could bridge literary studies and religious ethics (Hasan, 2016; Sergeant, 2021).

Taken together, the evidence from primary testimony, formal analysis, and reception converges: Lessing's late fiction adopts Sufi method as literary form. The novels neither smuggle in a creed nor merely garnish realism with exotic imagery. They stage instruction through dossiers, chronicles, pavilions, trials, and visions in order to retrain attention, reconcile contraries, and re-open the possibility of unity. That is precisely what Sufi teaching-stories claim to do, and it explains why Lessing's "space fiction" still reads, in Coldwell's words, as an invitation to "expansion beyond the normally perceived" (Coldwell, 1980, p. 113). In this light, Lessing's turn is not a departure from the political but an attempt to work upstream of it, at the level where perception becomes ethics.

CONCLUSION

This paper has shown that Doris Lessing's late novels are not merely decorated with mystical imagery; they are engineered around a pedagogy traceable to Sufi teaching-stories. Across Shikasta, The Marriages Between Zones Three, Four and Five, and the "inner-space" works, indirection, nested frames, tutelary guides, reversals, and exercises in attention serve as the narrative motors. Devices like the dossier form, the marriage pavilion, and visionary "briefings" are not ornamental; they train readers to hold contraries, to tolerate uncertainty, and to reimagine selfhood as relation.

Understanding Lessing's turn in these terms clarifies both form and ethics: speculative architectures become laboratories for the education of perception, and unity is pursued not as dogma but as practiced attunement. This methodological reading also explains the novels' cosmopolitan lexicon, terms that invite diverse audiences into a discipline of noticing rather than into a creed.

Future work can map specific teaching-story types onto discrete scenes and align quotations to uniform print editions. But the central claim stands: Lessing adapts an old technology of transformation to modern fiction, crafting "teaching-stories in space" that aim to change how, and with whom, we live.

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REFERENCES

Barbican. (2017). Brave New Words: Writing the Unknown (exhibition essay by Andy Sawyer; includes an excerpt from Lessing's The Marriages Between Zones Three, Four and Five). https://www.barbican.org.uk/s/bravenewwords

Bazin, N. T. (1999). Androgyny or catastrophe: Doris Lessing's vision in the early 1970s. In P. S. Perrakis (Ed.), Spiritual exploration in the works of Doris Lessing (pp. 33–42). Greenwood Press. https://digitalcommons.odu.edu/english_fac_pubs/147/

Coldwell, J. (1980). Canopus in Argos: Archives [Review of Shikasta and The Marriages Between Zones Three, Four and Five]. Atlantis, 6(1), 118–123. https://atlantisjournal.ca/index.php/atlantis/article/download/4698/3930/6140

Fahim, S. S. (1994). Doris Lessing: Sufi equilibrium and the form of the novel. St. Martin's/Palgrave. https://archive.org/details/dorislessingsufi0000fahi

Frost, C. (2016). Breakdown and Regeneration: Some Major Themes in Doris Lessing's Latest Fiction. LiNQ (Literature in North Queensland), 11(1). (Journal archive homepage: https://journals.jcu.edu.au/linq

Galin, M. (1997). Between East and West: Sufism in the novels of Doris Lessing. SUNY Press. https://archive.org/details/betweeneastwests0000gali

Hardin, N. S. (1973). Doris Lessing and the Sufi way. Contemporary Literature, 14(4), 565–581. https://www.jstor.org/stable/1207473

Hasan, M. M. (2016). Discovering Doris Lessing: Convergences between Islam and her thoughts. American Journal of Islamic Social Sciences, 33(2), 1–25. https://www.ajis.org/index.php/ajiss/article/download/247/1956/4596

Kiaei, S. (2011). Sufi Novels and Parables: A Significant Change in Doris Lessing's Writing. Asian Culture and History. https://doi.org/10.5539/ACH.V4N1P41

Le Guin, U. K. (2018). Dreams Must Explain Themselves: The selected non-fiction of Ursula K. Le Guin. London: Gateway/Gollancz. Publisher page: https://www.sfgateway.com/titles/ursula-k-le-guin/dreams-must-explain-themselves/9781473205956/ (For a freely accessible excerpt confirming quoted material, see: https://cdn.bookey.app/files/pdf/book/en/dreams-must-explain-themselves.pdf

Lessing, D. (1975). The small personal voice. In P. Schlueter (Ed.), A small personal voice: Essays, reviews, interviews (pp. 3–7). Vintage/Knopf. https://archive.org/details/smallpersonalvoi00less

Lessing, D. (1996). On the death of Idries Shah (excerpt from The Daily Telegraph obituary). https://www.dorislessing.org/on.html

Lessing, D. (1980). The marriages between zones three, four, and five (as narrated by the chroniclers of zone three). New York: Knopf. Open Library / Internet Archive (controlled digital lending): https://archive.org/details/marriagesbetween00less

Lessing, D. (1994). The Marriages Between Zones Three, Four and Five (Flamingo ed.). London: Flamingo. Internet Archive (controlled digital lending): https://archive.org/details/marriagesbetween0000less

Lessing, D. (1980). Shikasta: Re, colonised planet 5 (UK ed.). London: Granada. Internet Archive (controlled digital lending): https://archive.org/details/shikastarecoloni00less_0

Lessing, D. (1981). Shikasta: Re, colonised planet 5 (US Vintage ed.). New York: Vintage. Internet Archive (controlled digital lending): https://archive.org/details/shikastarecoloni0000dori

Méndez García, M. (2003). Retórica de la esquizofrenia en los epígonos del modernismo: Sábato, Fuentes, Donoso y Del Paso (Doctoral dissertation, Universidad Complutense de Madrid). UCM E-Prints. https://eprints.ucm.es/id/eprint/5013/

Moriyama, T. (2018). A response to Prof. Mark Sedgwick: "Neo-Sufism in the 1960s: Idries Shah." CISMOR Working Paper, 73–76. https://www.cismor.jp/uploads-images/sites/2/2018/05/A-Response-to-Prof.-Mark-Sedgwick-Neo-Sufism-in-the-1960s-Idries-Shah.pdf

Sedgwick, M. (2018). Neo-Sufism in the 1960s: Idries Shah. CISMOR Working Paper. https://www.cismor.jp/uploads-images/sites/2/2018/05/Neo-Sufism-in-the-1960s-Idries-Shah.pdf

Sergeant, D. (2021). From realism to utopia in Doris Lessing's The Four-Gated City. University of Plymouth Research Repository. https://pearl.plymouth.ac.uk/cgi/viewcontent.cgi?article=1021&context=sc-research

Shah, I. (1977). Tales of the dervishes: Teaching stories of the Sufi masters. Octagon Press. (Internet Archive item record). https://archive.org/details/tales-of-the-dervishes-teaching-stories-of-the-sufi-masters

Siltaoja, R. (2012). A small voice for the Earth: A Romantic and Green reading of Doris Lessing's Shikasta (Master's thesis, University of Tampere). Trepo institutional repository. https://trepo.tuni.fi/bitstream/10024/84272/1/gradu06481.pdf

Taubman, R. (1979, December 20). Doris Lessing's space fiction. London Review of Books, 1(5). https://www.lrb.co.uk/the-paper/v01/n05/robert-taubman/doris-lessing-s-space-fiction

Taubman, R. (1980, June 19). Queen to King Four. London Review of Books, 2(12). https://www.lrb.co.uk/the-paper/v02/n12/robert-taubman/queen-to-king-four

University of East Anglia Archives. (n.d.). DL/A-Z//SHAH I — Correspondence with Idries Shah (collection catalogue). https://archivecollections.uea.ac.uk/dl.a-z..shah-i

Waarvik, M. L. (1986). "Canopus in Argos: Doris Lessing's Sufist science-fiction series" (MA thesis). University of Alaska. https://scholarworks.alaska.edu/bitstream/handle/11122/8489/Waarvik_M_1986.pdf

Is There a U-Shaped Long-Run Relationship Between Trade Globalization and Unemployment? Evidence From Türkiye

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ABSTRACT

This study examines whether a U-shaped long-run relationship exists between trade globalization and unemployment in Türkiye over the period 1991–2022. Using annual data and the ARDL bounds testing approach, trade globalization is measured by the KOF Trade Globalization Index, while its squared term is included to test for nonlinearity. The unemployment rate is sourced from World Bank WDI (ILO modeled estimates).

ADF unit root tests confirm that all variables (UNEMP, TRADEGLOB, and TRADEGLOB²) are I(1), satisfying ARDL requirements. The bounds test indicates a stable long-run cointegration relationship. Long-run estimates from the ARDL(1,5,5) model reveal a statistically significant negative coefficient for trade globalization and a positive coefficient for its squared term, confirming a U-shaped pattern. The turning point occurs at a KOF trade globalization index value of approximately 47.86, implying that unemployment initially declines with rising trade openness but begins to increase beyond this threshold.

Short-run dynamics show mixed effects, while the error-correction term (−0.5201, significant at 1%) indicates that roughly 52% of any disequilibrium is corrected within one year. Diagnostic tests confirm that the model is well-specified, with normally distributed residuals, no serial correlation, homoscedasticity, correct functional form, and parameter stability.

The results suggest that moderate trade globalization reduces unemployment in Türkiye, but excessive openness beyond a certain level generates upward pressure on unemployment, likely due to import competition, structural rigidities, and skill mismatches. This finding highlights the importance of complementary labor market policies to sustain the employment benefits of globalization.

Keywords – Trade Globalization, Unemployment, U-Shaped Relationship, Nonlinearity, ARDL Bounds Testing, Türkiye, Cointegration, KOF Globalization Index.

INTRODUCTION

The rise of globalization has fundamentally transformed global labor markets. While economic integration is generally associated with efficiency gains and trade expansion, its distributional impacts on employment remain complex and often context-dependent. Trade globalization—measured by the increasing openness of economies through imports and exports—has been particularly influential in shaping unemployment trends across countries (Dutt et al., 2009). From a theoretical perspective, neoclassical trade models predict that economies abundant in labor-intensive resources will experience employment gains through comparative advantage mechanisms. However,

empirical findings on the globalization–unemployment nexus remain inconclusive.

The rapid advancement of trade globalization over the past three decades has fundamentally reshaped labor markets worldwide, with profound implications for unemployment dynamics in emerging economies such as Türkiye. Trade globalization, measured by indicators like the KOF Trade Globalization Index, promotes resource reallocation toward comparative advantage sectors, potentially reducing unemployment through increased export opportunities and productivity gains in labor-intensive industries. However, it can also generate job displacement in import-competing sectors, skill mismatches, and structural unemployment, leading to ambiguous net effects (Özen & Koyuncu, 2022; Okşak & Koyuncu, 2017; Aysan & Ozturk, 2017).

From a theoretical standpoint, the Heckscher-Ohlin model posits that trade liberalization expands employment in labor-abundant economies by leveraging comparative advantages, whereas the specific factors model highlights short-run dislocations in import-competing industries, potentially elevating unemployment until factor mobility restores equilibrium (Feenstra & Taylor, 2017). In Türkiye, these tensions are accentuated by its export-led growth strategy post-1980s liberalization, which has boosted manufacturing and services but exposed vulnerabilities in agriculture and textiles to global competition. Recent data from the Turkish Statistical Institute (TÜİK) underscore persistent youth unemployment rates exceeding 20% in 2023, amid fluctuating trade openness influenced by EU customs union dynamics and geopolitical shifts (TÜİK, 2024).

Recent empirical work has highlighted the possibility of nonlinear or asymmetric effects in globalization's impact on macroeconomic variables, suggesting that the relationship with unemployment may follow a U-shaped pattern: an initial decline at lower levels of trade globalization followed by an increase beyond a certain threshold (Yilmaz & Koyuncu, 2019; Unver & Koyuncu, 2021; Aysan & Ozturk, 2017). This pattern aligns with broader theoretical expectations in developing contexts, where initial integration into global markets boosts employment via export-led growth, but escalating openness later exacerbates vulnerabilities like offshoring and wage pressures in non-competitive sectors (Balsvik & Jensen, 2013).

Empirical evidence from youth labor markets in emerging economies further supports this nonlinearity, revealing U-shaped trajectories where moderate openness enhances participation but high levels induce discouragement effects due to skill-biased technological spillovers (Baliamoune, 2022). Moreover, interactions between globalization and income levels can modulate these effects, with higher per capita income amplifying unemployment reductions in mature phases of openness, a dynamic pertinent to Türkiye's middle-income status (Jayadevan et al., 2025). In Türkiye, a middle-income economy with a history of trade liberalization

since the 1980s, these dynamics are particularly salient amid episodes of economic volatility, including the 2001 crisis and post-2010 slowdowns, which amplified structural unemployment rates hovering around 10-14% (Cavusoglu & Tulek, 2018).

This study contributes to the literature by testing for such a U-shaped long-run relationship between trade globalization and unemployment in Türkiye over the period 1991–2022, employing the ARDL bounds testing approach and incorporating a quadratic term to capture potential nonlinearity. By focusing on nonlinearities, our analysis extends prior linear assessments, offering policy insights for balancing trade openness with labor market safeguards in similar emerging markets, such as targeted reskilling programs to mitigate threshold-induced reversals.

LITERATURE REVİEW

When the literature on trade globalization and unemployment is scanned, it is seen that many studies have been carried out on this subject. In particular, the researchers; it is noteworthy that they work on Türkiye and developing/transition economies. The effect of trade globalization on the country's economy and labor market attracts attention. In general, it is concluded that trade globalization has varying effects on unemployment and related variables. In this study, literature review; the effects of trade globalization on unemployment are examined under two headings as positive ones and negative ones.

Extensive research has been devoted to understanding the impact of globalization on unemployment, especially in developing economies. International studies highlight that while globalization often stimulates economic growth, its effects on employment can vary depending on labor market institutions, human capital levels, and structural flexibility (Felbermayr et al., 2011). According to the Stolper–Samuelson theorem, trade openness should raise the demand for abundant factors—such as low-skilled labor in developing countries—thus reducing unemployment (Helpman & Itskhoki, 2010). However, empirical results have been mixed.

For instance, Awad and Youssof (2016) found that economic globalization had a significant long-run negative impact on unemployment in Malaysia, suggesting globalization created more jobs over time. Similarly, Mushtaq et al. (2022), using panel data across developing Asian economies, confirmed that globalization contributes to lowering unemployment, especially when accompanied by investment in human capital. Gozgor (2017), analyzing 87 countries, identified a significant inverse relationship between

trade openness and structural unemployment. On the other hand, Agénor (1996) emphasized that trade reforms could initially increase unemployment due to intersectoral labor shifts.

Studies highlighting positive effects emphasize job creation in export-oriented sectors, enhanced female labor force participation, and overall employment growth through resource reallocation and growth channels (Okşak & Koyuncu, 2017; Özen & Koyuncu, 2022; Yılmaz & Koyuncu, 2016).

For instance, empirical evidence from Turkish manufacturing firms indicates that exporting activities foster labor demand, particularly in skill-intensive industries, thereby mitigating unemployment pressures during integration phases (Cavusoglu & Tulek, 2018).

Conversely, negative effects include structural unemployment from import competition, banking crises triggered by financial openness, and poverty exacerbation in certain contexts (Yalçinkaya Koyuncu & Varsak, 2019; Özen & Yalçinkaya Koyuncu, 2020; Özen, 2020).

Nonlinear or asymmetric patterns have also been identified in related areas, such as interest rates on external debt and long-run relationships with investment, tax revenue, investment, tourism, public expenditures, and corruption (Yilmaz & Koyuncu, 2019; Koyuncu & Unver, 2021; Unver & Koyuncu, 2021; Yalçinkaya Koyuncu & Songur, 2023; Yalçinkaya Koyuncu & Songur, 2024; Koyuncu & Unver, 2017).

Extending this to unemployment, cross-country analyses in emerging markets reveal that while moderate trade openness curtails joblessness via human capital synergies, excessive integration can invert this benefit, yielding U-shaped trajectories influenced by institutional quality and FDI inflows (Bărbuță-Mișu et al., 2024). These findings underscore the need for threshold-aware policies, particularly in Türkiye, where globalization's labor impacts have shown mixed outcomes across sub-periods of reform and crisis (Shahbaz et al., 2023).

Empirical applications akin to our study, employing nonlinear ARDL models to probe the trade openness-unemployment nexus, yield mixed results that both corroborate and contrast our U-shaped hypothesis. For instance, in a non-linear ARDL framework applied to Romania over 1990–2022, trade openness alongside government size exhibits a threshold effect on unemployment, with initial reductions giving way to increases beyond a certain openness level, mirroring our findings for Türkiye and attributing the reversal to structural rigidities in labor markets (Bărbuță-Mișu et al., 2024). Similarly, Aysan and Ozturk (2017) utilize ARDL bounds testing on Turkish data from 1980–2015 to examine globalization's impact on employment, uncovering a long-run negative linear effect that aligns with our early-stage globalization benefits but overlooks the potential U-turn observed in our extended sample period.

Recent augmented ARDL analyses on Turkish youth unemployment from 1988–2021 further reinforce linear benefits, showing a consistent long-run reduction from globalization without quadratic inflection, possibly due to subsample focus on vulnerable cohorts where initial gains dominate (Uğurlu, 2024). In contrast, studies diverging from nonlinearity, such as those using symmetric ARDL on Somali data, report asymmetric positive shocks from trade openness boosting growth and indirectly curbing unemployment without a quadratic inflection, highlighting contextual differences in fragile economies where institutional weaknesses amplify linear gains. Another pertinent application in Asian emerging markets employs ARDL to assess trade openness on economic stability, finding a stabilizing linear reduction in unemployment volatility, which challenges our U-shaped pattern by emphasizing sustained benefits from openness without reversal thresholds (Shahbaz et al., 2023).

Broadening to youth-specific dynamics in Middle East and North Africa (MENA) regions, including Türkiye, panel estimates reveal U-shaped patterns in trade openness effects on youth unemployment, with downturns at low openness levels yielding to upturns at high levels (>200% of GDP), driven by competition-induced skill mismatches—a result that bolsters our hypothesis by underscoring demographic vulnerabilities in nonlinear responses (Baliamoune, 2022).

Cross-nationally, spatial Durbin models across 158 countries (1991–2019) identify nonlinear interactions where economic globalization's unemployment-mitigating effects strengthen with rising per capita income, implying inverted U-shapes in low-income contexts that flatten in middle-income ones like Türkiye, thus partially aligning with our threshold at moderate globalization levels (Jayadevan et al., 2025).

These comparative insights affirm the value of nonlinearity in capturing evolving globalization dynamics, particularly in middle-income contexts like Türkiye, where post-liberalization crises may precipitate the upward turn in unemployment beyond moderate openness levels. Echoing earlier cross-OECD evidence, the "Great U-Turn" in labor outcomes—initial inequality reductions from trade followed by reversals—extends to unemployment via wage polarization, providing a macro-historical lens for our findings (Alderson & Nielsen, 2002).

DATA AND METHODOLOGY

This study attempts to investigate if there exists any U-shaped long term relationship between trade globalization and unemployment rate in Turkiye for an annual sample covering years between 1991-2022. We employed ARDL estimation technique to perform our cointegration and long-run analyses. Variable of unemployment (UNEMP) is measured as percentage share of unemployed people in total labor force (modeled ILO estimate). The data of UNEMP variable come from World Development Indicators (WDI) of the World Bank and the data of trade globalization (TRADEGLOB) are collected from KOF Index. The association between trade globalization and unemployment rate may occur in a non-linear form. We may observe a decreasing impact of trade globalization on unemployment rate at early stage of trade globalization level and an increasing effect of trade globalization on unemployment rate after a particular threshold level of trade globalization. Hence a U-shaped long term association between trade globalization and unemployment rate rate is anticipated.

Firstly we conducted a cointegration analysis between trade globalization and unemployment rate by using ARDL bounds test given the estimation findings from the model below:

$$\Delta \text{UNEMP}_t = \alpha_0 + \sum_{i=1}^{p} \delta_i \Delta \text{UNEMP}_{t-i} + \sum_{i=0}^{q} \phi_i \Delta \text{TRADEGLOB}_{t-i} + \sum_{i=0}^{r} \omega_i \Delta \text{TRADEGLOBSQ}_{t-i} + \theta_0 UNEMP_{t-1} + \theta_1 \text{TRADEGLOB}_{t-1} + \theta_2 \text{TRADEGLOBSQ}_{t-1} + \varepsilon_t \quad (1)$$

In Equation 1 above θ0, θ1, and θ2 notations represent the long term parameters of the model; δi, ϕi, and ωi notations show the short term parameters of the model; Δ notations stands for first degree difference operator; the constant term of the model is given by α_0 notation, and ε_t notation reflects white noise error term of the model. Meanwhile we expect to see negative and positive coefficient estimation for θ1 and θ2 parameters respectively.

In the null hypothesis (i.e., H0: θ0=θ1=θ2=0) of ARDL bounds test, we assert that variables of trade globalization and unemployment rate are not co-integrated. On the other hand in the alternative hypothesis (i.e., H0: θ0≠θ1≠θ2≠0) of ARDL bounds test, we claim that variables of trade globalization and unemployment rate are co-integrated.

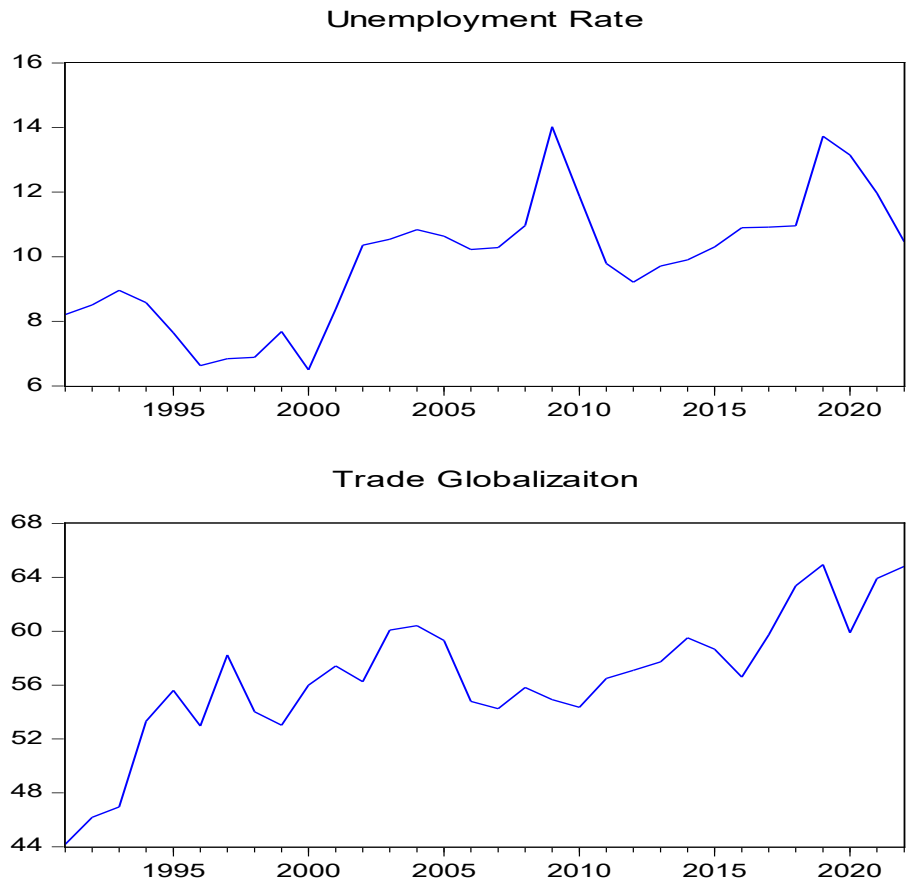
If F-statistic value obtained from ARDL bounds test is bigger than the critical value of upper limit at a given significance level then we say that variables of trade globalization and unemployment rate are co-integrated whereas any F-statistic value smaller than the critical value of lower limit indicates absence of cointegration association between trade globalization and unemployment rate. F-statistic value remaining between two critical values is inconclusive.

We estimated the following model to get short-run and long-run coefficient estimations:

$$UNEMP_t = \beta_0 + \sum_{i=1}^{p} \alpha_i \Delta UNEMP_{t-i} + \sum_{i=0}^{q} \mu_i \Delta \text{TRADEGLOB}_{t-i} + \sum_{i=0}^{r} \lambda_i \Delta \text{TRADEGLOBSQ}_{t-i} + \gamma ECM_{t-1} + \varepsilon_t \quad (2)$$

αi, μi, and λi notations in Equation 2 above are dynamic coefficients returning the model back to the balance in the long run; ECM term represents error correction term of the model; γ is the adjustment speed at which the model goes back to long-run in response to a shock taken into place in the short-run. Also it is required to have statistically significant negative coefficient estimation for the speed of adjustment term.

Graph 1 below displays the behavior of variables of trade globalization and unemployment rate for the period of 1991-2022. As seen from the Graph 1, the series of trade globalization has an upward trend and sharply goes up while the series of unemployment rate fluctuates over the estimation period with two peaks at 2009 and 2019 and with a deep at 2000.



Graph 1: Graphs of Series of UNEMP and TRADEGLOB

ESTIMATION AND FINDINGS

We must have series with integration order zero or one in order to be able to use ARDL bounds test in cointegration analysis. Therefore Augmented Dickey-Fuller (ADF) unit root test was implemented to find out integration order of our two variables. As pointed out by the results of ADF unit root tests, UNEMP, TRADEGLOB, and TRADEGLOBSQ variables are integrated order one at %1 and %5 significance levels and thus they satisfy the requirement of ARDL bounds test.

Table 1: ADF Unit Root Test Findings

Null Hypothesis: UNEMP has a unit root			
		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		***-1.76757***	***0.6974***
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	
Null Hypothesis: D(UNEMP) has a unit root			
		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		***-4.62967***	***0.0042***
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	
Null Hypothesis: TRADEGLOB has a unit root			
		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		***-3.17108***	***0.1015***
Test critical values:	1% level	-4.144584	
	5% level	-3.498692	
	10% level	-3.178578	
Null Hypothesis: D(TRADEGLOB) has a unit root			
		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		***-8.02664***	***0.0000***
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	
Null Hypothesis: TRADEGLOBSQ has a unit root			
		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		***-3.39702***	***0.0628***
Test critical values:	1% level	-4.144584	
	5% level	-3.498692	
	10% level	-3.178578	
Null Hypothesis: D(TRADEGLOBSQ) has a unit root			
		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		***-8.23733***	***0.0000***
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	

Next we used AIC criterion for the selection of optimal lag length of our ARDL model. AIC criterion automatically assessed one hundred eighty distinct models and chose ARDL(1,5,5) model as the best model with optimal

lag length (see Figure 1 and Table 1). ARDL(1,5,5) model was utilized in all of our analyses.

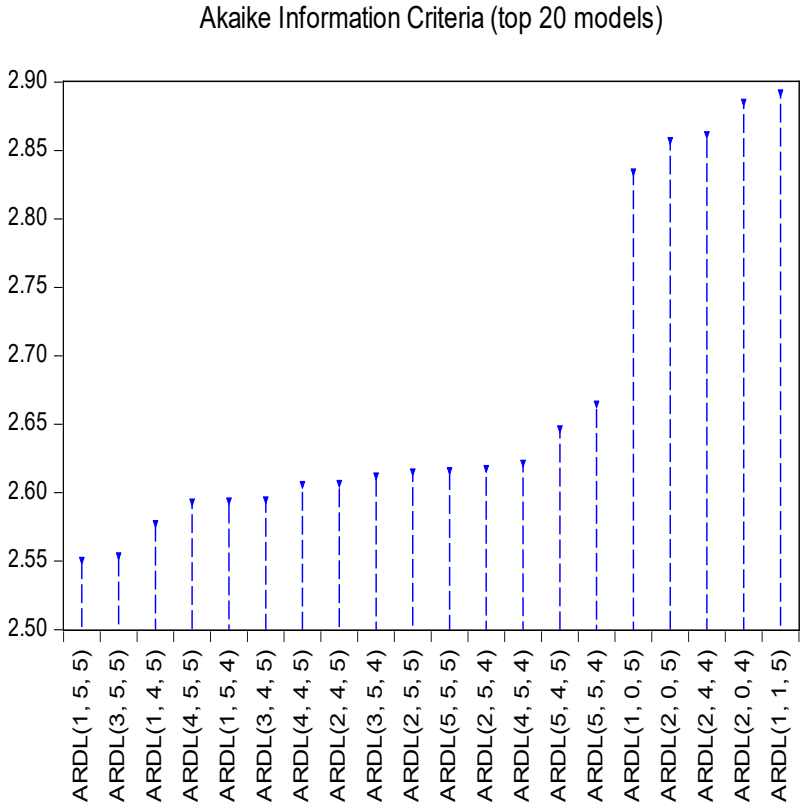


Figure 1: Top 20 ARDL Models with the Lowest AIC Scores

Table 2: Selection of ARDL Model

Model	AIC*	Specification	Model	AIC*	Specification	Model	AIC*	Specification
145	**2.550592**	**ARDL(1, 5, 5)**	128	3.032674	ARDL(2, 2, 4)	138	3.444053	ARDL(2, 1, 0)
73	2.553893	ARDL(3, 5, 5)	111	3.043117	ARDL(2, 5, 3)	143	3.447029	ARDL(2, 0, 1)
151	2.577450	ARDL(1, 4, 5)	32	3.043665	ARDL(5, 0, 4)	108	3.454389	ARDL(3, 0, 0)
37	2.593259	ARDL(4, 5, 5)	62	3.043907	ARDL(4, 1, 4)	137	3.476961	ARDL(2, 1, 1)
146	2.594091	ARDL(1, 5, 4)	8	3.044929	ARDL(5, 4, 4)	173	3.483383	ARDL(1, 1, 1)
79	2.594713	ARDL(3, 4, 5)	91	3.049001	ARDL(3, 2, 5)	159	3.491118	ARDL(1, 3, 3)
43	2.606073	ARDL(4, 4, 5)	112	3.051388	ARDL(2, 5, 2)	168	3.507698	ARDL(1, 2, 0)
115	2.606849	ARDL(2, 4, 5)	77	3.052076	ARDL(3, 5, 1)	178	3.510186	ARDL(1, 0, 2)
74	2.612269	ARDL(3, 5, 4)	85	3.052839	ARDL(3, 3, 5)	102	3.511201	ARDL(3, 1, 0)
109	2.615215	ARDL(2, 5, 5)	55	3.052869	ARDL(4, 2, 5)	107	3.513816	ARDL(3, 0, 1)
1	2.616285	ARDL(5, 5, 5)	25	3.054667	ARDL(5, 1, 5)	132	3.513937	ARDL(2, 2, 0)
110	2.617822	ARDL(2, 5, 4)	41	3.054994	ARDL(4, 5, 1)	72	3.514093	ARDL(4, 0, 0)
38	2.621677	ARDL(4, 5, 4)	6	3.056241	ARDL(5, 5, 0)	142	3.516297	ARDL(2, 0, 2)
7	2.646794	ARDL(5, 4, 5)	117	3.061351	ARDL(2, 4, 3)	101	3.537656	ARDL(3, 1, 1)
2	2.664885	ARDL(5, 5, 4)	158	3.062684	ARDL(1, 3, 4)	123	3.546063	ARDL(2, 3, 3)
175	2.834392	ARDL(1, 0, 5)	170	3.064045	ARDL(1, 1, 4)	136	3.548048	ARDL(2, 1, 2)
139	2.857281	ARDL(2, 0, 5)	83	3.072366	ARDL(3, 4, 1)	131	3.548718	ARDL(2, 2, 1)
116	2.861502	ARDL(2, 4, 4)	118	3.073688	ARDL(2, 4, 2)	177	3.549883	ARDL(1, 0, 3)
140	2.885407	ARDL(2, 0, 4)	49	3.079873	ARDL(4, 3, 5)	172	3.556034	ARDL(1, 1, 2)
169	2.892133	ARDL(1, 1, 5)	47	3.085609	ARDL(4, 4, 1)	167	3.556582	ARDL(1, 2, 1)
150	2.899286	ARDL(1, 5, 0)	12	3.085838	ARDL(5, 4, 0)	162	3.557130	ARDL(1, 3, 0)
67	2.914011	ARDL(4, 0, 5)	153	3.090560	ARDL(1, 4, 3)	66	3.562158	ARDL(4, 1, 0)
133	2.916829	ARDL(2, 1, 5)	86	3.091244	ARDL(3, 3, 4)	71	3.565218	ARDL(4, 0, 1)
114	2.917123	ARDL(2, 5, 0)	155	3.097705	ARDL(1, 4, 1)	141	3.570475	ARDL(2, 0, 3)
103	2.919716	ARDL(3, 0, 5)	92	3.105794	ARDL(3, 2, 4)	126	3.574732	ARDL(2, 3, 0)

120	2.926016	ARDL(2, 4, 0)	75	3.117135	ARDL(3, 5, 3)	96	3.582349	ARDL(3, 2, 0)
157	2.932247	ARDL(1, 3, 5)	56	3.117229	ARDL(4, 2, 4)	106	3.584602	ARDL(3, 0, 2)
80	2.935566	ARDL(3, 4, 4)	26	3.117670	ARDL(5, 1, 4)	36	3.586084	ARDL(5, 0, 0)
163	2.958267	ARDL(1, 2, 5)	76	3.121536	ARDL(3, 5, 2)	65	3.595698	ARDL(4, 1, 1)
104	2.958643	ARDL(3, 0, 4)	19	3.124723	ARDL(5, 2, 5)	87	3.597229	ARDL(3, 3, 3)
134	2.958836	ARDL(2, 1, 4)	40	3.126776	ARDL(4, 5, 2)	166	3.598455	ARDL(1, 2, 2)
149	2.964456	ARDL(1, 5, 1)	50	3.126860	ARDL(4, 3, 4)	171	3.599533	ARDL(1, 1, 3)
68	2.969896	ARDL(4, 0, 4)	81	3.127141	ARDL(3, 4, 3)	130	3.601721	ARDL(2, 2, 2)
44	2.971039	ARDL(4, 4, 4)	5	3.128524	ARDL(5, 5, 1)	135	3.607052	ARDL(2, 1, 3)
121	2.980089	ARDL(2, 3, 5)	164	3.132136	ARDL(1, 2, 4)	161	3.608890	ARDL(1, 3, 1)
152	2.980240	ARDL(1, 4, 4)	82	3.146321	ARDL(3, 4, 2)	100	3.610385	ARDL(3, 1, 2)
97	2.980701	ARDL(3, 1, 5)	39	3.147035	ARDL(4, 5, 3)	95	3.610750	ARDL(3, 2, 1)
61	2.982179	ARDL(4, 1, 5)	13	3.152051	ARDL(5, 3, 5)	125	3.613113	ARDL(2, 3, 1)
42	2.982614	ARDL(4, 5, 0)	46	3.158590	ARDL(4, 4, 2)	60	3.627866	ARDL(4, 2, 0)
127	2.983019	ARDL(2, 2, 5)	11	3.159150	ARDL(5, 4, 1)	70	3.630125	ARDL(4, 0, 2)
113	2.983299	ARDL(2, 5, 1)	45	3.164438	ARDL(4, 4, 3)	30	3.634800	ARDL(5, 1, 0)
78	2.984824	ARDL(3, 5, 0)	154	3.165495	ARDL(1, 4, 2)	105	3.637546	ARDL(3, 0, 3)
31	2.986833	ARDL(5, 0, 5)	20	3.190908	ARDL(5, 2, 4)	35	3.637816	ARDL(5, 0, 1)
176	2.990448	ARDL(1, 0, 4)	4	3.199962	ARDL(5, 5, 2)	90	3.642318	ARDL(3, 3, 0)
147	2.997065	ARDL(1, 5, 3)	14	3.200559	ARDL(5, 3, 4)	165	3.643660	ARDL(1, 2, 3)
84	2.998514	ARDL(3, 4, 0)	3	3.220238	ARDL(5, 5, 3)	160	3.652249	ARDL(1, 3, 2)
119	3.000033	ARDL(2, 4, 1)	10	3.231980	ARDL(5, 4, 2)	129	3.660862	ARDL(2, 2, 3)
48	3.012269	ARDL(4, 4, 0)	9	3.238014	ARDL(5, 4, 3)	64	3.664794	ARDL(4, 1, 2)
122	3.023975	ARDL(2, 3, 4)	144	3.397057	ARDL(2, 0, 0)	59	3.665627	ARDL(4, 2, 1)
156	3.025225	ARDL(1, 4, 0)	180	3.406892	ARDL(1, 0, 0)	124	3.666309	ARDL(2, 3, 2)
98	3.031782	ARDL(3, 1, 4)	174	3.435612	ARDL(1, 1, 0)	51	3.666952	ARDL(4, 3, 3)
148	3.032102	ARDL(1, 5, 2)	179	3.438741	ARDL(1, 0, 1)	99	3.668255	ARDL(3, 1, 3)

Table 2: Continued

Model	AIC*	Specification	Model	AIC*	Specification	Model	AIC*	Specification
29	3.668519	ARDL(5, 1, 1)	63	3.724857	ARDL(4, 1, 3)	18	3.763242	ARDL(5, 3, 0)
94	3.669962	ARDL(3, 2, 2)	93	3.728259	ARDL(3, 2, 3)	57	3.781674	ARDL(4, 2, 3)
89	3.674443	ARDL(3, 3, 1)	53	3.730795	ARDL(4, 3, 1)	52	3.786679	ARDL(4, 3, 2)
69	3.686549	ARDL(4, 0, 3)	88	3.734022	ARDL(3, 3, 2)	22	3.791392	ARDL(5, 2, 2)
54	3.690333	ARDL(4, 3, 0)	28	3.736278	ARDL(5, 1, 2)	27	3.798278	ARDL(5, 1, 3)
24	3.698687	ARDL(5, 2, 0)	23	3.737266	ARDL(5, 2, 1)	17	3.804001	ARDL(5, 3, 1)
34	3.700733	ARDL(5, 0, 2)	15	3.739962	ARDL(5, 3, 3)	21	3.854463	ARDL(5, 2, 3)
58	3.720987	ARDL(4, 2, 2)	33	3.759713	ARDL(5, 0, 3)	16	3.859039	ARDL(5, 3, 2)

Table 3 below shows the results of cointegration analysis conducted via ARDL bounds test. According to the findings in Table 3, F-statistic value of 4.492971 exceeds the upper limit critical values at %5 and %10 significance levels for finite samples and asymptotic sample. Given this fact, we are able to conclude that unemployment rate and trade globalization are co-integrated and hence they move together in the long term in Turkiye.

Table 3: ARDL Bounds Test Findings

Test Statistic	Signif.	I(0)/Lower Limit	I(1)/Upper Limit
F-statistic: **4.492971**			
		Asymptotic: n=1000	
	10%	2.63	3.35
k: 2	5%	3.1	3.87
	2.5%	3.55	4.38
	1%	4.13	5
Actual Sample Size: 31		Finite Sample: n=35	
	10%	2.845	3.623
	5%	3.478	4.335
	1%	4.948	6.028
		Finite Sample: n=30	
	10%	2.915	3.695
	5%	3.538	4.428
	1%	5.155	6.265

Table 4 below reports the long-run coefficient estimation results of our ARDL(1,5,5) model. In parallel to our prior expectation, we obtained negative statistically significant coefficient estimation for TRADEGLOB variable and positive statistically significant coefficient estimation for TRADEGLOBSQ variable at %10 significance levels. This finding discloses that U-shaped relationship is valid between unemployment rate and trade globalization with a turn point at 47.85948088 value of trade globalization.

Table 4: Long-run Coefficient Estimations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRADEGLOB	-3.3337	1.8622	-1.7902	0.0912
TRADEGLOBSQ	0.0348	0.0172	2.0274	0.0586
Constant	87.5076	50.7206	1.7253	0.1026

EC = UNEMP - (-3.3337*TRADEGLOB + 0.0348*TRADEGLOBSQ + 87.5076)

We provided the short term coefficient estimations of our ARDL(1,5,5) model in Table 5 below. Third lag of TRADEGLOB variable is statistically significant with a positive sign whereas first and third lags of TRADEGLOBSQ variable are statistically significant with negative sign. As anticipated, we also got statistically significant negative coefficient estimation for error correction term (i.e., -0.5201) and this implies that a shock occurred in the short-run will be absorbed about in 6 months.

Table 5: Short-run and Long-run Coefficient Estimations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TRADEGLOB)	-0.2101	0.7073	-0.2970	0.7701
D(TRADEGLOB(-1))	1.3835	0.8543	1.6194	0.1238
D(TRADEGLOB(-2))	-0.8363	0.7719	-1.0834	0.2938
D(TRADEGLOB(-3))	1.6650	0.9167	1.8164	0.0870
D(TRADEGLOB(-4))	0.6524	1.0372	0.6290	0.5377
D(TRADEGLOBKARE)	0.0024	0.0062	0.3834	0.7062
D(TRADEGLOBKARE(-1))	-0.0142	0.0079	-1.7993	0.0897
D(TRADEGLOBKARE(-2))	0.0062	0.0071	0.8703	0.3962
D(TRADEGLOBKARE(-3))	-0.0187	0.0083	-2.2526	0.0378
D(TRADEGLOBKARE(-4))	-0.0079	0.0096	-0.8243	0.4212
ECM(-1)	-0.5201	0.1131	-4.5982	0.0003
R-squared	0.7336	Mean dependent var		0.0727
Adjusted R-squared	0.6004	S.D. dependent var		1.2072
S.E. of regression	0.7631	Akaike info criterion		2.5686
Sum squared resid	11.6469	Schwarz criterion		3.0774
Log likelihood	-28.8135	Hannan-Quinn criter.		2.7345
Durbin-Watson stat	1.9425			

We tested our ARDL(1,5,5) model by implementing several diagnostic tests (i.e., Jerque-Bera normality test, Breusch-Godfrey serial correlation LM test for autocorrelation, ARCH test for heteroskedasticity, Ramsey RESET test for model specification error, and CUSUM-square test for parameter stability).

Given the results of Jerque-Bera normality test in Figure 2, we deduce that residuals of our ARDL(1,5,5) model are normally distributed.

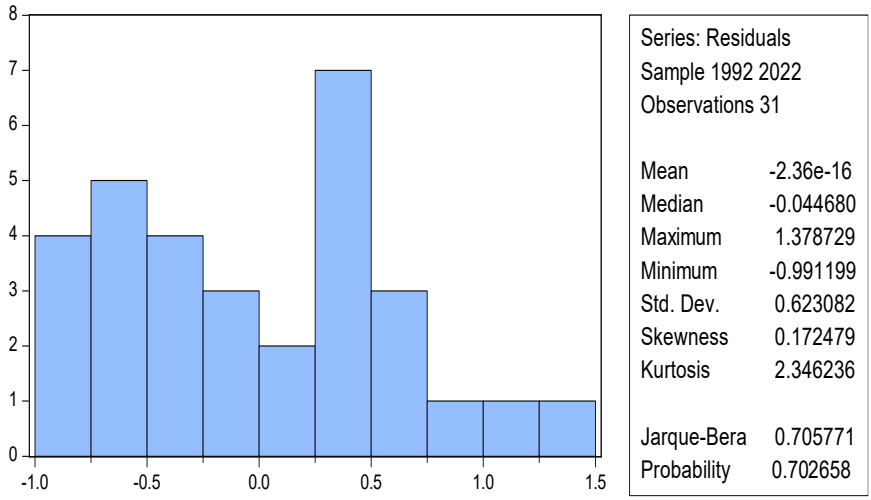


Figure 2: Normality Test

Table 6: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.053903	Prob. F(2,15)	0.9477
Obs*R-squared	0.221208	Prob. Chi-Square(2)	0.8953

Harvey heteroscedasticity test findings in Table 7 hint that ARDL(1,5,5) model has homoscedastic variance.

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.278002	Prob. F(13,17)	0.3127
Obs*R-squared	15.32202	Prob. Chi-Square(13)	0.2877

We reported model specification error test findings in Table 8 and the results of Ramsey RESET test reveal that our ARDL(1,5,5) model does not possess model misspecification problem.

Table 8: Ramsey RESET Test

	Value	df	Probability
t-statistic	0.417902	16	0.6816
F-statistic	0.174642	(1, 16)	0.6816

As seen from Figure 3 and 4 below, the results of parameter stability tests obtained from CUSUM and CUSUM-square tests indicate that coefficients of ARDL(1,5,5) model are stable.

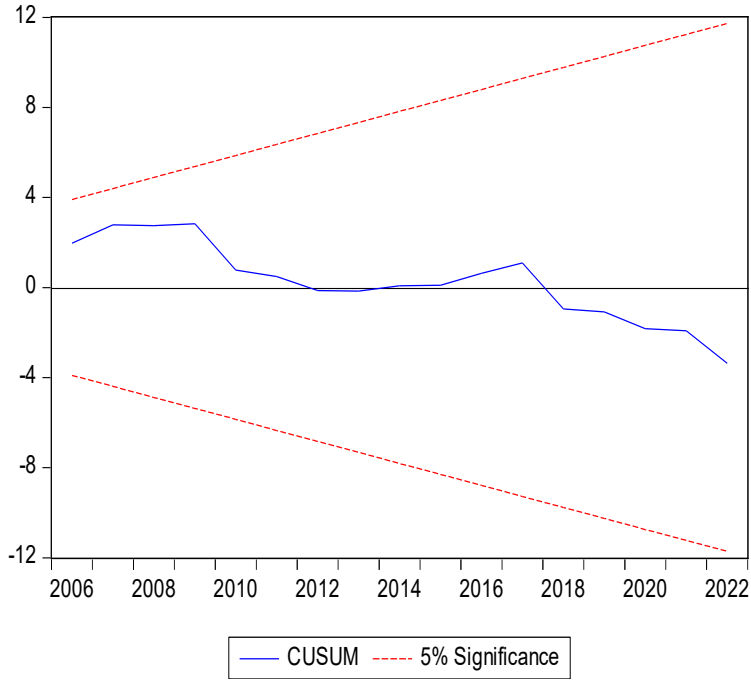


Figure 3: CUSUM Parameter Stability Test

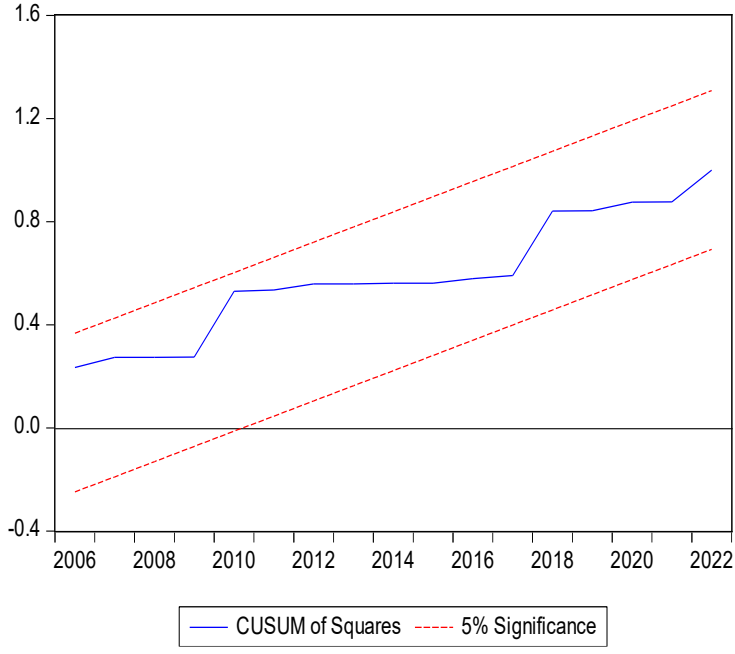


Figure 4: CUSUM-Square Parameter Stability Test

CONCLUSION

In this study we try to identify if there is nonlinear (i.e., U-shaped) association between trade globalization and unemployment rate in Turkiye for the period of 1991-2022 by using ARDL estimation method. We conducted ADF unit root test to check the integration order of variables of unemployment rate and trade globalization. ADF unit root test findings pointed out that variables of unemployment rate and trade globalization are stationary at first differences and thus they are integrated order one. According to the findings of ARDL bounds test of cointegration analysis, there is a co-integrating relationship between unemployment rate and trade globalization. Regarding to the long run coefficient estimation results, we got statistically significant negative long-run coefficient estimation for TRADEGLOB variable and statistically significant positive long-run coefficient estimation for TRADEGLOBSQ variable with a turn point at 47.85948088 value of trade globalization. Moreover based on the results of diagnostic tests indicate that ARDL(1,5,5) model is free from the problems of non-normality, model misspecification, autocorrelation, heteroscedasticity, and parameter instability.

REFERENCES

Agénor, P. R. (1996). The labor market and economic adjustment. IMF Staff Papers, 43(2), 261–335. https://doi.org/10.2307/3867350

Alderson, A. S., & Nielsen, F. (2002). Globalization and the great U-turn: Income inequality trends in 16 OECD countries. American Journal of Sociology, 107(5), 1244–1299. https://doi.org/10.1086/341329

Awad, A. R. M., & Youssof, I. A. (2016). The impact of economic globalization on unemployment: The Malaysian experience. Journal of International Trade & Economic Development, 25(3), 378–395. https://doi.org/10.1080/09638199.2016.1151069

Aysan, M. H., & Ozturk, I. (2017). The effects of globalization on employment: Bounds test approach in Turkey sample. Asian Economic and Financial Review, 7(3), 123–129. https://www.researchgate.net/publication/312589157

Baliamoune, M. (2022). Trade and youth labor market outcomes: Empirical evidence and policy implications (Policy Paper No. 02/22). Policy Center for the New South.

Balsvik, R., & Jensen, S. (2013). Does trade foster employment growth in emerging markets? Evidence from Turkey. World Development, 51, 123–137. https://doi.org/10.1016/j.worlddev.2013.05.012

Bărbuță-Mișu, N., Dobre, C., & Călin, A. C. (2024). Unemployment rate and its relationship with government size, trade openness and inflation in Romania: A non-linear ARDL approach. Heliyon, 10(18), Article e36710. https://doi.org/10.1016/j.heliyon.2024.e36710

Cavusoglu, B., & Tulek, B. (2018). The effect of economic globalization on unemployment in emerging markets. International Journal of Economics and Finance Studies, 10(2), 1–18. https://dergipark.org.tr/tr/download/article-file/558064

Dutt, P., Mitra, D., & Ranjan, P. (2009). International trade and unemployment: Theory and cross-national evidence. Journal of International Economics, 78(1), 32–44.

Feenstra, R. C., & Taylor, A. M. (2017). International economics (4th ed.). Worth Publishers.

Felbermayr, G., Prat, J., & Schmerer, H.-J. (2011). Globalization and labor market outcomes: Wage bargaining, search frictions, and firm heterogeneity. Journal of Economic Theory, 146(1), 39–73. https://doi.org/10.1016/j.jet.2010.07.004

Gozgor, G. (2017). The impact of globalization on structural unemployment: An empirical reappraisal. International Economic Journal, 31(4), 471–489.

Helpman, E., & Itskhoki, O. (2010). Labor market rigidities, trade and unemployment. Review of Economic Studies, 77(3), 1100–1137.

Jayadevan, C. M., Hoang, N. T., & Yarram, S. R. (2025). Interaction effect of economic globalization and income per capita on unemployment. Economies, 13(3), Article 72. https://doi.org/10.3390/economies13030072

Koyuncu, J. Y., & Unver, M. (2017). The association between corruption and globalization in African countries. Social Sciences Research Journal, 6(4), 20–28.

Koyuncu, J. Y., & Unver, M. (2021). Causality and long-run analyses between financial globalization and investment in Turkey. Balkan and Near Eastern Journal of Social Sciences, 7(04), 91–99.

Mushtaq, M., Ahmed, S., Fahlevi, M., Aljuaid, M., & Saniuk, S. (2022). Globalization and employment nexus: Moderating role of human capital. PLoS ONE, 17(10), e0276431. https://doi.org/10.1371/journal.pone.0276431

Okşak, Y., & Koyuncu, J. Y. (2017). Does globalization affect female labor force participation: Panel evidence. Journal of Economics Bibliography, 4(4), 381–387.

Özen, E. (2020). Does urbanization play role on poverty?: Empirical evidence... In Interdisciplinary Public Finance, Business and Economics Studies (Vol. III, pp. 101–106). Peter Lang.

Özen, E., & Koyuncu, C. (2022). Globalization and employment: The case of Turkey. Balkan Sosyal Bilimler Dergisi, 11(21), 1–6. https://doi.org/10.55589/bsbd.1135195

Özen, E., & Yalçinkaya Koyuncu, J. (2020). Does globalization deteriorate or alleviate poverty: Panel analysis. In R. Yılmaz & G. Löschnigg (Eds.), Studies on Balkan and Near Eastern Social Sciences (Vol. 4, pp. 21–31). Peter Lang. ISBN 978-3-631-81910-4.

Shahbaz, M., Wang, J., & Raghutla, C. (2023). The impact of trade openness on economic stability in Asian emerging markets: The moderating role of

institutional quality. Sustainability, 15(15), 11736. https://doi.org/10.3390/su151511736

TÜİK. (2024). Labour force statistics, 2024. Turkish Statistical Institute. https://data.tuik.gov.tr/Bulten/Index?p=Labour-Force-Statistics-2024-54059

Uğurlu, S. (2024). Does globalization reduce youth unemployment? Augmented ARDL approach. Trends in Business and Economics, 38(3), 177–183. https://doi.org/10.16951/trendbusecon.1480078

Unver, M., & Koyuncu, J. Y. (2021). Does more globalization mean more tax revenue?: Long-run evidence from Turkey. Balkan Sosyal Bilimler Dergisi, 10(20), 28–34.

Yalçinkaya Koyuncu, J., & Songur, D. (2023). Gelişmekte olan ekonomilerde hiper globolleşme döneminde kamu harcamaları. Balkan Sosyal Bilimler Dergisi, 12(23), 30–42.

Yalçinkaya Koyuncu, J., & Songur, D. (2024). The long term relationship between globalization and tourism: The case of Turkey. Balkan and Near Eastern Journal of Social Sciences, 10(01).

Yalçinkaya Koyuncu, J., & Varsak, S. (2019). Globalization and banking crises: The case of developing economies. In R. Yılmaz & G. Löschnigg (Eds.), Studies on Balkan and Near Eastern Social Sciences (Vol. 3, pp. 245–254). Peter Lang. ISBN 978-3-631-78289-7.

Yılmaz, R., & Koyuncu, J. Y. (2016). The impact of privatization on employment level: Panel study evidence from transition countries. International Balkan and Near Eastern Social Sciences (IBANESS) Conference Series Proceedings – Plovdiv/Bulgaria – March 12-13, 2016 (pp. 479–483).

Yilmaz, R., & Koyuncu, J. Y. (2019). Asymmetric effect of globalization on the interest rates on external debt: The case of Turkey. Social Sciences Research Journal, 8(1), 189–193.

The Impact of Female Labor Force Participation on Exports in Türkiye: Short-Run and Long-Run Analysis

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ABSTRACT

This study investigates the short-run and long-run effects of female labor force participation (FLFP) on export performance in Türkiye over the period 1990–2024, using the Autoregressive Distributed Lag (ARDL) bounds testing approach. Exports of goods and services (as a percentage of GDP) and the female labor force participation rate (for women aged 15+) are analyzed in logarithmic form, with data sourced from the World Bank's World Development Indicators.Unit root tests confirm that both series are integrated of order one, I(1), satisfying the preconditions for ARDL estimation. The bounds test reveals a stable long-run cointegration relationship between FLFP and exports. Long-run estimates show that a 1 percentage point increase in the female labor force participation rate is associated with a statistically significant 0.44 percentage point rise in the export-to-GDP ratio. In the short run, the effect is not statistically significant, while the error-correction term is negative, significant, and indicates reasonably fast adjustment toward long-run equilibrium.Diagnostic tests confirm that the ARDL(2,5) model is well-specified, with residuals that are normally distributed, free from serial correlation and heteroskedasticity, and parameter estimates that remain stable over time.The findings suggest that higher female labor force participation contributes positively to Türkiye's export performance in the long run, underscoring the importance of gender-inclusive labor policies to sustain export-led growth. This result adds country-specific evidence to the mixed international literature on the trade–gender nexus.

Keywords:Female Labor Force Participation, Exports, Export-Led Growth, ARDL Bounds Testing, Türkiye, Gender And Trade, Long-Run Relationship, Cointegration, Short-Run Dynamics.

INTRODUCTION

The relationship between international trade and gender dynamics has gained considerable academic and policy attention in recent decades, particularly with the expansion of global value chains and the increasing integration of developing economies into international markets. Among the most debated questions is whether and how export-led growth affects women's participation in the labor force. While export expansion is often associated with structural transformation and employment creation, the extent to which it facilitates or impedes female labor force participation (FLFP) remains theoretically contested and empirically heterogeneous.

From a neoclassical perspective, trade liberalization is expected to enhance overall employment by reallocating resources toward comparative advantage sectors. In many developing countries, these sectors tend to be labor-intensive and export-oriented, potentially creating new employment

opportunities for women (Do et al., 2022). As women are often concentrated in low-skilled occupations, particularly in manufacturing and agriculture, the reallocation effects of trade are believed to benefit female labor supply by increasing sectoral demand for their work (Aguayo-Téllez, 2012).

However, emerging evidence complicates this optimistic narrative. While some countries have witnessed a rise in female employment alongside trade expansion, others have experienced stagnant or even declining FLFP, suggesting the existence of structural, institutional, and cultural mediators. For instance, empirical studies reveal that trade openness can reinforce existing gender inequalities when it is not accompanied by gender-sensitive labor policies, social protection systems, or access to education and childcare (Chaudhary & Verick, 2021; Korinek, Moïsé, & Tange, 2021). Moreover, in contexts where labor markets are highly segmented and patriarchal norms persist, the benefits of trade may accrue predominantly to male workers, exacerbating gender gaps rather than closing them (Balié et al., 2020).

A growing body of literature also indicates that the impact of exports on FLFP is sectorally and geographically uneven. For example, studies focusing on East and Southeast Asia highlight that export-oriented industries such as textiles, garments, and electronics have historically relied on female-dominated labor (Pahl & Timmer, 2020), whereas in Latin America and the Middle East, the effects are more constrained by institutional factors such as informality, limited access to property rights, or discriminatory hiring practices (Cirera et al., 2021). In Sub-Saharan Africa, where agriculture accounts for a large share of female employment, trade-induced structural shifts have sometimes resulted in the displacement of women from traditional livelihoods without adequate substitution in modern sectors (Duflo & Topalova, 2021).

The macroeconomic importance of FLFP further underscores the relevance of this topic. Higher levels of female participation in the labor market are associated with faster GDP growth, more equitable income distribution, and stronger human development outcomes (Klasen, 2019; Cuberes & Teignier, 2016). Yet, despite its policy relevance, the empirical evidence on the trade–gender nexus remains mixed, partly due to differences in data coverage, methodological approaches, and contextual variability across countries and sectors.

Against this backdrop, this study seeks to contribute to the growing but inconclusive literature by empirically analyzing the relationship between export performance and female labor force participation. In doing so, it goes beyond aggregated national indicators and incorporates sectoral dynamics, institutional conditions, and socio-economic structures. The analysis is grounded in the hypothesis that export growth can enhance FLFP, but only under enabling conditions such as inclusive labor market regulations, adequate human capital, and gender-responsive economic policies.

This paper makes three key contributions. First, it synthesizes sector-specific and time-series data to provide a nuanced understanding of how exports influence female labor force participation in both the short and long run. Second, it employs an econometric strategy that controls for integration orders and structural breaks using ARDL bounds testing, addressing a methodological gap in much of the earlier literature. Third, by focusing on the Turkish economy over the period 1990–2024, it sheds light on the institutional and demographic mechanisms through which female labor supply and export performance are interlinked, thus offering relevant insights for both academic researchers and policy makers.

In light of the uneven and conditional effects found in previous research, our analysis underscores the importance of considering not just whether export-led growth generates opportunities for women's employment, but how and under what conditions it does. Ultimately, this research aims to inform a more context-sensitive and evidence-based policy framework.

LITERATURE REVİEW

Female labor force participation (FLFP) is a crucial determinant of sustainable economic development, gender equality, and inclusive growth. Within this context, the relationship between international trade—especially export-led growth—and women's participation in the labor market has attracted significant theoretical and empirical attention. According to the theory of comparative advantage derived from Ricardo's classical trade model, developing countries tend to specialize in labor-intensive sectors, potentially increasing demand for female labor due to its relatively lower cost (Wood, 1991; Elson, 1999; Yalcinkaya Koyuncu, Yilmaz, & Unver, 2016).

However, feminist economic literature approaches this assumption critically, arguing that export-oriented growth often channels women into low-wage, insecure, and gender-reinforcing forms of employment (Standing, 1999; Seguino, 2000). Therefore, the relationship between exports and FLFP is not merely quantitative but shaped by qualitative and institutional factors. The following sections provide an overview of empirical evidence, organized thematically.

A significant number of empirical studies—especially in low- and middle-income countries—suggest that exports positively influence women's labor force participation. This effect is largely attributed to an increase in demand for female labor in labor-intensive export sectors. Busse and Spielmann (2006), in a panel data analysis covering 92 developing countries, find that increases in export activity significantly raise female employment,

particularly in sectors such as textiles and apparel. Similarly, Jansen and von Uexkull (2010) report that export growth supports FLFP in low-income countries, though the magnitude of the effect varies by sector. These findings are reinforced by panel evidence showing that economic and social dimensions of globalization promote FLFP in developing countries (Oksak & Yalcinkaya Koyuncu, 2017).

Dehejia, Jordà, and Singhal (2022), in their Journal of International Economics study, demonstrate that rising export demand increases employment opportunities for low-skilled women, particularly in countries with more flexible labor markets. This finding highlights the importance of institutional context in mediating the effect of exports on FLFP.

Similarly, Dippel et al. (2023), in their American Economic Review article, find that export shocks at the regional level in the United States lead to increased female employment, although this effect is more pronounced in services than in manufacturing. This suggests the need to differentiate export effects by sectoral composition.

Several studies find that export growth does not always result in a significant or sustained increase in FLFP. Often, these effects are sectorally or temporally bounded and contingent on other structural factors. Standing (1999) emphasizes that the feminization of labor under export-led industrialization often results in insecure, low-paid employment, producing only marginal or temporary gains in FLFP. Gaddis and Pieters (2017), using micro-level econometric data from Brazil, show that while export expansion benefits highly educated women, it has little to no impact on low-skilled female workers. In some regions, poverty appears to be a driver of FLFP, particularly where women enter the labor market out of necessity rather than opportunity (Ozen & Yalcinkaya Koyuncu, 2018a).

In contexts where gender norms remain rigid, even strong export growth fails to meaningfully improve FLFP. Heath and Jayachandran (2018), in the Journal of Economic Perspectives, demonstrate that entrenched patriarchal norms in South Asia continue to inhibit women's labor market participation, regardless of export opportunities. This underscores the necessity of considering cultural variables alongside economic factors.

While export expansion may raise FLFP in numerical terms, it may simultaneously reinforce structural disadvantages through precarious employment. Seguino (2000) contends that export-led growth in East Asia increased female employment by deliberately suppressing wages, thereby positioning women as a cheap labor reserve within global production chains. Tang, Liu, and Zheng (2020), in a Difference-in-Differences study published in World Development, find that export-promoting policies in China raised female employment but also resulted in reduced job security and shorter-term contracts for women. The authors argue that the quality of employment remains an underexamined dimension in the analysis of FLFP.

Moreover, Kucera and Milberg (2000) find that as export-oriented sectors undergo technological upgrading, male labor is increasingly favored, leading to a displacement effect for women. This suggests that export-induced gains in female employment may erode over time due to sectoral restructuring.

The effect of exports on FLFP is not unidirectional. Labor market institutions, education levels, legal frameworks, and social norms can either strengthen or attenuate this relationship. This highlights the role of human capital formation as an indirect channel through which exports affect women's labor market outcomes. Consistent with this view, political stability (Ozen & Yalcinkaya Koyuncu, 2018b) and freedom of expression (Yalcinkaya Koyuncu & Ozen, 2018) have also been shown to facilitate women's labor force integration. Furthermore, cross-country panel evidence finds that broader civil liberties support higher FLFP across institutional settings (Yalcinkaya Koyuncu & Ozen, 2017). Similarly, cultural, ethnic, and linguistic diversity have also been investigated as explanatory variables in FLFP disparities (Koyuncu & Ozen, 2017).

Carranza, Dupas, and Johnson (2022), in their Quarterly Journal of Economics study, demonstrate that gender-equal legal reforms—such as anti-discrimination laws—amplify the positive employment effects of exports on women. This indicates that legal and institutional frameworks are critical in shaping equitable outcomes.

Hallward-Driemeier and Gajigo (2015) argue that labor market regulations promoting gender equality increase the likelihood that export-led growth translates into inclusive employment gains for women.

Despite the comprehensive empirical findings presented above, the relationship between exports and FLFP remains a significant research gap: Studies that utilize country-level, sector-based panel data analyses are limited, particularly in regions such as MENA, SSA, and Turkey. Furthermore, a literature review reveals that changes in FLFP regarding employment quality are often overlooked. Intermediary mechanisms (education, childcare infrastructure, legal regulations) remain underrepresented. Studies capturing temporal dynamics (e.g., changes in FLFP following structural breaks) are relatively few in number. Methodological approaches that robustly demonstrate causal relationships should be utilized more widely. In this regard, future research could benefit from integrating sectoral productivity, investment trends, and technological infrastructure, as shown in studies on exports and privatization (Yalcinkaya Koyuncu & Yilmaz, 2015), export-investment dynamics (Yalcinkaya Koyuncu & Unver, 2021), and ICT-trade interactions (Yalcinkaya Koyuncu & Koyuncu, 2017).

DATA AND METHODOLOGY

This study tries to empirically examine both short-run and long-run effects of female labor force participation on exports of goods and services in Turkiye by utilizing a data sample for the period of 1990-2024 and Auto Regressive Distributed Lag (ARDL) estimation method. Variable of exports (EXPORTS) is measured as percentage share of exports of goods and services in gross domestic product while variable of female labor force participation rate (FLFPR) is given by the percentage share of female labor force participation in female population ages 15+. The data for EXPORTS and FLFPR variables were obtained from World Development Indicators (WDI) of the World Bank. Moreover the logarithmic forms of all variables were used in the analyses. Increases in female labor force participation in an economy lead to increases in production and in turn increases in exports of goods and services. Hence we expect to get positive coefficient estimation for FLFPR variable. Firstly we conducted co-integration analysis via ARDL bounds test and for that purpose we estimated following model:

$$\Delta \text{EXPORTS}_t = \alpha_0 + \sum_{i=1}^{p} \delta_i \Delta \text{EXPORTS}_{t-i} + \sum_{i=0}^{q} \phi_i \Delta FLFPR_{t-i} + \theta_0 \text{EXPORTS}_{t-1} + \theta_1 FLFPR_{t-1} + \varepsilon_t \quad (1)$$

In Equation 1 above: θ0 and θ1 notations represent long-term coefficients; δi and ϕi notations stand for short-term coefficients; Δ notation is first degree difference operator; α_0 reflects constant term of the model, and ε_t is white noise error term of the model.

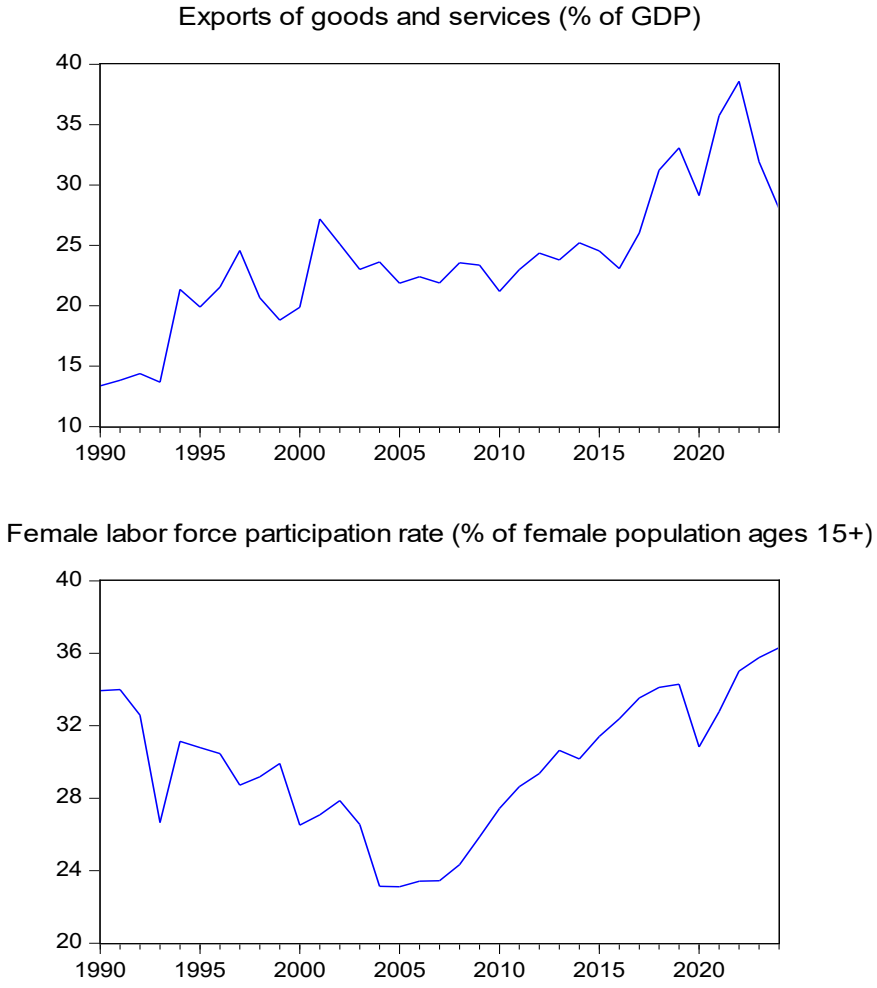
The null hypothesis of ARDL bounds test is given by H0: θ0=θ1=0 and the null hypothesis asserts the absence of co-integrating relationship between female labor force participation rate and exports of goods and services. On the other hand the alternative hypothesis of ARDL bounds test is represented by H1: θ0≠θ1≠0 and the alternative hypothesis claims the existence of co-integrating association between female labor force participation rate and exports of goods and services. If F-statistic value gathered from ARDL bounds test is bigger than the critical value of upper limit at a given significance level, we say that female labor force participation rate and exports of goods and services are co-integrated and thus those variables move together in the long-run. However if the F-statistic value obtained from ARDL bounds test is smaller than the critical value of lower limit at a given significance level or stay in somewhere between lower and upper limit critical values then we cannot conclude that female labor force participation rate and exports of goods and services are co-integrated.

We estimated the following model to obtain short-run and long-run coefficients:

$$EXPORTS_t = \beta_0 + \sum_{i=1}^{p} \alpha_i \Delta EXPORTS_{t-i} + \sum_{i=0}^{q} \mu_i \Delta FLFPR_{t-i} + \gamma ECM_{t-1} + \varepsilon_t \quad (2)$$

In Equation 2 above: αi and μi notations show the dynamic coefficients which return the model back to the balance in the long run; ECM term is error correction term of the model; γ represents the speed of adjustment at which the model goes back to long run in response to a shock taken in place in the short-run. Moreover the coefficient for the speed of adjustment term must be negative and statistically significant.

The Graph 1 below reflects the behavior of the series of female labor force participation rate and exports of goods and services over time. As seen from the graph EXPORTS variable has an upward trend over the estimation period except the drops after 2022. FLFPR variable possesses a downward trend until 2005 and after that it has an upward trend over the period of 1990-2024.



Graph 1: EXPORTS and FLFPR Variables

ESTIMATION AND FINDINGS

We implemented Phillips-Perron (PP) unit root test by estimating a model containing constant and linear trend to figure out the integration order of our variables of EXPORTS and FLFPR. We must have variables with integration order no more than one in order to be eligible for using ARDL bounds test in co-integration analysis. PP unit root test findings show that neither EXPORTS variable nor FLFPR variable is stationary at levels. However both EXPORTS variable and FLFPR variable are stationary at first differences. This means that they are integrated order one and meet the integration order requirement of ARDL bounds test and hence we are eligible to employ ARDL bounds test for co-integration analysis.

Table 1: PP Unit Root Test

Null Hypothesis: EXPORTS has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		-3.18213	0.1044
Test critical values:	1% level	-4.24364	
	5% level	-3.54428	
	10% level	-3.2047	
Null Hypothesis: D(EXPORTS) has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		-6.60572	0.0000
Test critical values:	1% level	-4.24364	
	5% level	-3.54428	
	10% level	-3.2047	
Null Hypothesis: FLFPR has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		-1.73864	0.7117
Test critical values:	1% level	-4.24364	
	5% level	-3.54428	
	10% level	-3.2047	
Null Hypothesis: D(FLFPR) has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		-6.79088	0.0000
Test critical values:	1% level	-4.24364	
	5% level	-3.54428	
	10% level	-3.2047	

After unit root test, we should decide on optimal lag length of the model. Therefore we used AIC criterion to find out optimal lag length. After evaluation of 42 distinct possible models by AIC criterion, Figure 1 and Table 2 below disclose that ARDL(2,5) model is the best model with respect to optimal lag length. Because of that we performed all of our analyses by employing ARDL(2,5) model.

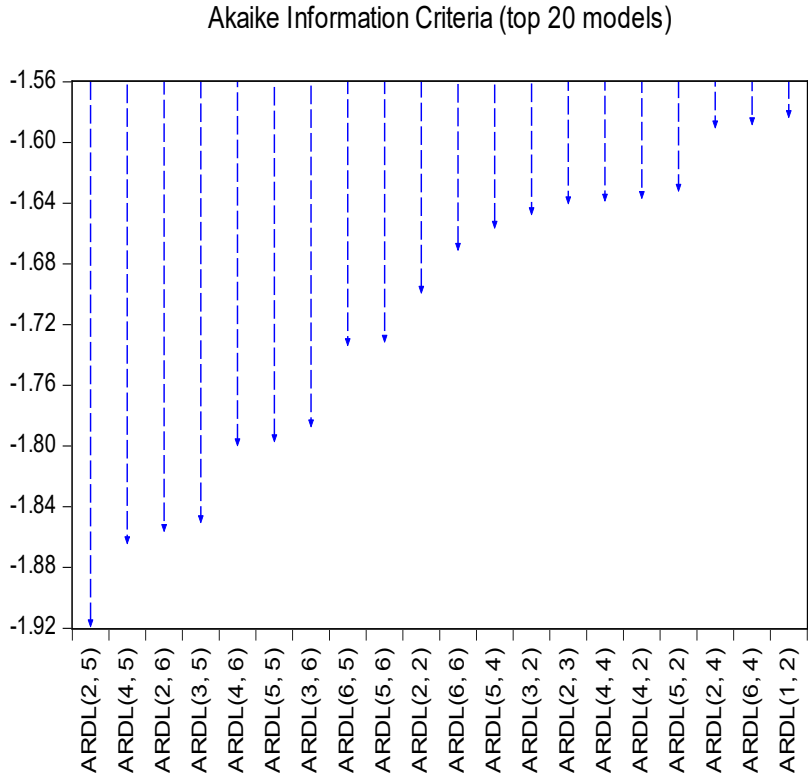


Figure 1: Top 20 ARDL Models

Table 2: ARDL Models Evaluated

Model	**AIC**	Specification	Model	**AIC**	Specification
30	**-1.916433**	**ARDL(2, 5)**	18	-1.568368	ARDL(4, 3)
16	-1.861654	ARDL(4, 5)	37	-1.568301	ARDL(1, 5)
29	-1.853662	ARDL(2, 6)	5	-1.564799	ARDL(6, 2)
23	-1.847852	ARDL(3, 5)	35	-1.563021	ARDL(2, 0)
15	-1.797095	ARDL(4, 6)	11	-1.561462	ARDL(5, 3)
9	-1.794473	ARDL(5, 5)	28	-1.551511	ARDL(3, 0)
22	-1.784709	ARDL(3, 6)	24	-1.539881	ARDL(3, 4)
2	-1.731279	ARDL(6, 5)	42	-1.536272	ARDL(1, 0)
8	-1.728957	ARDL(5, 6)	39	-1.533984	ARDL(1, 3)
33	-1.696742	ARDL(2, 2)	21	-1.506671	ARDL(4, 0)
1	-1.668418	ARDL(6, 6)	36	-1.506141	ARDL(1, 6)
10	-1.653908	ARDL(5, 4)	34	-1.505631	ARDL(2, 1)
26	-1.64495	ARDL(3, 2)	4	-1.495857	ARDL(6, 3)
32	-1.637832	ARDL(2, 3)	27	-1.48763	ARDL(3, 1)
17	-1.635953	ARDL(4, 4)	41	-1.467369	ARDL(1, 1)
19	-1.634258	ARDL(4, 2)	38	-1.465411	ARDL(1, 4)
12	-1.62948	ARDL(5, 2)	14	-1.441276	ARDL(5, 0)
31	-1.587761	ARDL(2, 4)	20	-1.437719	ARDL(4, 1)
3	-1.585635	ARDL(6, 4)	7	-1.372739	ARDL(6, 0)
40	-1.581033	ARDL(1, 2)	13	-1.372345	ARDL(5, 1)
25	-1.57753	ARDL(3, 3)	6	-1.303893	ARDL(6, 1)

In Table 3 below we displayed co-integration test results gathered from ARDL bounds test. As indicated by Table 3, F-statistic value of 7.231449 is bigger than the upper limit critical values at all significance levels and sample sizes. Hence we can state that there is cointegration relationship between female labor force participation rate and exports of goods and services and they move together in the long-run.

Table 3: ARDL Bounds Test

Test Statistic	Signif.	I(0)/Lower Limit	I(1)/Upper Limit
F-statistic: **7.231449**			
		Asymptotic: n=1000	
	10%	4.05	4.49
k: 1	5%	4.68	5.15
	2.5%	5.3	5.83
	1%	6.1	6.73
Actual Sample Size: 30		Finite Sample: n=30	
	10%	4.427	4.957
	5%	5.377	5.963
	1%	7.593	8.35

Table 4 shows the long-run coefficient estimation results of ARDL(2,5) model. In parallel to our prior anticipation, we obtained positive coefficient estimation for FLFPR variable and this finding is statistically significant at least at %5 significance level. According to the results, if female labor force participation rate goes up by one percent then exports of goods and services increases by %0.44 in Türkiye during the estimation period.

Table 4: ARDL Bounds Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FLFPR	0.4423	0.1897	2.3315	0.0303
TREND	0.0163	0.0028	5.7936	0.0000

EC = EXPORTS - (0.4423*FLFPR + 0.0163*TREND)

Table 5 exhibits the estimation results of error correction model. Short-run coefficient estimation of EXPORTS variable is positive and statistically insignificant at %1 significance level. Short-run coefficient estimation of FLFPR variable is negative and statistically insignificant at %1 significance level for first and fourth lags. As required, coefficient estimation of ECM term is negative and statistically significant at %1 significance level.

Table 5: ECM Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTANT	0.82561	0.168166	4.909489	0.0001
D(EXPORTS(-1))	0.436719	0.152085	2.871542	0.0094
D(FLFPR)	0.262964	0.307646	0.854761	0.4028
D(FLFPR(-1))	-1.239266	0.304478	-4.070132	0.0006
D(FLFPR(-2))	-0.209425	0.26748	-0.782953	0.4428
D(FLFPR(-3))	-0.342116	0.24664	-1.387109	0.1807
D(FLFPR(-4))	-0.700656	0.238676	-2.935596	0.0082
ECM(-1)	-0.888014	0.181782	-4.885057	0.0001
R-squared	0.63449	Mean dependent var		0.009073
Adjusted R-squared	0.518191	S.D. dependent var		0.115797
S.E. of regression	0.080378	Akaike info criterion		-1.980982
Sum squared resid	0.142133	Schwarz criterion		-1.60733
Log likelihood	37.71473	Hannan-Quinn criter.		-1.861448
F-statistic	5.455696	Durbin-Watson stat		1.799444
Prob(F-statistic)	0.00098			

Finally some diagnostic tests (i.e., Jerque-Bera normality test, Breusch-Godfrey serial correlation LM test for autocorrelation, ARCH test for heteroskedasticity, Ramsey RESET test for model specification error, and CUSUM and CUSUM-square tests for parameter stability) were implemented to check if our ARDL(2,5) model possesses any problem. Figure 2 displays the findings of Jerque-Bera normality test and Jerque-Bera normality test points out that residuals of ARDL(2,5) model are normally distributed.

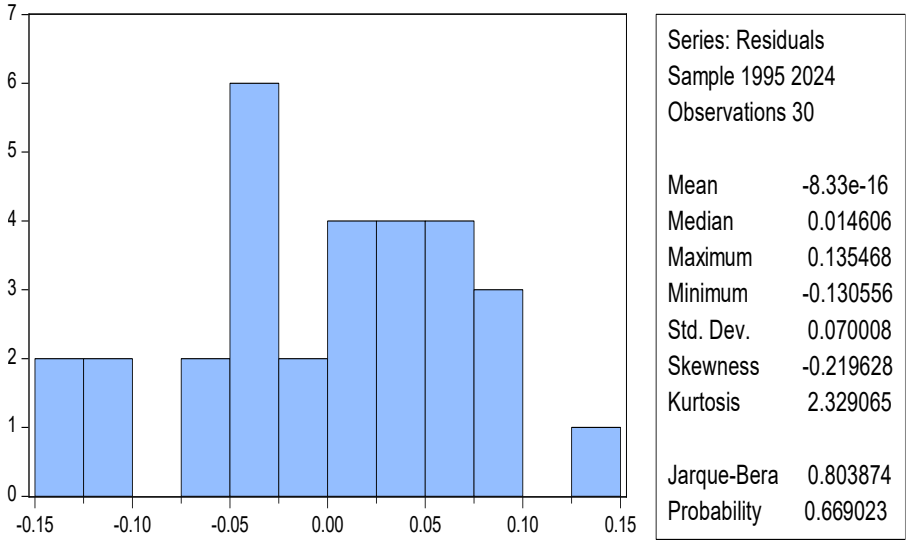


Figure 2: Jarque-Bera Normality Test

In Table 6 we reported the results of autocorrelation test and the findings show that the residuals of ARDL(2,5) model do not suffer from autocorrelation problem.

Table 6: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.507878	Prob. F(2,18)	0.2481
Obs*R-squared	4.304994	Prob. Chi-Square(2)	0.1162

Table 7 reports the results of heteroscedasticity test and the findings of ARCH heteroscedasticity test imply that ARDL(2,5) model possesses homoscedastic variances.

Table 7: ARCH Heteroskedasticity Test

F-statistic	0.001995	Prob. F(1,27)	0.9647
Obs*R-squared	0.002143	Prob. Chi-Square(1)	0.9631

In Table 8 we show the results of model misspecification test (namely Ramsey RESET test) and the findings of Ramsey RESET test disclose that ARDL(2,5) model is correctly specified at %1 and %5 significance level.

Table 8: Ramsey RESET Test

	Value	df	Probability
t-statistic	1.881101	19	0.0754
F-statistic	3.538542	(1,19)	0.0754

Lastly the results of parameter stability tests (i.e., CUSUM test and CUSUM-square test) are shown in Figure 3 and 4. According to the results of CUSUM test and CUSUM-square test, ARDL(2,5) model is free from parameter instability problem.

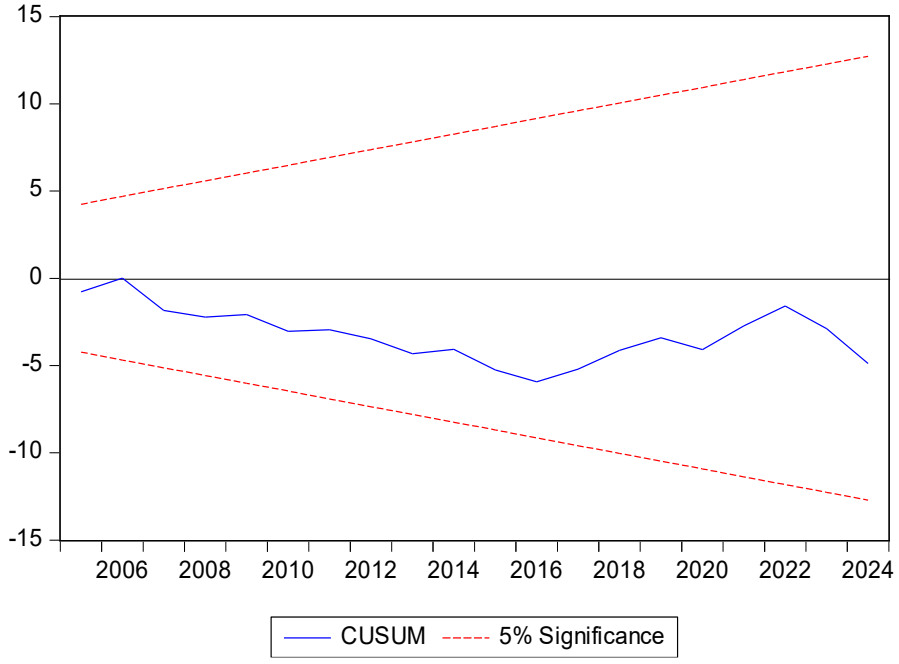


Figure 3: CUSUM Test for Parameter Stability of ARDL(2,5) Model

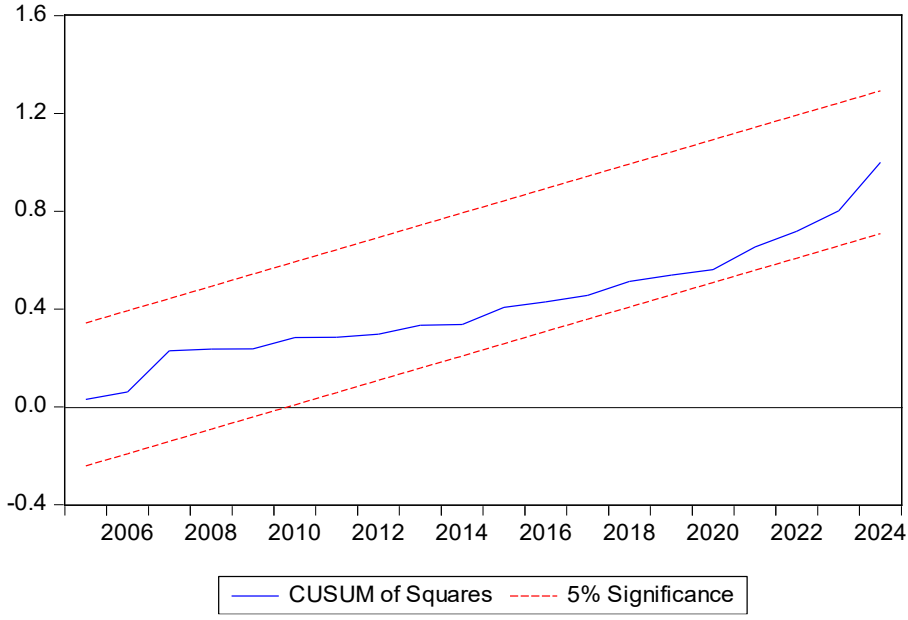


Figure 4: CUSUM-square Test for Parameter Stability of ARDL(2,5) Model

CONCLUSION

In this study we attempt to investigate short-run and long-run impacts of female labor force participation on exports of goods and services in Turkiye by employing ARDL estimation technique for a data sample covering years between 1990 and 2024. We conducted PP unit root test to identify the integration orders of the variables of female labor force participation rate and exports of goods and services. The findings of PP unit root test reveal that variables of female labor force participation rate and exports of goods and services are stationary at first differences and thus they are integrated order one. Given the integration order one for each variable, we implemented co-integration analysis by utilizing ARDL bounds test. ARDL bounds test results disclose that variables of female labor force participation rate and exports of goods and services are co-integrated and hence they move together in the long-run in Turkiye. According to the long-run coefficient estimations, there is statistically significant positive association between variable of female labor force participation rate and variable of exports of goods and services. More specifically, if female labor force participation rate jumps by one percent then

exports of goods and services goes up by %0.44 in Turkiye over the period of 1990-2024. Finally we conducted several conventional diagnostic tests to see if our model possesses any problem. The results of diagnostic tests point out that our ARDL(2,5) model is free from the problems of non-normality, model misspecification, autocorrelation, heteroscedasticity, and parameter instability.

REFERENCE

Aguayo-Téllez, E. (2012). The impact of trade liberalization on employment, wages and working conditions in developing countries: A review of the literature. ILO Employment Working Paper No. 108.

Balié, J., Morales-Opazo, C., Mas Aparisi, A., & Ron, M. N. (2020). Gender inequalities and food systems: Lessons from a global analysis. World Development, 130, 104951. https://doi.org/10.1016/j.worlddev.2020.104951

Berik, G., Rodgers, Y. V. D. M., & Zveglich, J. E. (2004). International trade and gender wage discrimination: Evidence from East Asia. Review of Development Economics, 8(2), 237–254. https://doi.org/10.1111/j.1467-9361.2004.00230.x

Busse, M., & Spielmann, C. (2006). Gender inequality and trade. Review of International Economics, 14(3), 362–379. https://doi.org/10.1111/j.1467-9396.2006.00584.x

Carranza, E., Dupas, P., & Johnson, S. (2022). The economic impacts of legal reforms for women in the labor market. Quarterly Journal of Economics, 137(3), 1455–1500. https://doi.org/10.1093/qje/qjac020

Chamlou, N., Muzi, S., & Ahmed, H. (2011). Understanding the determinants of female labor force participation in the Middle East and North Africa region (World Bank Policy Research Working Paper No. 6066). The World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/706051468052476900

Chaudhary, R., & Verick, S. (2021). Female labor force participation in Asia: Trends, constraints, and policy drivers. International Labour Review, 160(3), 327–354. https://doi.org/10.1111/ilr.12174

Cirera, X., Comin, D., Cruz, M., & Oikonomou, K. (2021). The firm-level links between exports and wages in developing countries. Journal of Development Economics, 149, 102596. https://doi.org/10.1016/j.jdeveco.2020.102596

Cuberes, D., & Teignier, M. (2016). Aggregate effects of gender gaps in the labor market: A quantitative estimate. Journal of Human Capital, 10(1), 1–32. https://doi.org/10.1086/683847

Dehejia, R., Jordà, Ò., & Singhal, S. (2022). Export expansion and female labor market outcomes. Journal of International Economics, 137, 103628. https://doi.org/10.1016/j.jinteco.2022.103628

Dippel, C., Gold, R., Heblich, S., & Pinto, R. (2023). Regional trade shocks and labor market dynamics. American Economic Review, 113(2), 467–503. https://doi.org/10.1257/aer.20200800

Do, Q.-T., Levchenko, A. A., & Raddatz, C. (2022). Trade, inequality, and the labor market. Journal of Economic Literature, 60(3), 799–864. https://doi.org/10.1257/jel.20201453

Duflo, E., & Topalova, P. (2021). Female labor force participation in developing countries. In Handbook of Labor, Human Resources and Population Economics (pp. 1–35). Springer. https://doi.org/10.1007/978-3-319-57365-6_162-1

Elson, D. (1999). Labor markets as gendered institutions: Equality, efficiency and empowerment issues. World Development, 27(3), 611–627. https://doi.org/10.1016/S0305-750X(98)00147-8

Gaddis, I., & Pieters, J. (2017). The gendered labor market impacts of trade liberalization: Evidence from Brazil. Journal of Human Resources, 52(2), 457–490. https://doi.org/10.3368/jhr.52.2.0214-6235R

Hallward-Driemeier, M., & Gajigo, O. (2015). Strengthening economic rights and women's labor force participation. The World Bank. https://openknowledge.worldbank.org/handle/10986/21020

Heath, R., & Jayachandran, S. (2018). The causes and consequences of increased female education and labor force participation in developing countries. Journal of Economic Perspectives, 32(3), 143–168. https://doi.org/10.1257/jep.32.3.143

Jansen, M., & von Uexkull, E. (2010). Trade and employment in the global crisis: WTO–ILO report. WTO and ILO. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_145336.pdf

Kabeer, N., & Mahmud, S. (2004). Globalization, gender and poverty: Bangladeshi women workers in export and local markets. Journal of International Development, 16(1), 93–109. https://doi.org/10.1002/jid.1065

Klasen, S. (2019). What explains uneven female labor force participation levels and trends in developing countries? World Bank Research Observer, 34(2), 161–197. https://doi.org/10.1093/wbro/lkz005

Korinek, J., Moïsé, E., & Tange, H. (2021). Trade and gender: A framework of analysis. OECD Trade Policy Papers, No. 245. https://doi.org/10.1787/b7c2cdd7-en

Koyuncu, C., & Ozen, E. (2017). Religious, ethnic, linguistic and cultural diversity and female labor force participation. Journal of Economics Bibliography, 4(1), 87–93.

Kucera, D., & Milberg, W. (2000). Gender segregation and gender bias in manufacturing trade expansion. World Development, 28(7), 1191–1210. https://doi.org/10.1016/S0305-750X(00)00026-1

Oksak, Y., & Yalcinkaya Koyuncu, J. (2017). Does globalization affect female labor force participation: Panel evidence. Journal of Economics Bibliography, 4(4), 381–387.

Ozen, E., & Yalcinkaya Koyuncu, J. (2018a). Poverty and female labor force participation in African countries: A panel analysis. IX. IBANESS Congress Series, 1162–1165.

Ozen, E., & Yalcinkaya Koyuncu, J. (2018b). The impact of political stability on female labor force participation: The case of Asia, Africa, and Islamic countries. IX. IBANESS Congress Series, 1158–1161.
Pahl, S., & Timmer, M. P. (2020). Do global value chains enhance economic upgrading? A long view. Journal of Development Studies, 56(9), 1683–1705. https://doi.org/10.1080/00220388.2019.1702151
Seguino, S. (2000). Gender inequality and economic growth: A cross-country analysis. World Development, 28(7), 1211–1230. https://doi.org/10.1016/S0305-750X(00)00018-8
Standing, G. (1999). Global feminization through flexible labor: A theme revisited. World Development, 27(3), 583–602. https://doi.org/10.1016/S0305-750X(98)00151-X
Tang, Y., Liu, Y., & Zheng, Y. (2020). Trade liberalization and employment quality: Evidence from China. World Development, 135, 105058. https://doi.org/10.1016/j.worlddev.2020.105058
Tejani, S., & Milberg, W. (2016). Global defeminization? Industrial upgrading and manufacturing employment. Feminist Economics, 22(2), 24–54. https://doi.org/10.1080/13545701.2015.1101305
UNCTAD. (2014). Trade and gender: Opportunities and challenges for developing countries. United Nations Conference on Trade and Development. https://unctad.org/webflyer/trade-and-gender-opportunities-and-challenges-developing-countries
Wood, A. (1991). North–South trade and female labor in manufacturing: A disaggregated analysis. World Development, 19(11), 1263–1279. https://doi.org/10.1016/0305-750X(91)90067-3
World Bank. (2012). World Development Report 2012: Gender equality and development. World Bank. https://doi.org/10.1596/978-0-8213-8810-5
Yalcinkaya Koyuncu, J., & Koyuncu, C. (2017). The association between ICT and export and import: Panel analysis. IV. IBANESS Congress Series, 649–654.
Yalcinkaya Koyuncu, J., & Ozen, E. (2017). The role of freedoms in female labor force participation: Panel evidence. IBANESS Conference Series, 350–357.
Yalcinkaya Koyuncu, J., & Ozen, E. (2018). An empirical analysis of the relationship between freedom of expression and female labor force participation. X. IBANESS Congress Series, 550–552.
Yalcinkaya Koyuncu, J., & Unver, M. (2021). Causality and long-term analysis between investments and exports in Turkey. The Journal of International Scientific Researches, 6(3), 250–260.
Yalcinkaya Koyuncu, J., & Yilmaz, R. (2015). The impact of privatization on export in transition economies: A panel study. Anadolu University Journal of Social Sciences, 15(2), 57–62.
Yalcinkaya Koyuncu, J., Yilmaz, R., & Unver, M. (2016). The relationship between female labor force participation and labor productivity: Panel data analysis. Eskisehir Osmangazi University Journal of Economics and Administrative Sciences, 11(2), 237–250.

The effectiveness of Artificial Intelligence (AI) on the power of Decision-Making and Strategy Building in Libyan Institutions: The Case of Employees in Oil and Gas Companies in Libya

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ABSTRACT

This study examines the impact of Artificial Intelligence (AI) on administrative decision-making and strategic planning in Libyan oil and gas institutions, centering on employee perspectives. In emerging markets with transitional digital infrastructures, particularly post-conflict economies like Libya, empirical research on AI integration remains limited. This qualitative case study addresses this gap by exploring AI adoption within a major national oil and gas company. Data were gathered through semi-structured interviews with employees across administrative levels and supported by document analysis. Findings reveal that AI use is partial, primarily applied in data processing and routine decision support. Despite limited deployment, AI enhances decision-making efficiency and introduces new strategic planning capabilities. However, its impact is not uniform; it is mediated by human and organizational factors. Educational background, digital literacy, age, managerial level, and organizational readiness significantly influence employee engagement with AI tools. Employees with higher digital fluency demonstrate greater acceptance and utilization, highlighting the need for targeted training and capacity-building. Organizational culture and infrastructural constraints further shape AI's effectiveness. The study contributes to academic discourse by illustrating the conditional and context-dependent nature of AI's influence in a resource-dependent, post-conflict setting. It offers practical implications for institutional leaders, HR units, and policymakers aiming to advance inclusive and responsible digital transformation. The findings emphasize that sustainable AI integration requires more than technological investment it demands a holistic approach that prioritizes human capital development, digital literacy, and adaptive organizational structures.

Keywords: Artificial Intelligence; Administrative Decision-Making; Strategic Planning; Oil And Gas Industry; Libya; Employee Perspectives; Digital Transformation; Emerging Markets.

INTRODUCTION

The integration of Artificial Intelligence (AI) into organizational processes has emerged as a transformative force in administrative decision-making and strategic planning across global industries. In the energy sector particularly within high-stakes, data-intensive environments such as oil and gas AI technologies are increasingly leveraged to enhance predictive analytics, optimize resource allocation, and improve strategic responsiveness (Ohalete et al., 2023; Parycek et al., 2024). However, in emerging and post-conflict economies like Libya, the adoption and effectiveness of AI remain uneven, constrained by transitional digital infrastructures, institutional fragmentation, and varying levels of workforce readiness (Vudugula et al., 2023; Amin et al.,

2025). Despite the strategic importance of Libya's oil and gas sector accounting for over 90% of national revenue the integration of AI into administrative and strategic functions remains underexplored, particularly from the perspective of employees who interact with these systems daily. While global energy firms deploy AI for real-time risk assessment, demand forecasting, and automated decision support, Libyan institutions continue to rely heavily on traditional, often bureaucratic, decision-making models (Garada, 2023; Abushrenta, 2022). This technological lag not only undermines operational efficiency but also limits strategic agility in a volatile geopolitical and market environment. Although recent initiatives indicate a growing interest in digital transformation, empirical evidence on how AI influences the power—defined as the speed, accuracy, confidence, and strategic depth of decision-making within Libyan institutions is scarce. Moreover, existing literature predominantly focuses on technologically advanced contexts, leaving a critical gap in understanding AI's effectiveness in resource-dependent, institutionally complex settings. This study addresses this gap by examining the impact of AI on administrative decision-making and strategy building within a major Libyan oil and gas company, with a specific focus on employee experiences, perceptions, and engagement. Drawing on qualitative data from semi-structured interviews and document analysis, the research investigates how AI tools are currently utilized, the extent to which they empower decision-makers, and the human, organizational, and infrastructural factors that mediate their effectiveness. By centering employee perspectives, the study contributes to the growing discourse on human-centered AI in public and private sector institutions in the MENA region.

The findings offer nuanced insights into the conditional nature of AI's effectiveness revealing that technological deployment alone is insufficient without parallel investments in digital literacy, organizational culture, and change management. For institutional leaders, HR practitioners, and policymakers, the study provides actionable recommendations for fostering inclusive, responsible, and sustainable AI integration. In doing so, it underscores the need for a holistic approach that positions people at the core of digital transformation strategies in Libya and similar emerging markets.

THE RESEARCH OBJECTIVE

This study examines the effectiveness of AI in enhancing decision-making and strategic planning within Libyan oil and gas institutions, focusing on employee perspectives. Findings indicate moderate AI integration, with positive impacts on efficiency and strategic capabilities, though adoption is uneven across administrative levels. Employee acceptance and utilization of AI are significantly influenced by digital literacy, age, and organizational support. The research highlights the need for targeted capacity-building and holistic digital transformation strategies to maximize AI's potential in Libya's energy sector.

THE RESEARCH PROBLEM STATEMENT

This study investigates the effectiveness of AI in enhancing decision-making and strategy building within Libyan oil and gas institutions, focusing on employee perspectives. Findings reveal moderate AI integration, with significant positive impacts on decision-making efficiency and strategic planning capabilities. Employee acceptance and utilization of AI are strongly influenced by digital literacy, age, and organizational support, highlighting human and infrastructural challenges. The research underscores the need for targeted capacity-building and holistic strategies to realize AI's transformative potential in Libya's energy sector.

RESEARCH HYPOTHESES

- H1.1: AI implementation in strategic planning has a significant effect on AI integration in decision-making efficiency.
- H1.2 AI implementation challenges has a significant effect on AI integration in decision-making efficiency.
- H1.3. Employee acceptance and utilization of AI has a significant effect on AI integration in decision-making efficiency.

- H2: Employee acceptance and utilization of AI moderates the relationship between implementation of AI in strategic planning and AI integration in decision-making efficiency.

LITERATURE REVIEW

The integration of Artificial Intelligence (AI) into organizational decision-making and strategic planning has emerged as a defining trend in the digital transformation of institutions across the global economy. AI technologies encompassing machine learning, natural language processing, predictive analytics, and intelligent automation are increasingly deployed to enhance the speed, accuracy, and scalability of administrative decisions and long-term strategy formulation (Bakeer, 2024; Fu et al., 2025). In high-stakes, data-intensive industries such as oil and gas, AI has demonstrated significant potential in optimizing operational workflows, forecasting market trends, and supporting risk-informed strategic choices (Agbaji, 2021; Makhzoum, 2024). However, much of the existing literature focuses on technologically advanced, stable environments, leaving a critical gap in understanding how AI functions within institutional contexts marked by digital immaturity, economic volatility, and socio-political complexity conditions that define many emerging markets, including Libya.

Early studies emphasized AI's technical capabilities, positioning it as a neutral, efficiency-enhancing tool capable of rationalizing bureaucratic processes (Lee, 2022). This techno-centric view assumed that organizational benefits would follow automatically from system deployment. However, more recent scholarship has shifted toward a socio-technical perspective, recognizing that AI's effectiveness is not determined solely by algorithmic sophistication but is mediated by human, organizational, and institutional factors (Brilon et al., 2024; De Kimpe et al., 2022). Employee acceptance, digital literacy, managerial trust, and leadership readiness have been identified as pivotal in shaping the actual impact of AI on decision-making power the extent to which decisions are faster, more accurate, and strategically robust (Whitfield & Whitfield, 2021). In this view, AI is not a standalone solution but a socio-technical intervention whose success depends on alignment with workforce competencies and organizational culture.

In the energy sector, particularly within national oil companies (NOCs), the adoption of AI has been uneven. While multinational corporations leverage AI for real-time reservoir modeling, predictive maintenance, and geopolitical risk assessment, state-owned enterprises in developing economies often lag due to infrastructural constraints, budget limitations, and resistance to change (Garada, 2023; Liu et al., 2025). In Libya, where the oil and gas sector contributes over 90% of export revenues and remains central to state stability, digital modernization has been slow and fragmented. Institutional inertia, legacy systems, and a shortage of skilled technical personnel further complicate AI integration (Duraimutharasan et al., 2025). Despite growing recognition of AI's strategic value, empirical studies on its implementation within Libyan institutions remain virtually nonexistent.

Moreover, the existing literature largely overlooks the employee perspective the individuals who interact with AI systems daily and whose interpretations, competencies, and attitudes ultimately determine the technology's real-world utility. Most studies focus on top-down implementations or technical outcomes, neglecting the micro-level dynamics of AI use in administrative and strategic roles. This is particularly problematic in transitional economies, where workforce readiness varies significantly across age groups, educational backgrounds, and hierarchical levels. As such, there is a pressing need for context-sensitive research that examines not just whether AI is used, but how it is experienced and enacted by employees in resource-dependent, post-conflict settings.

This study directly addresses this gap. While global discourse advances rapidly, localized empirical insights especially from North Africa and the MENA region are scarce. By focusing on Libyan oil and gas institutions, this research contributes to a more nuanced, inclusive understanding of AI's role in public and semi-public enterprises undergoing digital transition. It builds upon the socio-technical framework to argue that the effectiveness of AI in enhancing decision-making and strategy building is contingent not only on technological investment but on human capital development, organizational adaptability, and institutional support. In doing so, it responds to recent calls for more grounded, context-aware research on digital transformation in the Global South (Ohalete et al., 2023; Parycek et al., 2024).

THE RESEARCH METHOD

This study adopts a quantitative research design using a descriptive-correlational approach (Coronel et al., 2025). This design enables the examination of relationships between AI integration and administrative efficiency, strategic planning outcomes, and employee perceptions. As suggested by Valdez et al., (2025), a correlational strategy is appropriate for exploring associations among variables without manipulating them. The study is non-experimental in nature and emphasizes statistical relationships.

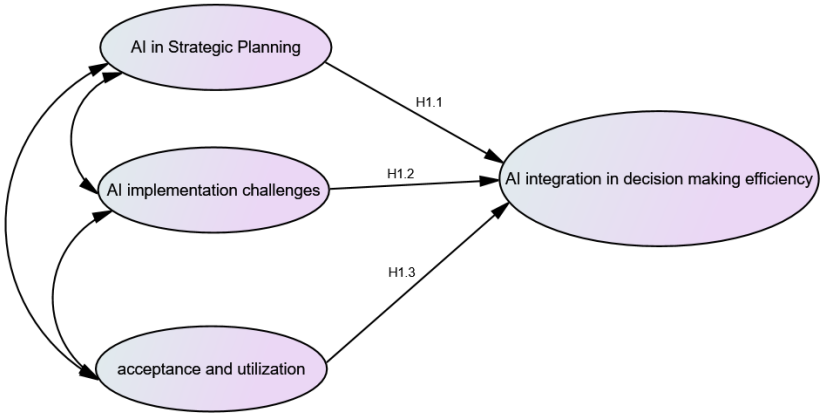

Fig 1. Study Model two (Moderation hypothesis model) AMOS v.24

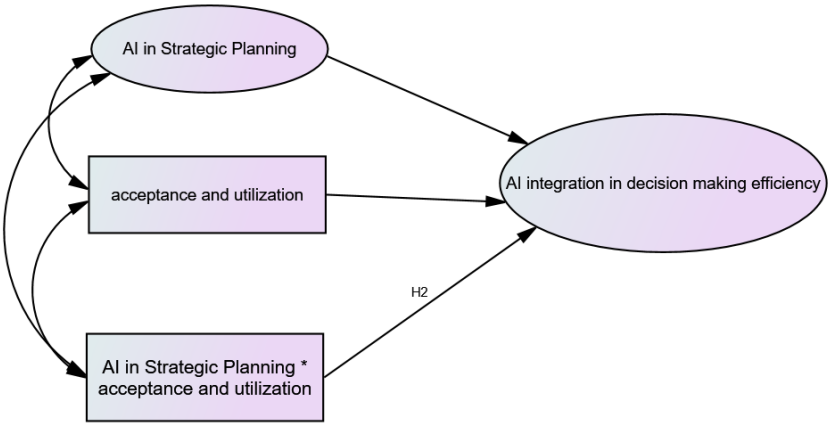

Fig 1.2. Study Model two (Moderation hypothesis model) AMOS v.24

1. Population

The study population consists of all 496 full-time employees across administrative, technical, and managerial departments at Oil and Gas Company. A stratified random sampling method was employed to ensure proportional representation across job levels and departments. Stratification was based on job roles (entry-level, mid-level, senior management, and technical staff) to ensure diversity in perspectives.

2. Data Analysis Technique

Data were coded and analyzed using SPSS (Statistical Package for the Social Sciences) version 27. Descriptive statistics (means, frequencies, standard deviations) were used to summarize demographic data. Pearson correlation and multiple regression analysis were employed to test the hypotheses and determine the strength and direction of relationships between variables. ANOVA and t-tests were used to examine the influence of demographic characteristics on AI acceptance. The study adhered to standard ethical principles. Participants were informed of their rights, including voluntary participation, confidentiality, and anonymity. Informed consent was obtained before questionnaire administration. All data were securely stored and used exclusively for academic purposes.

THE RESEARCH RESULTS

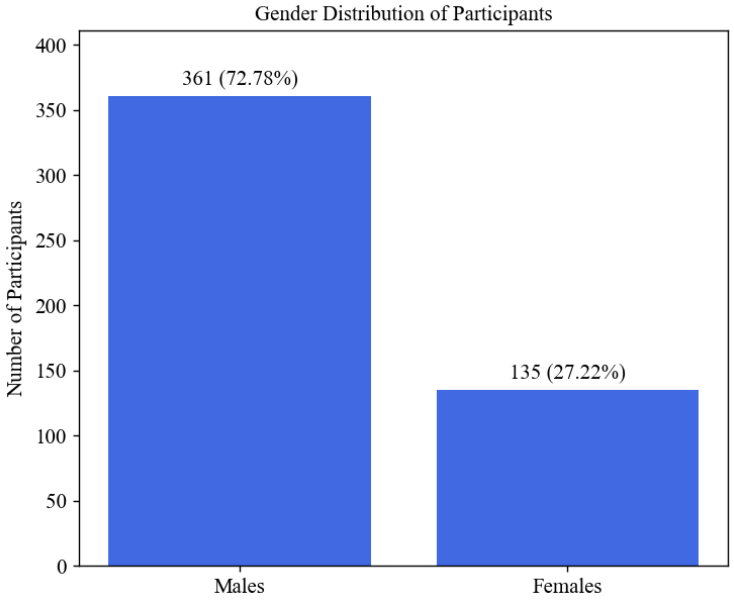

Fig 3 Gender variable percentages in bar chart

The above bar chart represented Gender variable percentages which show Males count in the sample was 361 subjects (72.78%), while female count was 135 subjects (27.22%). Figure.5. shows these percentages in bar chart.

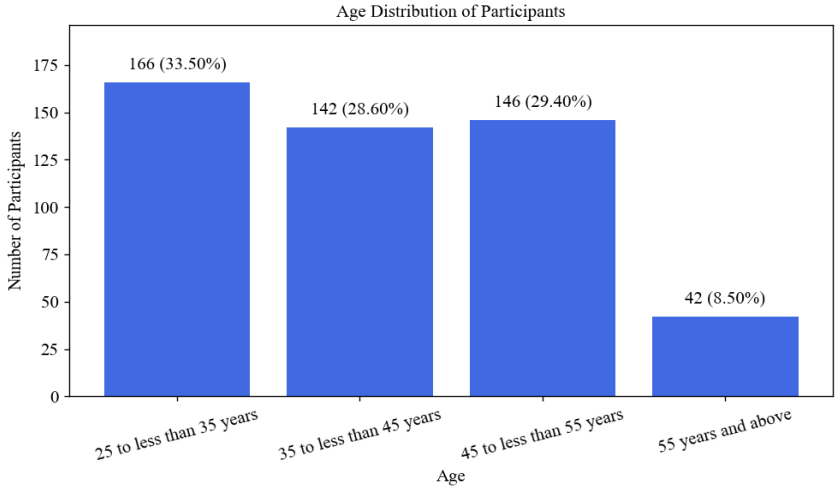

Fig 4 Age Group variable percentages in bar chart

The above bar chart displays the age distribution of 496 participants in the study. The largest group consists of individuals aged 25 to less than 35 years (33.50%), followed by those aged 45 to less than 55 years (29.40%) and 35 to less than 45 years (28.60%). The smallest group comprises participants aged 55 years and above, representing only 8.50% of the sample.

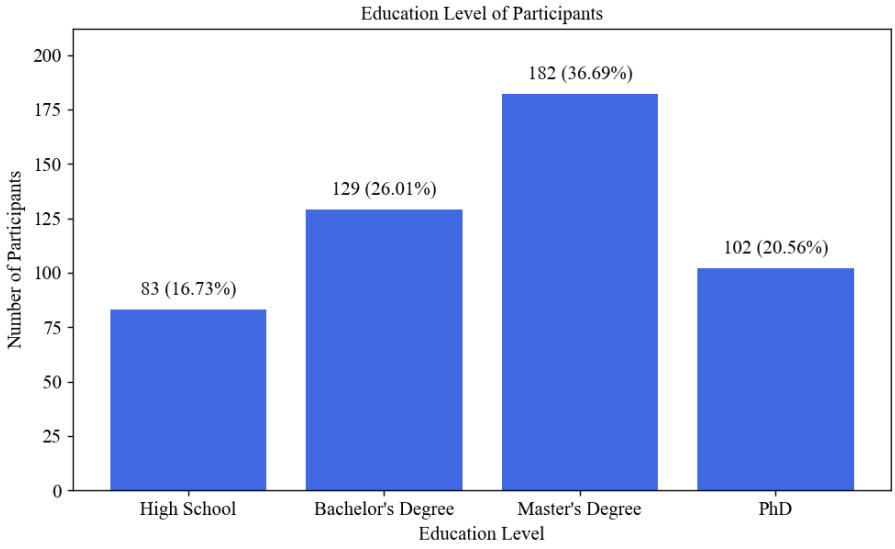

Fig 5 Education Levels variable percentages in bar chart

The above bar chart illustrates the educational background of the 496 participants in the study. The largest group holds a master's degree, accounting for 36.69% (182 participants), followed by those with a bachelor's degree at 26.01% (129 participants). Participants with a PhD make up 20.56% (102 individuals), while the smallest group has only a high school education, representing 16.73% (83 participants).

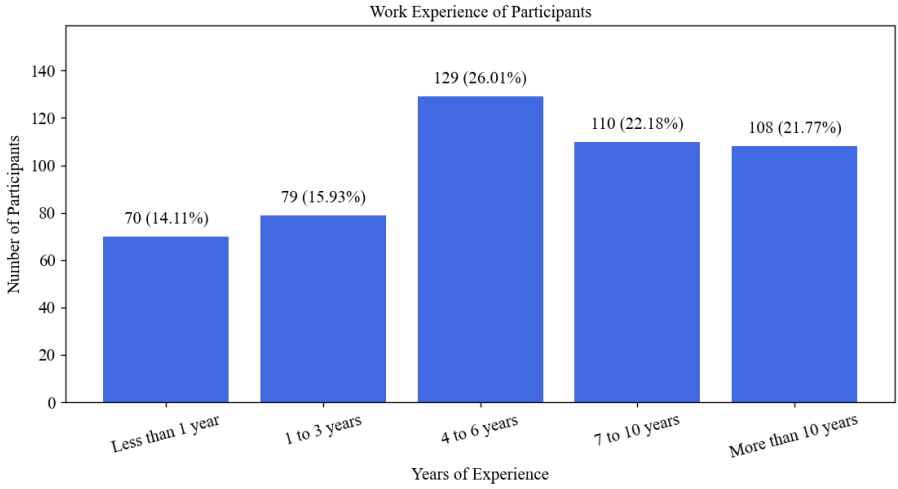

Fig 6 Years of experience variable percentages in bar chart

The above bar chart illustrates the distribution of work experience among the 496 participants in the study. The largest group consists of employees with 4 to 6 years of experience, accounting for 26.01% (129 participants). The remaining groups are relatively balanced, with those having more than 10 years of experience (21.77%) and 7 to 10 years (22.18%) being the next most common, while fewer participants have less than 1 year (14.11%) or 1 to 3 years (15.93%) of experience.

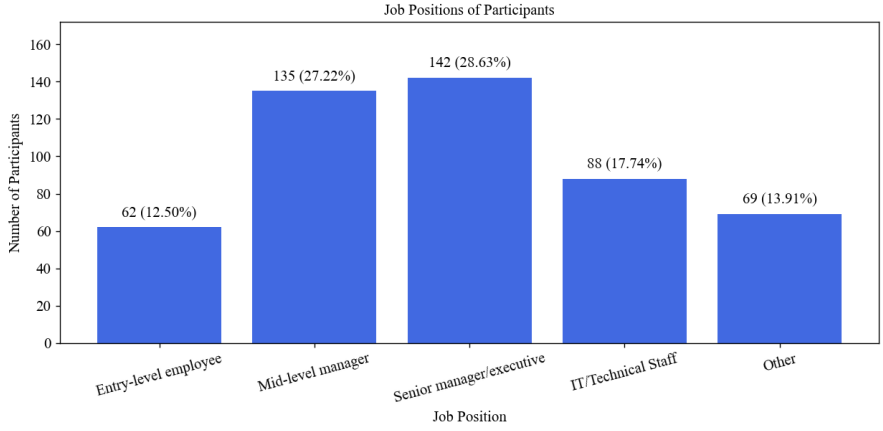

Fig 7 Position variable percentages in bar chart

The above bar chart illustrates the distribution of job positions among the 496 participants in the study. The largest group consists of senior managers/executives (28.63%, 142 participants), followed closely by mid-level managers (27.22%, 135 participants). Entry-level employees make up 12.50% (62 participants), while IT/technical staff and other roles account for 17.74% (88) and 13.91% (69) respectively.

1. Descriptive statistics of study variables

Table.1. Descriptive statistics of study variables

	N	Mean	Std. Deviation	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
AI integration in decision making efficiency	**496**	**2.92**	**.991**	.265	.110	-.744-	.219
Q1	496	2.92	1.176	.105	.110	-1.000-	.219
Q2	496	2.90	1.288	.130	.110	-1.093-	.219
Q3	496	2.92	1.252	.182	.110	-1.008-	.219
Q4	496	2.90	1.252	.181	.110	-1.002-	.219
Q5	496	2.91	1.267	.189	.110	-1.039-	.219
Q6	496	2.91	1.215	.142	.110	-.924-	.219
Q7	496	3.01	1.175	.093	.110	-.972-	.219
Q8	496	2.88	1.188	.192	.110	-.874-	.219
Q9	496	2.97	1.212	.098	.110	-.990-	.219
AI in Strategic Planning	**496**	**3.42**	**.754**	.218	.110	-.254-	.219
Q11	496	3.36	1.032	-.155-	.110	-.337-	.219
Q12	496	3.43	1.014	-.169-	.110	-.333-	.219
Q13	496	3.42	1.010	-.215-	.110	-.277-	.219
Q14	496	3.35	1.022	-.076-	.110	-.386-	.219
Q15	496	3.48	.997	-.203-	.110	-.325-	.219
Q16	496	3.41	1.021	-.210-	.110	-.493-	.219
Q17	496	3.49	1.039	-.359-	.110	-.291-	.219
Q18	496	3.42	1.024	-.257-	.110	-.466-	.219
AI implementation challenges	**496**	**3.52**	**.824**	-.552-	.110	-.109-	.219

Q21	496	3.47	1.130	-.399-	.110	-.642-	.219
Q22	496	3.49	1.108	-.503-	.110	-.469-	.219
Q23	496	3.52	1.067	-.439-	.110	-.369-	.219
Q24	496	3.47	1.071	-.452-	.110	-.363-	.219
Q26	496	3.48	1.156	-.445-	.110	-.702-	.219
Q27	496	3.57	1.128	-.672-	.110	-.292-	.219
Q28	496	3.57	1.133	-.634-	.110	-.348-	.219
Q29	496	3.60	1.109	-.712-	.110	-.165-	.219
Q30	496	3.51	1.126	-.541-	.110	-.410-	.219
Employee Acceptance and utilization	**496**	**3.41**	**.854**	.175	.110	-.696-	.219
Q31	496	3.44	1.148	-.195-	.110	-.854-	.219
Q32	496	3.45	1.092	-.220-	.110	-.730-	.219
Q33	496	3.44	1.123	-.145-	.110	-.889-	.219
Q34	496	3.38	1.076	-.115-	.110	-.733-	.219
Q35	496	3.36	1.106	-.057-	.110	-.872-	.219
Q36	496	3.38	1.059	-.106-	.110	-.568-	.219
General Attitudes towards AI	**496**	**2.50**	**.869**	.354	.110	-.587-	.219
Q41	496	2.63	1.171	.298	.110	-.834-	.219
Q42	496	2.46	1.076	.437	.110	-.536-	.219
Q43	496	2.47	1.038	.402	.110	-.448-	.219
Q44	496	2.46	1.089	.416	.110	-.530-	.219
Q45	496	2.49	1.155	.426	.110	-.659-	.219

Table.1. shows descriptive statistics of variables and items. The overall descriptive statistics were AI integration in decision making efficiency (M= 2.92, SD=.991), AI in Strategic Planning (M =3.42, SD= .752), AI implementation challenges (M =3.52, SD= .824) Employee Acceptance and utilization (M =3.41, SD= .854) and AI Challenges and Opportunities (M =2.50, SD= .869) on a scale of 5 points.

Table.2. Spearman's rho correlations

			1	2	3	4	5
Spearman's rho	1-AI integration in decision making efficiency	Correlation Coefficient	1.000				
		Sig. (2-tailed)	.				
		N	496				
	2-AI in Strategic Planning	Correlation Coefficient	.467**	1.000			
		Sig. (2-tailed)	.000	.			
		N	496	496			
	3-AI implementation challenges	Correlation Coefficient	-.023-	.203**	1.000		
		Sig. (2-tailed)	.608	.000	.		
		N	496	496	496		
	4-Employee acceptance and utilization of AI	Correlation Coefficient	.609**	.545**	.002	1.000	
		Sig. (2-tailed)	.000	.000	.968	.	
		N	496	496	496	496	
	5-General Attitudes towards AI	Correlation Coefficient	.111*	-.239-**	-.674-**	-.011-	1.000
		Sig. (2-tailed)	.013	.000	.000	.803	.
		N	496	496	496	496	496

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Spearman's rho correlations were used to test the relationships between variables, table.3. All correlations are significant at the 0.05 level (2-tailed) except the correlation between AI Implementation Challenges and AI integration in decision making efficiency. The highest correlation was found between AI Implementation Challenges and General Attitudes towards AI, ***r***= -.674, p<.001. The lowest correlation was found between General Attitudes towards AI and AI integration in decision making efficiency, ***r***= .111, p=.013.

Spearman's rho correlations were used to test the relationships between the study variables. According to Table 3, not all correlations are significant at the 0.05 level (2-tailed), specifically:

- The correlation between AI Implementation Challenges and AI Integration in decision-making efficiency is not significant.
- Correlation coefficient (r) = -.023, p-value = .608 → which is greater than 0.05, so it is not statistically significant.
- All other correlations involving the five main variables are significant at either $p < .05$ or $p < .01$, as indicated by the asterisks.

Actually, two correlations are non-significant at $p < .05$:

- AI Implementation Challenges ↔ AI Integration in Decision-Making Efficiency ($r = -.023$, $p = .608$).
- AI Implementation Challenges ↔ Employee Acceptance and Utilization ($r = .002$, $p = .968$).
- General Attitudes towards AI ↔ Employee Acceptance and Utilization ($r = -.011$, $p = .803$).

Additionally, the correlation between general attitudes towards AI and AI integration in decision-making efficiency is significant at $p = .013$, which is just below .05, so it is significant. Spearman's rho correlations were used to test the relationships between variables. Most correlations are statistically significant at the 0.05 level (2-tailed), except for the correlations between AI Implementation Challenges and AI Integration in Decision-Making Efficiency ($p = .608$), AI Implementation Challenges and Employee Acceptance and Utilization ($p = .968$), and General Attitudes towards AI and Employee Acceptance and Utilization ($p = .803$). The strongest correlation was between AI Implementation Challenges and General Attitudes towards AI ($r = -.674$, $p < .001$), indicating a strong negative relationship.

2. Scales validity

Model fit.

To validate the factor analysis of the multi-dimensional models, structural equation modeling was used. This is a confirmatory factor analysis that uses AMOS Software, (V.25). It is also known as testing the measurement model where AI integration in decision making efficiency, AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI are tested using the first-order confirmatory factor model to assess construct validity using the maximum likelihood method. Figure.10. as well as Tables .4. below show the confirmatory factor analysis indicators for AI integration in decision making efficiency, AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI scales.

Study Model

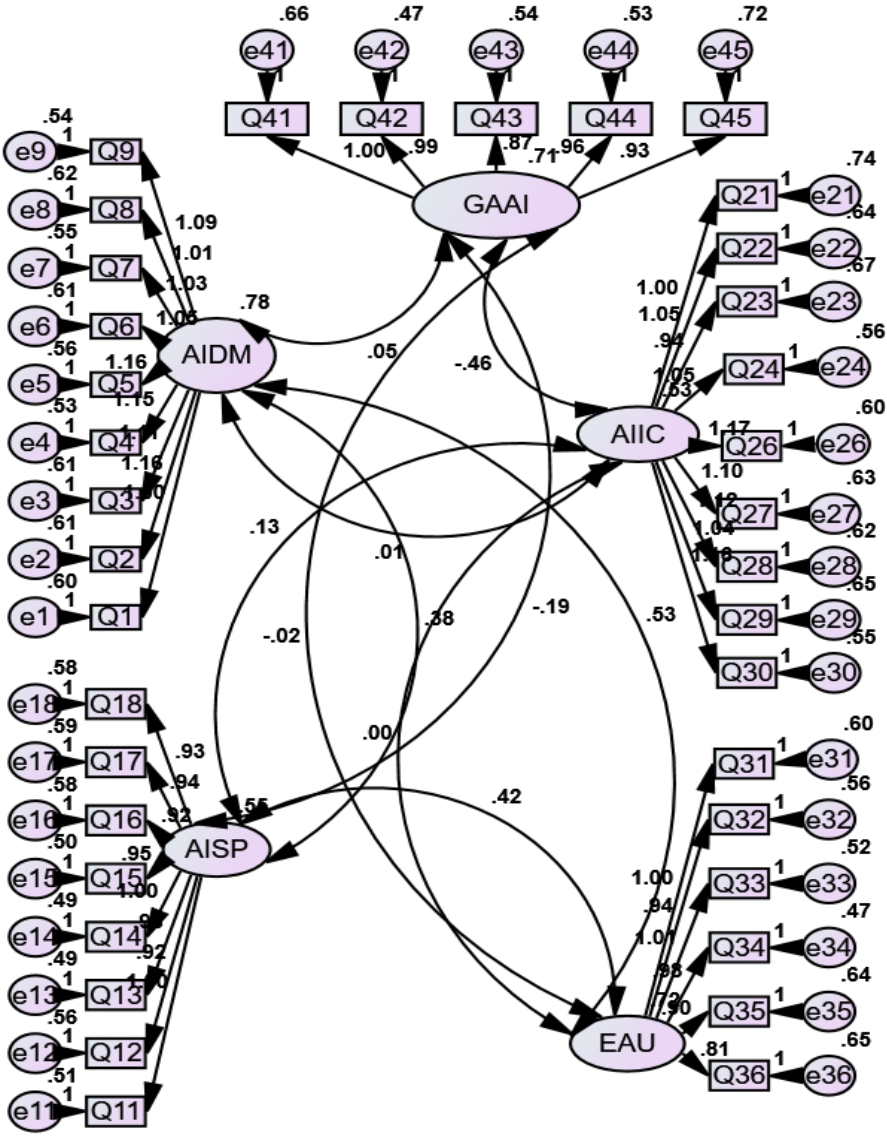

Fig 8 The Measurement Model for study Constructs

AIDM= AI integration in decision making efficiency, AISP= AI in Strategic Planning, AIIC= AI implementation challenges, EAU= Employee acceptance and utilization of AI and GAAI= General Attitudes towards AI.

Figure 10. shows the Measurement Model for study Constructs. Statistically significant covariances at .05 level, range between 0.13 and 0.53.

Table .3 Confirmatory factor analysis indicators for Study Constructs

Name of Constructs	Comparative Fit Index **(CFI)**	Root Mean Squared Error of Approximation (**RMSEA**)	Standardized Root Mean Square Residual (**SRMR**)	Result
AI integration in decision making efficiency, AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI	.918	.052	.0426	Satisfactory model fit

Results show that the comparative fit index (CFI) score is .918. A CFI value above .90 is considered satisfactory (Bentler, 1992). Root Mean Squared Error of Approximation (RMSEA) is .052. Values less than .05 indicate good fit, and values as high as .08 represent reasonable errors of approximation in the population (Browne & Cudeck,1993), χ^2 = 1446.265, df = 619, p < .001. Standardized Root Mean Square Residual (SRMR) is .0426. A SRMR of .05 and below is considered a good fit and a fit of .05 to .09 is considered an adequate fit (MacCallum et al. 1996). The following questions: (10, 19, 20, 25, 37, 38, 39 and 40) were deleted because they had low squared multiple correlations (below 0.400) which affects Average Variance Extracted, consequently convergent validity. All other indicators are considered acceptable to ensure goodness of fit (Tenenhaus et al., 2009), therefore, the five variables' (AI integration in decision making efficiency, AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI) scales are valid and can be used in measurement of these respective variables.

3. Convergent Validity: Average Variance Extracted (AVE)

Table. 4. The Average variation Extracted (AVE)

AI integration in decision making efficiency R^2		AI in Strategic Planning R^2		AI implementation challenges R^2		Employee acceptance and utilization R^2		General Attitudes towards AI R^2	
Q1	0.564	Q11	0.518	Q21	0.516	Q31	0.545	Q41	0.515
Q2	0.634	Q12	0.550	Q22	0.580	Q32	0.529	Q42	0.597
Q3	0.610	Q13	0.521	Q23	0.511	Q33	0.584	Q43	0.501
Q4	0.662	Q14	0.528	Q24	0.511	Q34	0.595	Q44	0.550
Q5	0.652	Q15	0.500	Q26	0.548	Q35	0.474	Q45	0.458
Q6	0.585	Q16	0.545	Q27	0.506	Q36	0.420		
Q7	0.598	Q17	0.553	Q28	0.516				
Q8	0.560	Q18	0.450	Q29	0.469				
Q9	0.632			Q30	0.564				
AVE	**0.611**	AVE	**0.521**	AVE	**0.525**	AVE	**0.525**	AVE	**0.524**

The Average variation Extracted (AVE) measures the degree of convergence or shared variation among the components within a factor. It is commonly accepted that AVE values of more than 0.500 are deemed satisfactory as presented in Table.7 above. In the present table, all AVE values meet this criterion. As an example, the Average Variance Extracted (AVE) for the AI integration in decision making efficiency factor is 0.611, suggesting that 61.1% of the variability in the observed variables can be accounted for by the latent construct.

4. Discriminant Validity: Fornell-Larcker Criterion

Table.5 Discriminant Validity results

1st construct		2nd construct	Correlation	shared variance	AVE 1st construct	AVE 2nd construct
AIDM	<-->	AISP	.467	0.218	0.611	0.521
AIDM	<-->	AIIC	-.023	0.001	0.611	0.525
AIDM	<-->	EAU	.609	0.371	0.611	0.525
AIDM	<-->	GAAI	.111	0.012	0.611	0.525
AISP	<-->	AIIC	.203	0.041	0.521	0.525
AISP	<-->	EAU	.545	0.297	0.521	0.525
AISP	<-->	GAAI	-.239	0.057	0.521	0.525
AIIC	<-->	EAU	.002	0.000	0.525	0.525
AIIC	<-->	GAAI	-.674	0.454	0.525	0.525
EAU	<-->	GAAI	-.011	0.000	0.525	0.525

AIDM= AI integration in decision making efficiency, AISP= AI in Strategic Planning, AIIC= AI implementation challenges, EAU= Employee acceptance and utilization of AI and GAAI= General Attitudes towards AI.

Discriminant Validity is "the degree to which two conceptually similar concepts are distinct" Hair et al, 2019, p.162. Statistically the shared variance between the two concepts should be lower than the AVE values for either construct, Collier, 2020. If we examine the discriminant validity of AI integration in decision making efficiency and AI in Strategic Planning, for example, we find the shared variance between them is = .218, which is lower than the AVE for AI integration in decision making efficiency (.611) or AI in Strategic Planning (.521). Thus, there is evidence that these constructs discriminate from one another. Similarly, the shared variances between any two constructs are lower than the AVE values for either construct, thus table .8, supports the discriminant validity of our constructs in the model.

5. Structural Model Assessment

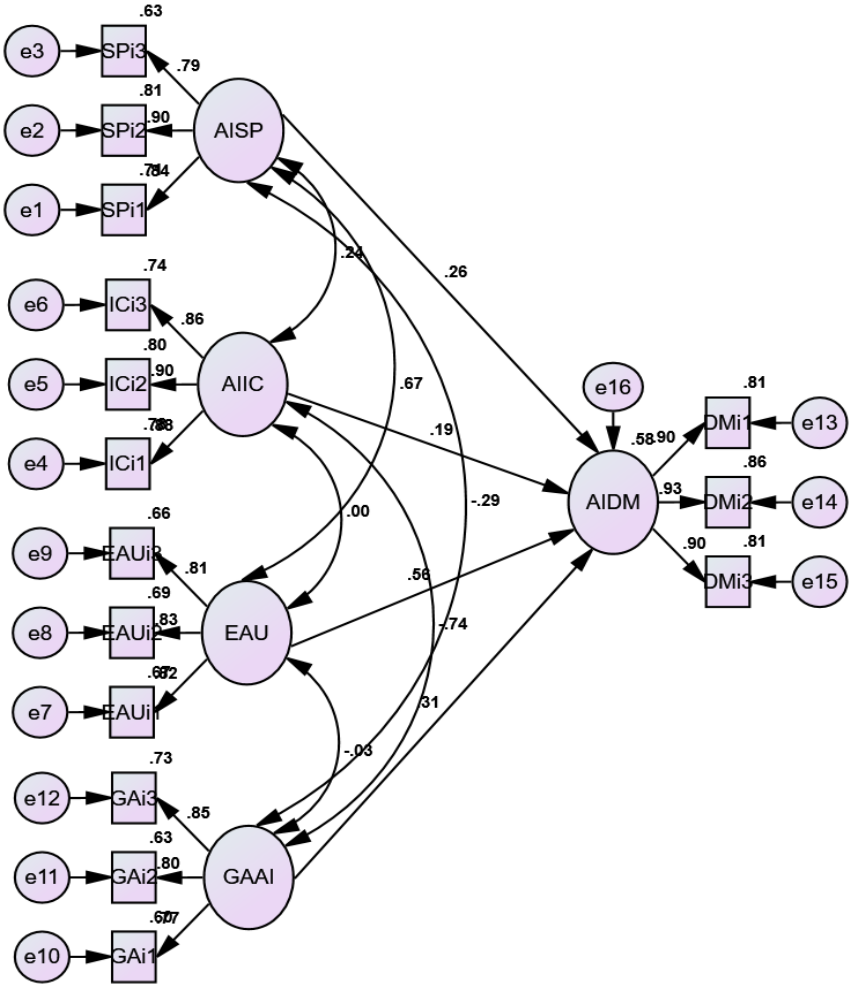

Fig 9 Structural Model of Study Variables

Figure 9 above . shows Structural Model of Study Variables. Goodness of fit resaults are addressed below.

6. Structural Model Fit Indicators - Goodness of Fit

Table 6 Structural Model Fit Indicators

Name of Constructs	Comparative Fit Index **(CFI)**	Root Mean Squared Error of Approximation (**RMSEA**)	Standardized Root Mean Square Residual (**SRMR**)	Squared Multiple Correlation **(R2)**	Result
AI integration in decision making efficiency, AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI	.990	.037	.0260	.577	Satisfactory model fit

Results show that the comparative fit index (CFI) score is .990, $\chi^2 = 134.437$, df = 80, $p < .001$. Root Mean Squared Error of Approximation (RMSEA) is .037. Standardized Root Mean Square Residual (SRMR) is .0260. R^2 explains the percentage of the variance in the outcome. In this study (R^2) = 0.577, it means that the predictors (AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI) explain 57.7% of the variance in the outcome (AI integration in decision making efficiency). Based on these indicators, the Structural Model has a satisfactory model fit and therefore the five constructs (AI integration in decision making efficiency, AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI) are valid in forming the Structural Model.

7. Hypotheses Testing

The following hypotheses are tested

H1.1: AI implementation in Strategic Planning has a significant effect on AI integration in decision making's efficiency. (**Supported**)
H1.2 AI implementation challenges have a significant effect on AI integration in decision making's efficiency. (**Supported**)

H1.3 Employee acceptance and utilization of AI has a significant effect on AI integration in decision making's efficiency. (**Supported**)
H1.4 General Attitudes towards AI have a significant effect on AI integration in decision making's efficiency. (**Supported**)

8. Statistical significance of parameter estimates

Table 7 Unstandardized regression Weights of AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI indicators

			Estimate	S.E.	C.R.	P
AI integration in decision making's efficiency	<---	AI in Strategic Planning	.345	.080	4.292	***
AI integration in decision making's efficiency	<---	AI implementation challenges	.226	.073	3.107	.002
AI integration in decision making's efficiency	<---	Employee acceptance and utilization of AI	.698	.075	9.243	***
AI integration in decision making's efficiency	<---	General Attitudes towards AI	.348	.074	4.701	***
SPi1	<---	AI in Strategic Planning	1.000			
SPi2	<---	AI in Strategic Planning	1.035	.044	23.782	***
SPi3	<---	AI in Strategic Planning	1.007	.050	20.316	***
ICi1	<---	AI implementation challenges	1.000			
ICi2	<---	AI implementation challenges	1.025	.038	27.134	***
ICi3	<---	AI implementation challenges	.944	.037	25.282	***
EAUi1	<---	Employee acceptance and utilization of AI	1.000			
EAUi2	<---	Employee acceptance and utilization of AI	1.072	.053	20.172	***
EAUi3	<---	Employee acceptance and utilization of AI	1.063	.054	19.660	***
GAi1	<---	General Attitudes towards AI	1.000			
GAi2	<---	General Attitudes towards AI	.935	.053	17.734	***
GAi3	<---	General Attitudes towards AI	.973	.052	18.864	***
DMi1	<---	AI integration in decision making's efficiency	1.000			
DMi2	<---	AI integration in decision making's efficiency	1.033	.031	32.917	***
DMi3	<---	AI integration in decision making's efficiency	1.003	.033	30.615	***

Table 7 Shows unstandardized regression Weights of AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI and unstandardized regression weights of their indicators. The critical ratios (C.R.) of indicators are all statistically different from zero (>±1.96 at a probability level of .05). Based on this criterion, all

indicators should be kept representing their respective constructs. The unstandardized direct effects of AI in Strategic Planning, AI implementation challenges, Employee acceptance and utilization of AI and General Attitudes towards AI are statistically significant = .345, .226, .698 and .348 respectively, p<.01, **H1.1, H1.2, H1.3 and H1.4** are supported.

9. Testing for moderation

Testing for moderation is carried out according to Mixed Model Method. The mixed model method includes latent variables with the independent and dependent variables in a model but includes a composite moderator variable along with a composite interaction term (Collier, 2020, p: 207).

H2: Employee acceptance and utilization of AI moderates the relationship between implementation of AI in Strategic Planning and AI integration in decision making's efficiency. (**Supported**)

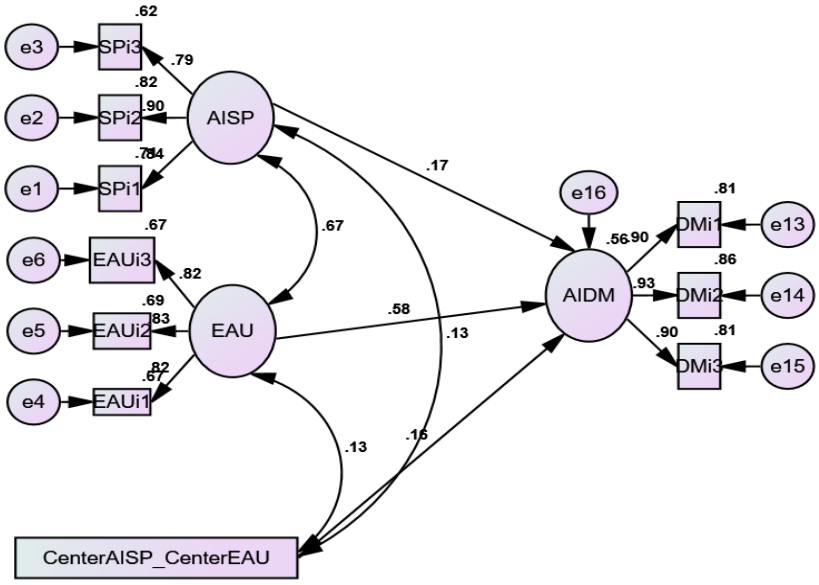

Fig 10 Mixed model moderation of Employee acceptance and utilization of AI of the relationship between implementation of AI in Strategic Planning and AI integration in decision making's efficiency.

Figure 10 shows mixed model moderation of Employee acceptance and utilization of AI of the relationship between implementation of AI in Strategic Planning and AI integration in decision making's efficiency. The direct effect is still statistically significant at .05 level.

Table 8 The effect of AI in Strategic Planning, Employee acceptance and utilization of AI and Centered AI in Strategic Planning * Centered Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency and unstandardized regression weights of all variables

			Estimate	S.E.	C.R.	P
AI integration in decision making's efficiency	<---	AI in Strategic Planning	.236	.072	3.269	.001
AI integration in decision making's efficiency	<---	Centered AISP * Centered EAU	.200	.043	4.615	***
AI integration in decision making's efficiency	<---	Employee acceptance and utilization of AI	.723	.073	9.968	***
SPi1	<---	AI in Strategic Planning	1.000			
SPi2	<---	AI in Strategic Planning	1.034	.044	23.497	***
SPi3	<---	AI in Strategic Planning	1.001	.050	20.173	***
DMi1	<---	AI integration in decision making's efficiency	1.000			
DMi2	<---	AI integration in decision making's efficiency	1.034	.031	32.899	***
DMi3	<---	AI integration in decision making's efficiency	1.004	.033	30.601	***
EAUi1	<---	Employee acceptance and utilization of AI	1.000			
EAUi2	<---	Employee acceptance and utilization of AI	1.066	.053	20.108	***
EAUi3	<---	Employee acceptance and utilization of AI	1.062	.054	19.715	***

Centered AI in Strategic Planning * Centered Employee acceptance and utilization of AI

Table 8 Shows the effect of AI in Strategic Planning, Employee acceptance and utilization of AI and Centered AI in Strategic Planning * Centered Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency and unstandardized regression weights of all variables.

The critical ratio (C.R.) for the predictor variable (AI in Strategic Planning), the moderator (Employee acceptance and utilization of AI) and the cross product of moderator and predictor (Centered AI in Strategic Planning * Centered Employee acceptance and utilization of AI) are all statistically different from zero (>±1.96 at a probability level of .05). The direct effect of AI in Strategic Planning on AI integration in decision making's efficiency is still statistically significant = .236, p= .001. The direct effect of Centred AI in Strategic Planning * Centred Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency is also, statistically significant =.200, p< .001 Results lead support to **H2**: Employee acceptance and utilization of AI moderates the relationship between implementation of AI in Strategic Planning and AI integration in decision making's efficiency.

10. Probing the Interaction

Probing the interaction is exploring how the relationship from the independent variable to the dependent variable changes in different levels of the moderator (Collier, 2020, p: 202). Testing how the moderator influences the relationship from the independent variable to the dependent variable is carried out at two points of the moderator, when the moderator is "Low" and when it is " High".

Probing the Interaction at Low value of the moderator

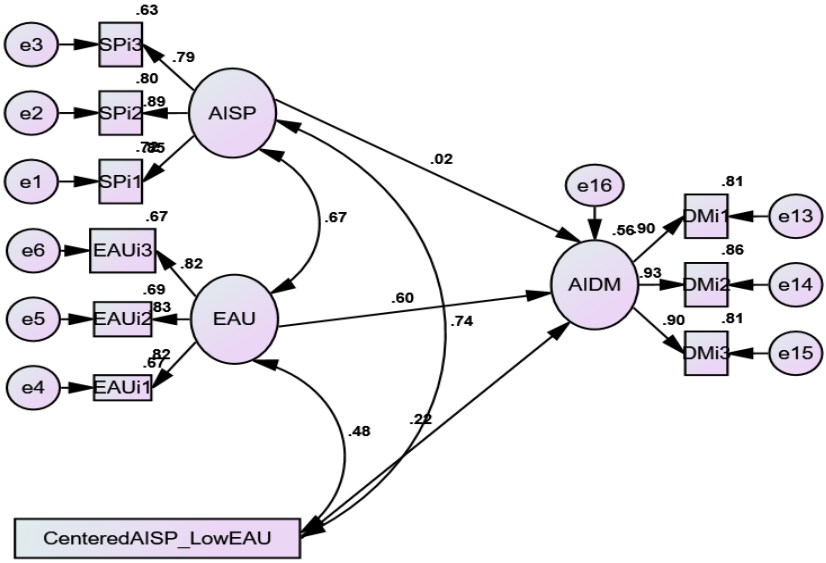

Fig 11 Mixed model moderation at Low Employee acceptance and utilization of AI

Figure 11 shows Mixed model moderation at Low Employee acceptance and utilization of AI. The standardized estimate of AI in Strategic Planning is not significant at p= .05 level. The standardized estimates of Low Employee acceptance and utilization of AI and Centred AI in Strategic Planning * Centred Employee acceptance and utilization of AI are both significant at p< .001 level.

Table 9 The effect of AI in Strategic Planning, Low Employee acceptance and utilization of AI and Centered AI in Strategic Planning * Low Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency and unstandardized regression weights of all variables

			Estimate	S.E.	C.R.	P
AI integration in decision making's efficiency	<---	AI in Strategic Planning	.027	.097	.282	.778
AI integration in decision making's efficiency	<---	Centered AISP * Low EAU	.197	.050	3.964	***
AI integration in decision making's efficiency	<---	Employee acceptance and utilization of AI	.746	.073	10.160	***
SPi1	<---	AI in Strategic Planning	1.000			
SPi2	<---	AI in Strategic Planning	1.017	.041	24.631	***
SPi3	<---	AI in Strategic Planning	1.000	.048	20.803	***
DMi1	<---	AI integration in decision making's efficiency	1.000			
DMi2	<---	AI integration in decision making's efficiency	1.034	.031	32.890	***
DMi3	<---	AI integration in decision making's efficiency	1.004	.033	30.603	***
EAUi1	<---	Employee acceptance and utilization of AI	1.000			
EAUi2	<---	Employee acceptance and utilization of AI	1.065	.053	20.115	***
EAUi3	<---	Employee acceptance and utilization of AI	1.062	.054	19.718	***

Table 9 Shows the effect of AI in Strategic Planning, Low Employee acceptance and utilization of AI and Centered AI in Strategic Planning * Low Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency and unstandardized regression weights of all variables. At

low level of the moderator variable (Employee acceptance and utilization of AI) the effect of AI in Strategic Planning on AI integration in decision making's efficiency is not statistically significant = 0.027, p= 0.778. The direct effect of Centred AI in Strategic Planning * Low Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency is statistically significant =.197, p< .001.

Probing the Interaction at High value of the moderator

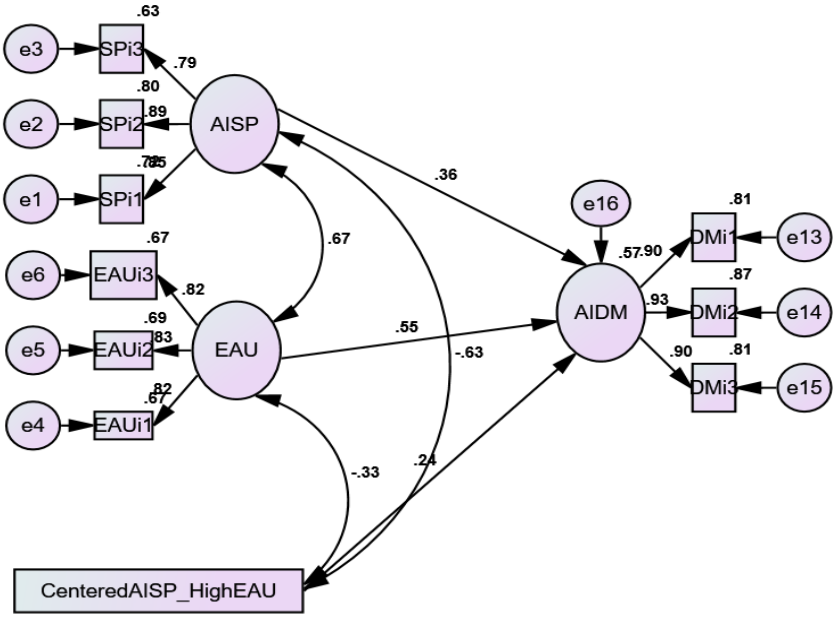

Fig 12 Mixed model moderation at High Employee acceptance and utilization of AI

Figure 12 above shows Mixed model moderation at High Employee acceptance and utilization of AI. All standardized estimates are significant at p< .001 level.

Table 10 The effect of AI in Strategic Planning, High Employee acceptance and utilization of AI and Centered AI in Strategic Planning * Centered Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency and unstandardized regression weights of all variables

			Estimate	S.E.	C.R.	P
AI integration in decision making's efficiency	<---	AI in Strategic Planning	.487	.092	5.281	***
AI integration in decision making's efficiency	<---	Centered AISP * High EAU	.246	.048	5.123	***
AI integration in decision making's efficiency	<---	Employee acceptance and utilization of AI	.690	.074	9.375	***
SPi1	<---	AI in Strategic Planning	1.000			
SPi2	<---	AI in Strategic Planning	1.016	.041	24.604	***
SPi3	<---	AI in Strategic Planning	1.000	.048	20.792	***
DMi1	<---	AI integration in decision making's efficiency	1.000			
DMi2	<---	AI integration in decision making's efficiency	1.034	.031	32.902	***
DMi3	<---	AI integration in decision making's efficiency	1.004	.033	30.598	***
EAUi1	<---	Employee acceptance and utilization of AI	1.000			
EAUi2	<---	Employee acceptance and utilization of AI	1.065	.053	20.120	***
EAUi3	<---	Employee acceptance and utilization of AI	1.061	.054	19.721	***

Table 10 above Shows the effect of AI in Strategic Planning, High Employee acceptance and utilization of AI and Centered AI in Strategic Planning * High Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency and unstandardized regression weights of all variables. At high level of the moderator variable (Employee acceptance and utilization of

AI) the effect of AI in Strategic Planning on AI integration in decision making's efficiency is statistically significant = 0.487, p< .001. The direct effect of Centred AI in Strategic Planning * High Employee acceptance and utilization of AI-on-AI integration in decision making's efficiency is also, statistically significant =.246, p< .001. At the end of this moderator probing, one concludes that the moderator is significant at all levels tested and you can see the strengthening properties of the moderator across the tests. AI in Strategic Planning to AI integration in decision making's efficiency:

High Moderator Level .487, Mean Centered Level .236 and Low Moderator Level .027

Table. 11. Summary of Hypotheses Testing

Hypothesis Number	Hypothesis Statement	Results
H1.1	AI implementation in Strategic Planning has a significant effect on AI integration in decision making's efficiency.	Accepted
H1.2	AI implementation challenges have a significant effect on AI integration in decision making's efficiency.	Accepted
H1.3	Employee acceptance and utilization of AI has a significant effect on AI integration in decision making's efficiency.	Accepted
H1.4	General Attitudes towards AI have a significant effect on AI integration in decision making's efficiency.	Accepted
H2	Employee acceptance and utilization of AI moderates the relationship between implementation of AI in Strategic Planning and AI integration in decision making's efficiency.	Accepted

DISCUSSION

The findings of this study underscore the complex yet transformative role that Artificial Intelligence (AI) plays in shaping administrative decision-making and strategic development within Libyan oil and gas institutions (Brilon et al., 2024); (Whitfield and Whitfield, 2021); (Lee, 2022); (De Kimpe et al., 2022).

Rooted in empirical evidence gathered from employees across multiple administrative tiers, the results illuminate both the enabling capacities and contextual constraints surrounding AI integration in this sector. First, the data reveal that the implementation of AI in strategic planning processes significantly enhances decision-making efficiency (Lee, 2022; De Kimpe et al., 2022). This finding aligns with prior literature, which emphasizes AI's capacity to process large datasets, generate predictive insights, and reduce the cognitive load on human decision-makers (Gerged and Almontaser, 2021). In Libya's energy sector where administrative workflows are traditionally bureaucratic and risk-prone the incorporation of AI tools introduces a level of procedural agility that has previously been absent (Otman, 2022; Bebas, 2023; Masoud and Kamuka, 2022). Participants acknowledged that AI technologies improved the accuracy and speed of strategic responses, particularly in resource planning and operational forecasting. This supports the hypothesis that AI functions as a strategic enabler rather than merely a technical supplement (Gerged and Almontaser, 2021).

Second, the study highlights the considerable impact of organizational challenges on the success of AI implementation (Masoud and Kamuka, 2022). Respondents noted obstacles such as inadequate digital infrastructure, limited technical training, and resistance to change factors that echo the constraints reported in existing studies on digital transformation in emerging economies (Otman, 2022); (Bebas, 2023; Masoud and Kamuka, 2022). Despite the potential benefits of AI, the absence of coherent institutional frameworks and fragmented ICT investments has hindered its widespread adoption (Masoud and Kamuka, 2022). The statistical evidence from the current research substantiates this narrative: although AI is being introduced, its application remains uneven, and its value under-realized due to operational and cultural frictions (Ben Dalla, 2020); (Ben Dalla et al., 2024). Furthermore, employee acceptance and utilization of AI emerged as a critical determinant of its effectiveness (Otman, 2022; Bebas, 2023; Masoud and Kamuka, 2022). The results affirm that trust in AI systems, combined with perceived usefulness and ease of use, strongly influences adoption rates and the quality of decision outcomes (Bebas, 2023; Masoud and Kamuka, 2022). Employees who viewed AI as a tool that complements rather than threatens their roles were more likely to engage meaningfully with these techies (Masoud and Kamuka, 2022). This behavioral orientation significantly moderated the relationship between AI deployment in strategic planning and decision-making outcomes (Ben Dalla et al., 2020). Therefore, fostering a positive perception of AI among employees appears essential for optimizing institutional returns on AI investment (Alawi and Masaud, 2021).

The findings also shed light on the organizational and contextual factors shaping the AI-employee relationship (Agila, 2024). The unique socio-economic and institutional landscape of Libya, characterized by ongoing

recovery and modernization efforts, appears to influence both the pace and the manner of AI adoption (Ben Dalla, 2020); (Ben Dalla et al., 2024). The perceived need for enhanced efficiency and strategic foresight within the oil and gas sector seems to be a driving force behind the gradual embrace of AI technologies. However, challenges related to infrastructure, data security, and potentially, change management, were implicitly acknowledged through the responses, indicating areas requiring further attention. This contextual sensitivity is vital for understanding AI implementation in emerging economies and resource-dependent sectors, where institutional readiness and workforce adaptability play crucial roles alongside technological capabilities (Makhzoum, 2024; Jellah, 2025).

Notably, the study also identifies a generational and educational divide in AI engagement. Younger, more digitally literate employees reported higher levels of comfort and interaction with AI systems compared to their older counterparts (Otman, 2022); (Bebas, 2023); (Masoud and Kamuka, 2022). Similarly, respondents with backgrounds in technical or managerial disciplines demonstrated greater proficiency in navigating AI-supported environments (Alahwal et al., 2025); (AlAbdouli and Al-Shihabi, 2025); (Alsoukini et al., 2025); (Oyewole et al., 2025); (Adebangbe, 2025). These disparities suggest the need for differentiated training programs and inclusive digital transformation strategies that address gaps in digital literacy and professional readiness (Masoud and Kamuka, 2022). In a broader context, the findings resonate with the socio-technical perspective, which posits that technological integration must be synchronized with organizational culture, human behavior, and structural readiness (Bebas, 2023; Masoud and Kamuka, 2022). The limited but growing use of AI within Libya's oil and gas companies reflects a transitional phase in which institutional modernization is underway but not yet consolidated. As such, the study contributes to the discourse on how emerging markets particularly those undergoing post-conflict recovery and economic restructuring can leverage AI for administrative reform and strategic growth (Otman, 2022; Bebas, 2023; Masoud and Kamuka, 2022). The results affirm that AI holds significant promise for enhancing administrative decision-making and strategic planning in Libyan oil and gas institutions (Gerged and Almontaser, 2021). However, realizing this promise necessitates a concerted focus on infrastructural investment, employee empowerment, and culturally sensitive change management. Future initiatives must therefore balance technological advancement with human-centered design and institutional alignment to ensure sustainable and inclusive AI adoption across the sector (Alahwal et al., 2025); (AlAbdouli and Al-Shihabi, 2025); (Alsoukini et al., 2025); (St-Amant, 2025); (Khanchel et al., 2025); (Oyewole et al., 2025); (Adebangbe, 2025).

This investigation employed a comprehensive mixed-methods research design incorporating quantitative performance analysis and qualitative organizational assessment protocols. The research population consisted of 412 administrative employees across various functional areas within Libyan oil and gas companies, including operations management, financial planning, human resources, and strategic development departments. Multi-stage sampling ensured representation across organizational levels and company sizes while accounting for institutional diversity within the sector (Masoud and Kamuka, 2022). Performance measurement instruments were developed using established efficiency assessment frameworks adapted for AI-integrated environments. Time-motion studies, decision accuracy assessments, and resource utilization analyses were conducted to measure quantitative efficiency improvements (Otman, 2022); (Bebas, 2023); (Masoud and Kamuka, 2022). Validated scales measuring decision-making confidence, organizational adaptation readiness, and technology acceptance were employed to assess qualitative efficiency dimensions. In-depth interviews with 35 senior managers, middle-level administrators, and technical specialists provided contextual insights into AI implementation challenges and efficiency outcomes. Interview protocols were designed to capture institutional-specific factors influencing AI adoption while maintaining focus on decision-making efficiency measurements. Thematic analysis techniques were employed to identify recurring patterns and distinctive responses within the qualitative data.

Qualitative assessment data indicates that AI integration has enhanced decision-making quality through improved information availability and analytical capabilities. Decision-makers reported increased confidence in their choices, with 71% indicating improved ability to consider multiple variables and scenarios simultaneously (Masoud and Kamuka, 2022). The consistency of decision outcomes improved significantly, reducing variability associated with individual cognitive biases and information processing limitations. Organizational learning effects emerged as a significant qualitative efficiency improvement, with employees developing enhanced analytical capabilities and data interpretation skills through interaction with AI systems (Otman, 2022; Bebas, 2023; Masoud and Kamuka, 2022). This capability development contributed to sustained efficiency improvements beyond immediate technological implementation benefits (Bebas, 2023; Masoud and Kamuka, 2022). The Libyan institutional context necessitated unique adaptation strategies that influenced overall efficiency outcomes. Organizations developed hybrid decision-making approaches that combined AI-generated insights with traditional experiential knowledge, particularly regarding geopolitical risk assessment and regulatory compliance considerations. These adaptations required additional time and resource investment but ultimately contributed to more robust decision-making frameworks (Bebas, 2023; Masoud and Kamuka, 2022). Cross-functional

collaboration enhancement represented another significant efficiency improvement, with AI systems facilitating information sharing and coordinated decision-making across organizational boundaries. This integration required significant organizational restructuring but resulted in improved decision quality and reduced coordination costs. The findings suggest that optimal decision-making efficiency in AI-integrated environments requires strategic alignment between technological capabilities and organizational processes (Masoud and Kamuka, 2022). Organizations that achieved the greatest efficiency improvements demonstrated systematic approaches to process redesign that maximized AI capabilities while maintaining human judgment contributions to complex decision-making (Otman, 2022). Training and development investments emerged as critical success factors for realizing efficiency gains. Organizations that provided comprehensive employee development programs achieved significantly better efficiency outcomes than those focusing primarily on technological implementation. This finding highlights the importance of human capital development in AI integration success.

Analysis reveals that successful efficiency optimization within institutional constraints requires creative adaptation strategies that work within existing frameworks while gradually building capabilities for broader transformation(Masoud and Kamuka, 2022). Libyan oil and gas companies developed indigenous AI implementation capabilities due to limited external technology transfer, creating unique organizational competencies that may provide competitive advantages in similar institutional environments (Otman, 2022; Bebas, 2023; Masoud and Kamuka, 2022). Regulatory compliance considerations significantly influenced efficiency optimization strategies, with organizations developing AI systems that incorporated local regulatory requirements and reporting standards (Masoud and Kamuka, 2022). This integration required additional development time but ultimately enhanced overall organizational effectiveness and regulatory compliance efficiency.

Longitudinal analysis indicates that AI-driven efficiency improvements tend to increase over time as organizations develop greater proficiency with integrated systems and employees adapt to new decision-making processes (Masoud and Kamuka, 2022). However, sustainability requires continuous investment in system maintenance, employee development, and process optimization to maintain competitive advantages. improvement sustainability through necessity, as organizations have been required to develop self-sufficient AI implementation capabilities that reduce dependence on external technology providers and support services (Bebas, 2023; Masoud and Kamuka, 2022). This finding highlights the importance of strategic communication and value demonstration in AI acceptance development. Utilization data indicates that AI strategic planning implementation follows distinct adoption curves that vary significantly across organizational functions

and levels. Senior management demonstrated the highest utilization rates at 67%, followed by middle management at 54%, and operational staff at 41%. This pattern reflects both access considerations and strategic planning involvement requirements. Effectiveness assessment reveals that organizations achieving successful AI utilization demonstrated systematic approaches to capability development and process integration. Companies that provided comprehensive training programs and process redesign support achieved 43% higher utilization effectiveness compared to those focusing primarily on technological implementation. Cross-functional utilization patterns showed significant variation, with financial planning and market analysis functions demonstrating higher adoption rates than human resources and operational planning areas. This variation reflects both technical compatibility factors and organizational priority considerations within the strategic planning context.

CONCLUSION

This study examines the impact of AI on decision-making and strategy building in Libyan oil and gas institutions, highlighting its potential to enhance efficiency, accuracy, and strategic agility. Findings show that AI improves administrative performance, particularly in data processing and forecasting, but its effectiveness is uneven and context-dependent. The success of AI integration is heavily mediated by employee factors such as digital literacy, age, education, and managerial support, with younger, tech-savvy staff showing greater engagement. Organizational readiness, infrastructure limitations, and cultural resistance remain key barriers to full-scale adoption. The research concludes that a holistic approach combining technological investment with human capital development and institutional reform is essential for realizing AI's transformative potential in Libya's critical energy sector.

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REFERENCES

Bakeer, A. (2024). Transforming Libyan Organizations Through AI: Assessing Readiness and Strategic Pathways.

Abushrenta, M. M. A. (2022). Challenges and opportunities of adopting IFRSs in Libya: the case of Libyan oil and gas industry. Nottingham Trent University (United Kingdom).

Agbaji, A. L. (2021). Leadership and managerial decision-making in an AI-enabled oil and gas industry. In Abu Dhabi International Petroleum Exhibition and Conference (p. D031S092R003). SPE.

Agila, A. A. A. (2024). Diabetes Prediction Using a Support Vector Machine (SVM) and visualize the results by using the K-means algorithm* Corresponding author:* Llahm Omar Faraj Ben Dalla, Tarik Milod Alarbi Ahmad2 .

Alawi, N. A., & Masaud, K. A. (2021). Environmental sustainability: management perception in oil and gas industry in Libya. International Journal of Environment, Workplace and Employment, 6(3), 220-233.
Ali, A., & Mahfouz, A. (2025). Building dynamic resilience capabilities for supply chain disruptions: insights from the Irish food industry. International Journal of Logistics Research and Applications, 1-29.
Almontaser, T. S., & Gerged, A. M. (2024). Insights into corporate social responsibility disclosure among multinational corporations during host-country political transformations: Evidence from the Libyan oil industry. Corporate Social Responsibility and Environmental Management, 31(3), 1818-1837.
Amin, S. M., El-Gazar, H. E., Zoromba, M. A., El-Sayed, M. M., & Atta, M. H. R. (2025). Sentiment of nurses towards artificial intelligence and resistance to change in healthcare organisations: A mixed-method study. Journal of Advanced Nursing, 81(4), 2087-2098.
Ben Dalla, L. O. F., Medeni, T. D., Medeni, I. T., & Ulubay, M. (2025). Enhancing Healthcare Efficiency at Almasara Hospital: Distributed Data Analysis and Patient Risk Management. Economy: Strategy and Practice, 19(4), 54–72. https://doi.org/10.51176/1997-9967-2024-4-54-72
Gerged, A. M., & Almontaser, T. (2021). Corporate adoption of SDG reporting in a non-enabling institutional environment: Insights from Libyan oil industries. Resources Policy, 74, 102240.
Bebas, M. T. (2023). Improving The Quality of Service In The Libyan Oil Sector: A Theoretical Assessment. Quantrade Journal of Complex Systems in Social Sciences, 5(1), 17-22.
Ben Dalla, L, O, F. Medeni, T, Medeni, I.(2024). Evaluating the Impact of Artificial Intelligence-Driven Prompts on the Efficacy of Academic Writing in Scientific Research
Бен Далла Л., Медени Т.Д., Медени И.Т., Улубай М. Повышение эффективности здравоохранения в больнице Алмасара: анализ распределенных данных и управление рисками для пациентов. Economy: strategy and practice. 2024;19(4):54-72. https://doi.org/10.51176/1997-9967-2024-4-54-72
Dalla, L. O. F. B. (2020). IT security Cloud Computing.
Dalla, L. O. B., Karal, Ö., Degirmenci, A., EL-Sseid, M. A. M., Essgaer, M., & Alsharif, A. (2025). Edge Intelligence for Real-Time Image Recognition: A Lightweight Neural Scheduler Via Using Execution-Time Signatures on Heterogeneous Edge Devices. *Journal homepage: https://sjphrt. com. ly/index. php/sjphrt/en/index*, *1*(2), 74-85.
Dalla, L. O. F. B., & Ahmad, T. M. A. (2020). The Sustainable Efficiency of Modeling a Correspondence Undergraduate Transaction Framework by using Generic Modeling Environment (GME).
Alsharif, A., Ibrahim, A. A., Waheshi, Y. A. A., Alsharif, M., Alhoudier, T. E., Esmail, E. M. A., & Dalla, L. O. F. B. (2025). An Analysis of Power Sector Investment by Technology in the Middle East and North Africa. *African Journal of Academic Publishing in Science and Technology (AJAPST)*, *1*(4), 25-39.
Ben Dalla, L, O, F. (2020). READING ROMANTIC NOVELS ON ARABIC PEOPLE TO IMPROVE THEIR ENGLISH LANGUAGE: A CASE STUDY, LIBYAN PEOPLE EDUCATORS English language case study Libyan secondary schools

Ben Dalla, L, O, F. (2021).Literature review (LR) on the powerful of Research methodology processes life cycle
Alahwal, E., Mansour, L., Al-Ojali, A. J., & Lahwal, F. (2025). Artificial Intelligence in Higher Education in Libya: Opportunities and Challenges. In Sebha University Conference Proceedings (Vol. 4, No. 1, pp. 45-50).
AlAbdouli, M. A., & Al-Shihabi, S. (2025). Artificial Intelligence and Its Performance Impacts in the Oil and Gas Industry: Challenges, Insights, and Evaluation Approaches. Results in Engineering, 107636.
Alsoukini, F. A. M., Adedokun, M. W., & Berberoğlu, A. (2025). Enhancing Sustainable Innovation Performance in the Banking Sector of Libya: The Impact of Artificial Intelligence Applications and Organizational Learning. Sustainability, 17(12), 5345.
Özuygun, M. E. (2025). Türkiye's Contribution to Modernization of Africa's Security and Defense Autonomy. Journal of Central and Eastern European African Studies, 5(2), 104-129.
Ben Dalla, L,O, F, M.eljali , E, Agila, A,A,A, (2020). The evaluation of the daily profits of the group of cosmetics Sephora branches by using distributed systems the K-means algorithm and WEKA visualization
Bentler, P. M. (1992). On the fit of models to covariances and methodology to the Bulletin. Psychological bulletin, 112(3), 400.
Brilon, S., Grassi, S., Grieder, M., & Schulz, J. F. (2024). Strategic competition and self-confidence. Management Science, 70(1), 507-525.
Browne, M. W. and Cudeck R. (1993). Alternative ways of assessing model fit. In Bollen, K. A., & Long, J. S. (Eds.). (1993). Testing structural equation models (Vol. 154). Sage.
Chang, K. Y. (2025). When travel agencies entrust AI with data: the role of knowledge-based dynamic capabilities in marketing innovation. Journal of Travel & Tourism Marketing, 42(6), 864-879.
Collier, J. (2020). Applied structural equation modeling using AMOS: Basic to advanced techniques. Routledge.
Coronel, M. D., Conde, R. D., Cagandahan, H. M., Datumama, F. D., & Gallego, R. I. F. (2025). Educational Impact and Challenges of Online Return Demonstrations in Nursing Education: A Descriptive-Correlational Study. Indonesian Journal on Learning and Advanced Education (IJOLAE), 52-68.
Dalla, L. O. B., Karal, Ö., & Degirmenciyi, A. (2025). Leveraging LSTM for Adaptive Intrusion Detection in IoT Networks: A Case Study on the RT-IoT2022 Dataset implemented On CPU Computer Device Machine.
St-Amant, M. (2025). Crude Oil, Refined Strategy: How Foreign Energy Investments Influence Intervention Strategies in Civil Wars (Doctoral dissertation, University of Toronto (Canada)).
Avramova, T., Peneva, T., & Ivanov, A. (2025). Overview of Existing Multi-Criteria Decision-Making (MCDM) Methods Used in Industrial Environments. Technologies, 13(10), 444.
Dalla, L. O. B., Medeni, T. D., & Medeni, İ. T. (2024). Evaluating the Impact of Artificial Intelligence-Driven Prompts on the Efficacy of Academic Writing in Scientific Research. *المجلة الأفروآسيوية للبحث العلمي (AAJSR)*, 48-60.
Khanchel, I., Lassoued, N., & Hamed, S. (2025). Intellectual capital, borrowers' default risk, and digitalization: Allies or adversaries?. Strategic Change, 34(2), 209-223.

Oyewole, S., Isike, C., Oche, T., & Olumba, E. E. (2025). Autonomous Weapons Systems in Africa: Emerging Realities, Prospects, and Risks. Journal of Applied Security Research, 1-26.
Adebangbe, S. A. (2025). Monitoring and managing oil spillage and environmental degradation through geoinformation (Doctoral dissertation, University of Glasgow).
Dalla, L. O. F. B. (2020). IT security Cloud Computing.
Dalla, L. O. F. B., & AHMAD, T. M. A. (2024). IMPROVE DYNAMIC DELIVERY SERVICES USING ANT COLONY OPTIMIZATION ALGORITHM IN THE MODERN CITY BY USING PYTHON RAY FRAMEWORK.
Ben Dalla, L., Medeni, T. M., Zbeida, S. Z., & Medeni, İ. M. (2024). Unveiling the Evolutionary Journey based on Tracing the Historical Relationship between Artificial Neural Networks and Deep Learning. *The International Journal of Engineering & Information Technology (IJEIT)*, *12*(1), 104-110.
Agila, A. A. A., & Elsseid, M. A. M. (2024). 3ournal of Cotal.
Ben Dalla, L., MEDENİ, T., MEDENİ, İ., & ULUBAY, M. (2024). Enhancing Healthcare Efficiency at Almasara Hospital: Distributed Data Analysis and Patient Risk Management. *Economy: strategy and practice*, *19*(4).
Dalla, L. O. F. B. (2020). The Influence of hospital management framework by the usage of Electronic healthcare record to avoid risk management (Department of Communicable Diseases at Misurata Teaching Hospital: Case study).
Dalla, L. O. F. B., & Ahmad, T. M. A. (2023). Journal of Total Science. *Journal of Total Science*.
DALLA, L. O. F. B., & AHMAD, T. M. A. Integration of Artificial Bee Colony Algorithm with Deep Learning for Predictive Maintenance in Industrial IoT.
DALLA, L., & AHMAD, T. M. A. (2024). The first Scientific Conference for Science and Technology Tripoli Libya THE ENHANCEMENT OF THE DYNAMIC DELIVERY SERVICES USING ANT COLONY OPTIMIZATION ALGORITHM IN THE MODERN CITY BY USING PYTHON RAY FRAMEWORK.
De Kimpe, L., Walrave, M., Verdegem, P., & Ponnet, K. (2022). What we think we know about cybersecurity: an investigation of the relationship between perceived knowledge, internet trust, and protection motivation in a cybercrime context. Behaviour & Information Technology, 41(8), 1796-1808.
Duraimutharasan, N., Deepan, A., Swadhi, R., Velmurugan, P. R., & Varshney, K. R. (2025). Enhancing Control Engineering Through Human-Machine Collaboration: AI for Improved Efficiency and Decision-Making. In Harnessing AI for Control Engineering (pp. 155-176). IGI Global Scientific Publishing.
Emon, M. M. H., & Khan, T. (2025). The mediating role of attitude towards the technology in shaping artificial intelligence usage among professionals. Telematics and Informatics Reports, 17, 100188.
Fu, L., Jia, G., Liu, Z., Pang, X., & Cui, Y. (2025). The applications and advances of artificial intelligence in drug regulation: A global perspective. Acta Pharmaceutica Sinica B, 15(1), 1-14.
Garada, A. S. (2023). Evaluating renewable energy applications in Libya (Doctoral dissertation, Cardiff University).
Dalla, L. O. B., Karal, Ö., & Degirmenciyi, A. (2025). Leveraging LSTM for Adaptive Intrusion Detection in IoT Networks: A Case Study on the RT-IoT2022 Dataset implemented On CPU Computer Device Machine.
Dalla, L. O. B., Karal, Ö., Degirmenci, A., & Ali, M. (2025). يحصلا فرصلا هايم ةجلاعم تايلمع نيسحت تايمزراوخ لوح تايبدلأل ةلماش ةعجارم.

Gerged, A. M., & Almontaser, T. (2021). Corporate adoption of SDG reporting in a non-enabling institutional environment: Insights from Libyan oil industries. Resources Policy, 74, 102240.
Hou, J., & Chen, J. (2024, August). Crossing the Digital Divide in Older People: Analysis of Influencing Factors on the Willingness of the Elderly to Use Mobile Payment. In International Conference on Management Science and Engineering Management (pp. 76-91). Singapore: Springer Nature Singapore.
Jellah, A. I. (2025). Applications of Cloud Computing and Artificial Intelligence in the Oil and Gas Industry: A Review. In 2025 IEEE 6th International Conference on Image Processing, Applications and Systems (IPAS) (pp. 1-7). IEEE.
Kim, J., & Moon, J. (2025). Determinants of usefulness of chat GPT for learning in technology acceptance model (TAM) using information credibility, fun, and responsiveness and moderating role of fun. SAGE Open, 15(1), 21582440251320173.
Law, R., Ye, H., & Lei, S. S. I. (2025). Ethical artificial intelligence (AI): principles and practices. International Journal of Contemporary Hospitality Management, 37(1), 279-295.
Lee, A. T., Ramasamy, R. K., & Subbarao, A. (2025, January). Understanding psychosocial barriers to healthcare technology adoption: A review of TAM technology acceptance model and unified theory of acceptance and use of technology and UTAUT frameworks. In Healthcare (Vol. 13, No. 3, p. 250). MDPI.
Lee, J. K. (2022). The effects of social comparison orientation on psychological well-being in social networking sites: Serial mediation of perceived social support and self-esteem. Current Psychology, 41(9), 6247-6259.
Lee, S. (2021). A Case Study of AI DEFENSE Applications in Major Northeast Asian States and Strategies for Building a ROK's AI-based National Defense System. terrorism, 2021, 1-01.
Lin, K. Y., Chang, K. H., Lin, Y. W., & Wu, M. J. (2025). Exploring Key Considerations for Artificial Intelligence Robots in Home Healthcare Using the Unified Theory of Acceptance and Use of Technology and the Fuzzy Analytical Hierarchy Process Method. Systems, 13(1), 25.
Ling, S., Zhang, Y., & Du, N. (2024). More Is Not Always Better: Impacts of AI-Generated Confidence and Explanations in Human–Automation Interaction. Human Factors, 66(12), 2606-2620.
Liu, H., Du, Z., Xue, T., & Jiang, T. (2025). An integrated artificial intelligence-driven approach to multi-criteria optimization of building energy efficiency and occupants' comfort: A case study. Journal of Building Engineering, 103, 111944.
MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. Psychological methods, 1(2), 130.
Makhzoum, S. M. (2024). Challenges of Artificial Intelligence (AI) in Higher Education Institutions in Libya. MB University International Review, 2(2), 78-87.
Masoud, M. A., & Kamuka, S. (2022). The Implementation of Effective EMS in the Libyan Petroleum Industry. Humanities & Natural Sciences Journal, 3(9), 205-212.
Na, S., Heo, S., Han, S., Shin, Y., & Roh, Y. (2022). Acceptance model of artificial intelligence (AI)-based technologies in construction firms: Applying the Technology Acceptance Model (TAM) in combination with the Technology–Organisation–Environment (TOE) framework. Buildings, 12(2), 90.

Ohalete, N. C., Aderibigbe, A. O., Ani, E. C., Ohenhen, P. E., & Akinoso, A. (2023). Advancements in predictive maintenance in the oil and gas industry: A review of AI and data science applications. World J. Adv. Res. Rev, 20(3), 167-181.
Otman, W. A. (2022). LIBYA. In Governing Law and Dispute Resolution in the Oil and Gas Industry (pp. 233-252). Edward Elgar Publishing.
Ou, M., Zheng, H., Zeng, Y., & Hansen, P. (2024). Trust it or not: Understanding users' motivations and strategies for assessing the credibility of AI-generated information. New Media & Society, 14614448241293154.
Parycek, P., Schmid, V., & Novak, A. S. (2024). Artificial Intelligence (AI) and automation in administrative procedures: Potentials, limitations, and framework conditions. Journal of the Knowledge Economy, 15(2), 8390-8415.
Tenenhaus, M., Amato, S., & Vinzi, V. E. (2009). A global Goodness–of–Fit index for PLS structural equation modelling. 5.
Valdez, G. F., Ajzoon, M. B., Al Zuwameri, N., & Javier, M. L. C. (2025). A Descriptive Correlational Study Examining the Relationship between Burnout, Turnover Intentions, and Empowerment among Omani Nurses. Mediterranean Nursing and Midwifery.
Vudugula, S., Chebrolu, S. K., Bhuiyan, M., & Rozony, F. Z. (2023). Integrating artificial intelligence in strategic business decision-making: A systematic review of predictive models. International Journal of Scientific Interdisciplinary Research, 4(1), 01-26.
Whitfield, S., & Whitfield, S. (2021). Strategic Competence and Oral Linguistic Confidence.
Далла, Л. Б., Медени, Т. Д., Медени, И. Т., & Улубай, М. (2025). Повышение эффективности здравоохранения в больнице Алмасара: анализ распределенных данных и управление рисками для пациентов. *Economy: strategy and practice*, *19*(4), 54-72.

Family Exposure to Digital Culture: The Transformation of Privacy and Relationship Forms

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ABSTRACT

Digital culture is producing a new social ground that profoundly transforms the structure, functions, and relational fabric of the family institution. Social media platforms not only make the family visible; they also drive family relationships towards a performative, aestheticised structure dependent on algorithmic dynamics. The erosion of privacy, the normalisation of surveillance practices, the redefinition of parenthood around performance and content production, and the digitisation of childhood experiences constitute the fundamental dimensions of this transformation. The study analyses the effects of digital culture on the family from a sociological perspective, within the framework of Baudrillard's simulation, Foucault's panopticon, Giddens' pure relationship, and Turkle's "lonely togetherness" concepts. The article discusses the reconstituted meaning world of the family in the digital age through family representations on social media, the erosion of digital privacy, the transformation of parenting and childhood experiences, and the fractures in family communication and forms of belonging. The conclusion discusses how fundamental values such as privacy, patience, loyalty, and solidarity can be preserved under new conditions to enable the family to transform without disintegrating within digital culture.

Keywords: Digital Culture, Family, Social Media, Privacy, Parenting, Surveillance, Childhood.

INTRODUCTION

The warm and safe space of the family is increasingly turning into a stage illuminated by the cold light of screens with the rise of digital culture. The boundaries of privacy are becoming blurred as sharing on social media platforms increases; relational emotions such as love, closeness, and belonging are becoming increasingly dependent on algorithmic visibility. The interconnected nature of digital culture reduces relationships from "bonds" to superficial and temporary "connections"; thus, the family becomes a stage for a performance watched from the outside rather than a place for sustainable shared experiences. This situation demonstrates that even in an age where the modern individual engages in more online interaction than ever before, relationships do not deepen at the same rate; the effort to be visible often replaces genuine closeness.

Historically, the family has been the primary social environment shaping an individual's identity, sense of belonging, and behavioural codes; it has been the central institution for production, care, solidarity, and cultural transmission. However, digitalisation is creating a profound paradigm shift that transforms the family at both the structural and functional levels. Social media platforms and digital communication technologies accelerate family

communication while also making it more superficial; they imbue parenting practices with a performative quality; they redefine the meaning of privacy and shift the source of belonging towards online communities. This process transforms the family from a passive user of the digital world into a social actor reshaped according to its cultural logic.

In this context, the article's fundamental question is formulated as follows: *How are digital culture and social media transforming the structure, relationships, and value system of the family institution?* This question is of central importance in understanding the multi-layered effects of digitalisation on the family. The study addresses this transformation through four fundamental analytical axes:

(1) *Family representations and the regime of spectacle on social media:* The reconfiguration of the family through aesthetically enhanced images promoted algorithmically.

(2) *The erosion of digital privacy and the culture of surveillance:* The publicisation of the private sphere, the normalisation of surveillance both institutionally and within family relationships.

(3) *The redefinition of parenthood and childhood experience within the digital performance economy:* The intertwining of parenthood with content production; childhood being shaped by digital consumption and algorithmic guidance.

(4) *Intra-family communication, forms of belonging, and new digital family formations:* The weakening of face-to-face communication, the rise of screen-centred interaction, and the transformation of the family by digital technologies along the axes of both dissolution and reconnection. This framework demonstrates that the transformations affecting the family institution in the digital age are not only socio-technical but also have emotional, cultural, and normative dimensions. In the following sections of the article, these four axes will be examined in detail, and the multifaceted effects of digital culture on the family will be discussed.

Representations of the Family in Social Media

With the rise of digital culture, the family is increasingly shifting from being a social unit based solely on biological and emotional bonds to becoming a performative narrative constructed through visual representations and shaped by the algorithmic logic of platforms. Family images shared on platforms centred on visuality, such as Instagram, reflect scenes that are selected, edited, filtered, and aesthetically optimised, rather than spontaneous snapshots taken from the natural flow of everyday life. Consequently, the family is now becoming a representational space defined not by 'how it lives' but by 'how it appears' in the digital environment.

Baudrillard's concepts of simulation and hyperreality provide an extremely powerful theoretical framework for analysing the nature of family representations in digital culture. According to Baudrillard (1998), simulation

refers to a system of representations that replaces reality and functions as if it were real. Within this framework, family scenes circulating in digital environments should be evaluated as images that replace reality rather than direct reflections of real family life. These images render invisible the disorder, fatigue, conflicts, and emotional uncertainties of everyday life; instead, they present a sterilised, aestheticised family construct that conforms to the norms of consumer culture.

Flawless breakfast tables meticulously arranged children's rooms, or idealised marital relationships push the often complex and multi-dimensional emotional reality of family life into the background. The resulting images thus produce not a reflection of the life they represent, but an idealised copy of that life—a simulacrum, in Baudrillard's terms. This visual universe composed of simulacra creates a hyper-reality that appears more real than reality itself. The hyper-real family image is not merely an aesthetic discourse that masks everyday reality; it also becomes a cultural mechanism that directs users towards a specific emotional, performative, and normative framework of expectations. Therefore, family images produced on digital platforms create an idealised normative framework of how family life should be, rather than representing family life itself. This framework influences how individuals evaluate themselves and contributes to the establishment of a family understanding inherent in the spectacle regime of the digital age by transforming cultural notions of the family.

One of the key determinants of this visual regime is the economy of likes upon which platforms are built. Likes, comments, and follower counts are the primary metrics that determine which family images gain visibility and enter circulation. Algorithms not only regulate which content users are exposed to, but also reproduce certain aesthetic norms, patterns of affect, and codes of social behaviour. Thus, representations of the family transcend forms of personal expression and become a standardised category of digital content within the performative aesthetics defined by the platforms.

This displayed image of the family not only feeds the desire for individual visibility but also contributes to the reconstruction of normative frameworks concerning the family. As Illouz (2007) emphasises in her analysis of emotional capitalism, in modern society, emotions, relationships, and forms of attachment are organised within market logic. In this context, social roles such as the "good mother," "caring father," or "successful family" are increasingly defined less by concrete relational experiences and more by digital performances. Jhally's (1990) analysis of advertising culture shows that representation is not merely a form of display but also functions as a powerful norm-producing mechanism. From this perspective, it is evident that family images circulating on social media reproduce and reinforce parenting norms and cultural imaginings of ideal family forms.

Consequently, digital culture distances the family from being an institution based on historically intrinsic values such as love, labour,

solidarity, and privacy, transforming it into a performative narrative displayed in a digital showcase and shaped according to the requirements of the platform economy. This transformation signifies not only a change in representation but also the emergence of a spectacle regime in which the cultural meanings, relational roles, and social expectations assigned to the family are reproduced.

The Erosion of Digital Privacy and the Family

Digitalisation has radically transformed the traditional boundaries between public and private spheres in modern societies; privacy has become a phenomenon that is being redefined both conceptually and practically. Everyday experiences that were previously confined within the four walls of the family context—a child's first steps, emotional intimacy between spouses, or ordinary household activities—are now being staged as "content" rather than experienced as "memories" and integrated into the circulation economy of social media platforms (Han, 2017). In this process, domestic life is transforming into a visual data field shaped not only by individual memories but also by digital archives, platform algorithms, and the data economy.

This transformation leads to the erosion of the ethical and normative essence that privacy has historically carried. The private sphere is no longer an internal space that the individual must protect; instead, it is being reproduced in line with the logic of transparency, visibility, and circulation promoted by digital platforms. Decision-making processes regarding which moments to share, how much to share, and with whom are increasingly shifting from the individual's subjective judgement to platform norms; the economy of likes and algorithmic visibility are becoming the new regulators that define the boundaries of privacy. Thus, privacy ceases to be an ethical choice based on the individual's will and becomes a strategy of adapting to the visibility regime of digital capitalism (Vatandaş, 2005d).

In this context, the phenomenon of sharenting—parents systematically sharing their children in digital environments from birth—is one of the most striking practices illustrating how representations of childhood are being restructured in the digital age. This practice means that the child is reduced to a digital persona before even entering the process of becoming a subject; childhood becomes a category of content that is "viewable," "evaluable," and "consumable" in an online showcase created by the parent (Blum-Ross & Livingstone, 2017). The child's body, facial expressions, behavioural repertoire, and developmental stages become part of the parent's digital self-presentation, while shared images and narratives structurally affect the child's future identity formation, privacy boundaries, and capacity for subjectivity.

This process can also be interpreted as a form of "symbolic violence" in the sense conceptualised by Bourdieu: this digital representation policy towards the child establishes an invisible but decisive power over them; the child is transformed into a data object without having any control over the

digital content produced about them. In this context, childhood ceases to be merely a biological or developmental stage; it becomes a data field reproduced within the algorithmic order of digital platforms. Every shared image, every moment and every digital trace is transformed into a "digital memory" that shapes the child's future processes of subjectification; the child becomes the object of representations of their own past without being the producer of these representations.

Therefore, sharenting is not only a violation of privacy; it also means the pre-establishment of an identity in the digital environment that the child is not yet developmentally able to express, and the subjugation of this identity to the data logic of platform capitalism. In this context, childhood is increasingly becoming a cultural, economic, and technological project, constructed by parental strategies, platform norms and algorithmic guidance.

The erosion of digital privacy is not limited to the data economy of platforms; it also permeates the fabric of family relationships and turns surveillance into a relational norm. Surveillance is no longer an external control mechanism applied by companies or states but has become a commonplace component of everyday family relationships. Spouses tracking each other's online activities, producing intra-relational meanings through "likes," or making security and fidelity assessments based on online timelines demonstrates that digital surveillance is legitimised by expectations of transparency. Similarly, parents' constant monitoring of their children's screen time, location information, and digital behaviour through applications, even if justified by a "protective" motivation, creates a surveillance regime that erodes boundaries and internalises control.

Foucault's (1995) panopticon metaphor is extremely illuminating in conceptualising this transformation: Surveillance is not merely a form of control imposed from outside; it becomes a disciplinary mechanism whereby individuals internalise their behaviour and feel as if they are constantly being watched. In the digital family environment, this mechanism becomes even more complex; both parents and children track each other's digital traces, establishing a mutual, continuous, and multi-layered surveillance relationship. This situation leads to a search for digital verification rather than emotional trust in family bonds.

In this context, Giddens (1992) concept of "pure relationships" provides an important analytical framework for understanding the impact of the erosion of digital privacy on family relationships. Pure relationships are based on expectations of constant openness, emotional validation and mutual transparency. The culture of digital surveillance intensifies these expectations, making relationships more fragile; trust is now defined less as an emotional process and more as the monitoring and verification of digital behaviour. Thus, family privacy not only diminishes but also evolves into a fragile, control-oriented relationality, reshaped under the shadow of pressure for transparency.

Parenting and Childhood Experience in the Digital Performance Economy

Digital culture transforms the experience of parenting and childhood not only at an instrumental level but also fundamentally in terms of its world of meaning, normative expectations, and everyday practices. Parenting, defined in traditional societies through responsibilities of care, supervision, and guidance, has evolved into a multi-layered structure shaped by digital responsibilities, surveillance technologies, and the economy of visibility. This transformation removes parenting from being merely a pedagogical task, turning it into a set of performative and control-oriented practices aligned with the norms of digital media. In this context, children's relationship with screens—screen time, content type, digital traces, and forms of interaction—has become one of the central assessment criteria determining the quality of contemporary parenting. Digital behaviour indicators are forming new normative references used to classify parenting as "good," "adequate," or "negligent"; parenting practices are increasingly shaped by the visibility regimes and algorithmic guidance of platforms (Livingstone & Blum-Ross, 2020).

In this context, digital parenting is not merely a process limited to concerns about ensuring the child's safety in the digital environment; it is also a symbolic interaction space where the parent reconfigures their own social position, values, and identity performance within digital culture. Digital parenting practices are surrounded by a logic of visibility that requires the display of parental identity in a "correct" and "acceptable" manner at both the individual and societal levels. Thus, parenting becomes a cultural performance intertwined with the aesthetic codes, emotional regimes, and normative expectations of platform capitalism.

One of the most prominent processes transforming digital parenting is the performativisation of parenting. The increasingly visible figure of the "mum influencer" on social media platforms transforms motherhood into a performance arena where care labour and content production intersect. The digital showcase, constructed through aesthetic home arrangements, organic feeding practices, creative play activities, and child development-focused discourse, defines motherhood not through the quality of care shown to the child, but through conformity to the aesthetic and emotional codes of digital representation. As Hochschild's (2012) analysis of emotional labour also shows, care labour is increasingly being incorporated into market logic, commodified, and transformed into an aesthetic performance. In the Turkish context, Erdoğan's (2019) analysis of middle-class parenting culture reveals how visibility on digital platforms is intertwined with class capital, cultural codes, and parenting norms, demonstrating that motherhood is increasingly framed within a normative and performative framework (Vatandaş, 2005c). The impact of digital culture is not limited to parenting practices; childhood itself is undergoing a profound and multi-layered transformation through the process of digitalisation. Today's children are no longer just consumers of

digital content; they have also become objects in the content production cycle. Lives that are transferred to the digital environment from birth, documented through images and videos, and circulated are shaping children's understanding of privacy, identity formation processes, and subjectivity capacity from an early age. Thus, childhood is shifting away from being understood as a historically natural, spontaneous, and protected stage of development, transforming into a cultural project driven by the demands of the digital economy, parents' visibility strategies, and platform algorithms.

This transformation is closely related to the internalised surveillance mechanism described in Foucault's (1995) analysis of the disciplinary society. In the digital childhood experience, surveillance ceases to be an external form of control and becomes a continuous control system embedded within the child's sense of self. The trackability of children in digital environments—location data, online activity, content preferences, interaction patterns—reshapes their behavioural repertoire not only for parental surveillance but also to conform to the logic of visibility, performativity, and data production of platforms. Therefore, digital childhood is not merely a process of socialisation; it is also a space for constructing subjectivity that is intertwined with the data production regime of digital capitalism.

Within this framework, childhood is increasingly becoming an experience that is algorithmically organised, aestheticised, and made performative; the child's right to subjectification, privacy boundaries, and identity formation are intertwined with the visual and data-based logic of digital platforms. Consequently, digitalisation not only transforms childhood; it also signals an era in which childhood is redefined as a cultural, economic, and technological project.

This structure also redefines the power relations between parents and children. Children's processes of becoming subjects are now shaped not only by socialisation within the family, but also by the options offered by algorithms, the expectations directed by the digital market, and the digital representation strategies established by parents. As Cook (2020) emphasises, childhood in today's conditions is not merely a biological and developmental stage; it has become a multi-layered "project" shaped by cultural, economic, and digital factors. Thus, the digital performance economy emerges as a central social arena that reconfigures both parenthood and childhood, deepens relational asymmetries, and integrates the family into the invisible logic of platform capitalism.

Intra-Family Communication, Forms of Belonging, and New Digital Family Formations

Digitalisation is fundamentally transforming family communication patterns not only on a purely instrumental level, but also in terms of relationality and emotionality. The phenomenon of family members living "alone together" while immersed in different screens, even when they are in

the same house and often in the same room, is one of the most striking phenomena in contemporary communication sociology. Messaging applications, emojis, and speed-oriented digital language are replacing the multi-layered forms of expression in face-to-face communication, such as gestures, facial expressions, intonation, and silence. This change represents not only a technical transformation in the nature of communication but also an ontological rupture. As Turkle (2011) points out, digital environments, while seemingly increasing connection, lead to a marked decline in empathy, deep listening, and emotional attunement (Vatandaş, 2005a).

Traditional rituals that unite the family around a sense of "us"—shared meals, daily conversations, worship, family visits—are disintegrating due to individual screen use and fragmented daily time structures; this disintegration weakens the emotional depth of family belonging. Bauman's (2000) analysis of liquid modernity provides an important framework for understanding this transformation: the modern individual is increasingly turning to more fluid, temporary and superficial bonds; they satisfy their need for recognition and appreciation through social media likes and online approval mechanisms rather than within the family. Thus, the family ceases to be the individual's primary sphere of belonging and transforms into an emotional community competing with digital networks.

On the other hand, digital culture is transforming the family not only along the axis of dissolution but also along the axis of reorganisation. Particularly in the contexts of diaspora and migration, digital communication tools—WhatsApp groups, video calls, online holiday celebrations, and live-streamed weddings—reunite physically dispersed family members within a digital "imagined community"; Anderson's (2006) conceptualisation of the nation-state can be applied to family relationships in this context. As Madianou and Miller (2012) point out, digital communication technologies prevent spatial separation from turning into relational disconnection, reproducing family belonging through screens. Thus, the family space ceases to be a fixed physical place and becomes a fluid social space constructed through digital interactions.

Beyond this, digitalisation paves the way for the emergence of new relational models that go beyond the traditional family form. "Chosen digital families," online solidarity communities, social media communities, and even emotional interactions established with artificial intelligence transform the family into a flexible relational space that requires rethinking the family beyond biological and legal ties. As Castells' (2010) analysis of the network society shows, contemporary relationships are increasingly woven around digital network logic, mutual support practices, and shared online experiences; the family is also reshaping itself as a new social form by integrating into these network dynamics (Vatandaş, 2005b).

In this context, digitalisation transforms the family into a structure that is both susceptible to dissolution and amenable to reconstitution. The

emerging picture shows that the concept of family should be understood not as a fixed, closed, and homogeneous social form, but as a dynamic and multi-layered network of relationships that reorganises itself according to the rhythm of digital interactions. Digital culture does not merely transform the family; it also reconfigures the normative, emotional, and symbolic expectations associated with the family.

CONCLUSION

Digital culture is not merely an instrumental technology that makes the family "visible"; it is a powerful ideological formation that transforms the family at the conceptual, normative, and relational levels. Social media and digital platforms, while transforming the family into content suitable for display, branding, and consumption, are also fundamentally redefining the boundaries of privacy, the understanding of fidelity, parenting roles, and forms of belonging. Therefore, the effects of digitalisation on the family go beyond a superficial discussion of "technology use"; they extend to the areas of social values, relational ethics, and personal subjectivity.

The theoretical literature allows us to understand the different dimensions of this transformation. Baudrillard's (1998) concept of hyperreality explains how representations of the family circulating on digital platforms have become aestheticised simulations that replace real family life. Giddens' (1992) "pure relationship" model provides an important framework for understanding how relationships in the digital age have become more fragile due to the constant demand for validation and transparency. Turkle's (2011) conceptualisation of "togetherness in isolation" is one of the typical manifestations in the digital age of family members being physically present in the same space yet emotionally distant from one another. Han's (2017) analysis of the "transparency society" shows how privacy has been reduced from a cultural value to algorithmic visibility and how this situation has led the family into a new regime of control, performance and exposure.

When these theoretical approaches are brought together, it becomes apparent that digital culture holds both transformative and threatening potential for the family. Therefore, thinking about the family in the digital age cannot be limited to practical suggestions about "using technology correctly." The real issue is what ethical and cultural values the family will be rebuilt upon. What makes a family a family? Shared visibility or shared privacy? Digital likes or the depth of relationships? Under what conditions can values

that protect the family against the fundamental logic of the visibility economy be sustained?

For the family to transform without dissolving within digital culture, fundamental relationship values such as privacy,

patience, loyalty, trust and solidarity must be adapted to new social conditions. Unless these values are redefined, the family risks becoming increasingly "watched" but increasingly less "lived". In this context, the fundamental focus of family policies, pedagogical strategies, and cultural debates in the digital age should not be to ban or idealise technology, but to establish a new ethical foundation that preserves the depth and privacy of human relationships.

REFERENCES

Anderson, B. (2006). *Imagined communities: Reflections on the origin and spread of nationalism* (Rev. ed.). Verso.

Baudrillard, J. (1998). *The consumer society: Myths and structures*. Sage.

Bauman, Z. (2000). *Liquid modernity*. Polity Press.

Blum-Ross, A., & Livingstone, S. (2017). Sharenting, parent blogging, and the boundaries of the digital self. *Popular Communication*, 15(2), 110–125.

Castells, M. (2010). *The rise of the network society* (2nd ed.). Wiley-Blackwell.

Cook, D. T. (2020). *The moral project of childhood: Motherhood, materiality, and early childhood education*. NYU Press.

Erdoğan, N. (2019). Türkiye'de orta sınıf ebeveynlik pratikleri ve kurs kültürü üzerine bir analiz. *Toplum ve Bilim*, 147, 45–72.

Foucault, M. (1995). *Discipline and punish: The birth of the prison* (A. Sheridan, Trans.). Vintage. (Original work published 1975)

Giddens, A. (1992). *The transformation of intimacy: Sexuality, love and eroticism in modern societies*. Polity Press.

Han, B.C. (2017). *The transparency society*. Stanford University Press.

Hochschild, A. R. (2012). *The managed heart: Commercialization of human feeling* (Updated ed.). University of California Press.

Illouz, E. (2007). *Cold intimacies: The making of emotional capitalism*. Polity Press.

Jhally, S. (1990). *The codes of advertising: Fetishism and the political economy of meaning in the consumer society*. Routledge.

Livingstone, S., & Blum-Ross, A. (2020). *Parenting for a digital future: How hopes and fears about technology shape children's lives*. Oxford University Press.

Madianou, M., & Miller, D. (2012). *Migration and new media: Transnational families and polymedia*. Routledge.

OpenAI. (2025). *ChatGPT (GPT-4o model) [Yapay zekâ destekli dil modeli]*. https://openai.com/chatgpt

Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other*. Basic Books.
Vatandaş, C. (2025a). *Aile Durumu (Zayıflayan Bağlar ve Değişen Roller)*. Pınar.
Vatandaş, C. (2025b). *Aile Değeri (Köklerden Ufuklara: Aileyi Yaşatan İlkeler)*. Pınar.
Vatandaş, C. (2025c). *Aile Umudu (Değerin, Bağın ve Sevginin İzinde)*. Pınar.
Vatandaş, C. (2025d). *Aile Yorgunluğu (Tükenen Değerler ve Çözülen İlişkiler)*. Pınar.
Vatandaş, C.& Vatandaş, S. (2023). Aile Kurumunun Tarihsel Serüveni ve Küresel Dünyadaki Durumu**.** (Edt. Saniy Vatandaş, Sezai Öztaş, Mehtap Polat). *Kimlik ve Kültür*, 59-96, Eğitim Yayınevi.
Vatandaş, S. (2020). Mahremiyetin Dönüşümü ve İletişim Araçları. *Humanitas-Uluslararası Sosyal Bilimler Dergisi*. 8 (16). 437-458.

The Transformative and Corrosive Effects of Capitalist Consumer Culture on The Institution of The Family: A Sociological Analysis in The Turkish Context

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ABSTRACT

This article analyses the economic, cultural, psychological, and relational transformations that capitalist consumer culture has wrought upon the institution of the family, taking into account the unique social processes within the Turkish context. In today's world, consumer culture has transcended its role as merely an economic mechanism related to goods and services, becoming an all-encompassing cultural system that determines how identities are constructed, how status hierarchies are reproduced, and how values such as happiness and success are defined. This system is gradually eroding the fundamental functions historically assumed by the family institution, such as production, solidarity, care, socialisation, and cultural transmission; it is shifting family relationships to a more fragile, individualised, and commercialised plane. One of the most visible effects of consumer culture is the transformation of the childhood experience. Digital platforms, media content, and the advertising industry intervene in children's socialisation process from an early age, turning childhood into a commodified phase. This situation also changes the meaning of parenthood; parenthood is increasingly becoming a performative role defined by the options offered by the market. Thus, authority, communication and emotional bonds within the family are being reshaped under the pressure of consumer culture. In the Turkish context, rapid modernisation, urbanisation, the commercialisation of the media economy and the spread of digitalisation make this transformation even more visible. As TÜİK data also shows, the increase in household consumption patterns in technology, communication, and entertainment expenditures demonstrates that consumption has become a central component of daily life. This study aims to reveal the fundamental reasons for the fragility in family structure by discussing, from a sociological perspective, how these transformations have reshaped the family institution in economic, cultural, and relational dimensions.

Keywords: Consumer Culture, Family, Functions Of The Family, Digital Culture, Family In Turkey, Communication Tools.

INTRODUCTION

Capitalism has been reorganised since the second half of the 20th century not only as an economic production model but also as a cultural system permeating the entirety of social life. The transition from production-centred classical capitalism to consumption-centred late capitalism has fundamentally transformed the world of the modern individual. In this new order, the individual's identity, the management of desires, patterns of taste, lifestyle performances, and consumption preferences have begun to take shape. As Harvey (2005) states in his analysis of neoliberal transformation,

market logic has not remained confined to the economic sphere; it has become a hegemonic framework that determines cultural practices, everyday relationships, and even the individual's sense of self. This process of expansion has led to the increasing colonisation of relational spheres – such as family, friendship, community, privacy, and emotional bonds – by market rationality.

One of the institutional structures where this transformation has been most clearly felt is the family. Historically the fundamental space for production, care, solidarity, cultural transmission and identity construction, the family has begun to take on a different function within consumer capitalism. The family has ceased to be a production-oriented social unit and has become a cultural stage that reproduces consumption, internalises the ideals of the market, and circulates desires. Consequently, consumer culture is fundamentally altering the nature of family relationships, reshaping them according to new norms, expectations, and behavioural patterns dictated by the market.

In Turkey, this transformation has been more pronounced and rapid. Unlike the organic transformation process that took centuries in Western societies, Turkey's modernisation process has been accelerated, discontinuous, and often based on a state-centred model of modernisation. Consequently, the establishment of consumer culture has had an impact that conflicts with traditional social structures and rapidly transforms them. Post-1980 economic liberalisation accelerated the institutionalisation of neoliberal policies in Turkey that encouraged consumption-oriented lifestyles. With the commercialisation of the media sector in the 1990s, advertising, popular culture and television series produced consumption-oriented symbolic worlds, restructuring households' desires and expectations. The acceleration of digitalisation in the 2000s has made consumer culture an invisible foundation of daily life, affecting individuals' economic, emotional and cultural practices.

TurkStat data shows that household consumption expenditures in Turkey have changed significantly over the years. While the share of essential expenditures has remained relatively stable, the rapid increase in communications, entertainment-culture, technology, and personal care expenditures reveals the extent to which consumer culture has permeated lifestyles. This increase in these items reflects not only a change in economic preferences but also a transformation in values. The family budget is increasingly being allocated to symbolic consumption products, digital devices, and visibility-based cultural practices.

These developments profoundly affect not only the economic structure of the family institution but also its cultural values, forms of communication, parenting models, and intergenerational relationships. For example, parenting is increasingly becoming a performance defined through consumption; children's socialisation is becoming open to the influence of digital platforms. Intra-family communication is shifting from face-to-face

interactions to screen-centred practices, weakening forms of emotional closeness and family rituals. Thus, consumer capitalism transforms the family not only into an economic unit but also into a social space where new cultural norms and market expectations are reproduced.

The Intervention of Capitalist Consumer Culture in the Family's Fundamental Functions

Capitalist consumer culture fundamentally interferes with the functions historically assumed by the family institution: production, socialisation, emotional support, and cultural transmission. In pre-capitalist societies, the family was positioned as the centre of both economic production and daily life; the organisation of production relations within the family gave rise to a strong bond structure based on solidarity and reciprocity. However, modern capitalism has severed production from the home and family context, transferring it to institutional structures—factories, companies, and bureaucratic organisations—thereby transforming the family from a unit of production into a unit of consumption. This transformation is not merely an economic reorganisation; it is also a profound shift in mindset that affects how family members perceive the world, define their needs, and produce value. The needs of family members are now shaped more by the products, images, and desires offered by the market than by their own preferences. Thus, the family has become both the target audience of consumption and a symbolic institution where consumption is reproduced (Vatandaş, 2025a).

As Baudrillard (1998) argues, modern consumption is based on the circulation of "symbolic meanings" rather than the fulfilment of needs. In this context, the family is transforming from a functional unit of consumption into a "symbolic investment area" that facilitates the circulation of status symbols, brand culture, and symbols related to lifestyle. Changes in the structure of household consumption expenditure in Turkey over the last twenty years—with the share of essential needs such as food and housing remaining constant, while spending on technology, personal care, communication and entertainment has increased rapidly—demonstrate the profound extent to which consumer culture has permeated family life (TÜİK, 2023). This change also reveals that the concepts of status, identity and success within the family are increasingly defined through material indicators.

The financialisation of consumption also increases economic pressure on families. Rising credit card usage rates in Turkey, the rapid increase in personal loans, and the perpetuation of consumption through borrowing condemn families to a continuous cycle of debt. This debt dynamic ensures the functioning of the consumption economy while simultaneously creating intense economic stress, anxiety, unpredictability, and relational tension within the family (Harvey, 2005). Credit-based consumption patterns often arise not from rational needs but from the influence of social pressures, desires

for visibility, and consumption norms imposed by the media; thus, the basis of economic decisions is shaped by market logic.

Socialisation processes are also undergoing a profound transformation under the influence of consumer culture. While in traditional societies the family was the most fundamental socialisation institution for transmitting values, social norms and cultural roles, today this function is increasingly being taken over by media industries, digital platforms and global consumer actors. The gaming industry, the cartoon sector, branded toy companies, child influencers, and social media content make children perceive the world through the lens of consumption logic, turning childhood into a market segment rather than a stage of development. As Cook (2020) points out, in modern capitalism, childhood is now defined as an economic category rather than a cultural stage.

Parenting is also undergoing a similar transformation process. Historically based on care, protection and moral guidance, parenting is increasingly becoming performative and market-based within modern consumer culture. "Successful parenting" is now measured by the material opportunities offered to children, courses, technological devices and visible parenting practices displayed on social media. The "course culture" — foreign language, sports, art, coding, social media content workshops — which is rapidly spreading among the middle classes, particularly in Turkey, ties children's lives largely to packages offered by market actors (Erdoğan, 2019). This situation removes parenting from the realm of natural emotion and responsibility, transforming it into a costly, competitive, and performance-based project.

The emotional function of the family is also affected by this transformation. As Illouz (2007) points out, modern capitalism has commodified even the world of emotions, linking happiness, loving relationships and emotional satisfaction to tools offered by the market. Within the family, happiness is increasingly derived not from relational depth, but from consumed products, activities, and external indicators. As a result, a culture of comparison, dissatisfaction, feelings of inadequacy, and emotional detachment are becoming widespread; market-driven, consumption-based expectations are replacing emotional bonds. Thus, the family is moving away from being a structure that naturally fulfils its historical functions and is transforming into a fragile social space guided by consumer culture.

The Restructuring of Family Relationships by Consumer Culture

Capitalist consumer culture transforms family relationships not only quantitatively but more significantly at a qualitative level. The forms of relationships between family members, mutual expectations, communication patterns, and daily practices are being reshaped by the values, norms, and lifestyle codes imposed by consumer culture. This transformation leads to the replacement of functions central to classical family models, such as solidarity,

reciprocity, and emotional continuity, with consumption-based references offered by the market. As Zygmunt Bauman (2007) expresses in his conceptualisation of "liquid modernity," modern individuals evaluate even their relationships through the logic of consumption; attachment processes are replaced by a relationality centred on performance, visibility, and pleasure. This situation points to a structural rupture that fundamentally affects the nature of family relationships.

One of the areas where this rupture is most evident is parenthood. Modern media, advertising, and social platforms are increasingly transforming parenthood into a performative arena. "Good parenting" is no longer evaluated through the love, care, and moral guidance provided to children; rather, it is assessed through the services, courses, products, and activities made visible on social media. This commodification of parenting is also consistent with Arlie Hochschild's (2012) concept of "commercial sentimentality": even family relationships are being redefined within emotional forms regulated by the market. The widespread use of social media in Turkey has accelerated this transformation; many family events, from children's birthdays to school achievements, have become a "show" and a performance of parenthood displayed in the digital sphere. This disrupts the natural rhythm of the parent-child relationship, transforming it into a form of "visible parenting"; the internal naturalness of parenting is replaced by external validation mechanisms.

Consumer culture also significantly transforms family status relations. Family members have begun to position themselves and each other through consumption preferences, brand usage, and lifestyle indicators. Bourdieu's (1984) concepts of cultural capital and habitus explain how consumption practices become symbolic indicators of social position. The acceleration of brand-centred identity construction among young people in Turkey is a social reflection of this process. Clothing style, mobile phone brand, social media visibility, places frequented, and products consumed have become status-determining factors not only for individuals but even within families. This situation weakens the perception of equality within the family; it creates emotional tensions such as jealousy, conflict, and feelings of worthlessness, especially in households with limited socio-economic resources (Vatandaş, 2025b).

Consumer culture is also fragmenting family time. The culture of speed in modern life—in line with Rosa's (2013) concept of "social acceleration"—is making it increasingly difficult for family members to spend time together. Traditional family rituals such as eating together, chatting, and organising joint activities are weakening due to individual screen use, digital entertainment formats, and algorithmic content consumption. Field research conducted in Turkey shows that family communication is increasingly established through digital tools, with individuals living in the same household often leading "parallel lives" (Ministry of Family and Social Services, 2022).

This situation leads to a decrease in emotional closeness within the family, superficial relationships, and increased fragility.

Consequently, capitalist consumer culture, while seemingly diversifying family relationships, actually renders them more fragile, superficial, and performative. The solidarity, reciprocity, and emotional integrity historically produced by the family are being replaced by a relational model determined by image, status, and consumption expectations. Thus, the family is transforming into a social space shaped by the symbolic and cultural codes of the market; the intrinsic meaning of relationships is eroding in the face of the external pressures of market logic.

The Effects of Media, Advertising, and Digital Culture on the Family

The advertising industry has gone far beyond being merely a communication tool for the modern consumer economy, becoming a powerful cultural mechanism that systematically produces desires, values, and social expectations. Within this mechanism, the family occupies a central position, both as an area of emotional investment and as an ideal target audience that ensures the continuity of consumption demand. Advertising strategies create a conscious sense of deficiency in family members, presenting consumption not as a matter of choice but as a necessary and natural activity. In this process, the image of the "ideal family" is largely constructed around consumption practices; the message that the family model that goes on holiday, buys new products, and provides their children with "the best opportunities" is happy and successful is constantly reinforced. This idealisation is consistent with the logic of "constant comparison and competition" in the consumer society described by Bauman (2007); for family members, the measure of happiness and success increasingly becomes dependent on the objects they possess rather than on relationships.

This world depicted in advertisements fosters a culture of comparison among family members, creating psychological pressure. The substitution of emotions such as happiness, belonging, and love with purchasable products overshadows the reality of family needs and brings expectations based on social performance to the fore. The impact of media representations is felt more strongly in cultures such as Turkey, where social visibility is highly valued. As families compare their living standards to the images presented in advertisements, an increase in feelings of inadequacy, deficiency, and failure becomes inevitable. Thus, the advertising industry becomes not only a force that encourages consumption but also a cultural force that transforms family psychological dynamics (Jhally, 1990).

Social media is accelerating this transformation, turning family privacy into a public spectacle. Byung-Chul Han's (2017) conceptualisation of the "transparency society" explains the modern individual's desire to gain value through visibility. Families, adapting to this regime of visibility, have begun to display their everyday practices—weddings, birthdays, holidays,

ceremonies of achievement, even domestic routines—on social media platforms. Over time, these practices have evolved beyond mere sharing into performative rituals shaped by the aesthetic and economic logic of spectacle. The increasing luxury and ostentation of wedding and engagement ceremonies in Turkey is a concrete example of how family rituals have become objects of consumption (Göle, 2019). The meaning of rituals is shifting from internal cultural values to external codes of visibility.

This culture of visualisation and display transforms the family from a place where relationships are lived into a stage where representations are produced. It is not the nature of the emotional processes experienced within the family that matters, but how they appear to the outside world. As social media algorithms operate based on likes, interactions, and follower counts, family practices become increasingly dependent on external validation mechanisms. This leads to a weakening of attachment to family values, the performativisation of relationships, and emotional bonds increasingly becoming victims of visibility competition (Vatandaş, 2025c).

Digital culture is fundamentally transforming the childhood experience. Algorithms act as a powerful cultural filter, directing children's interests, attention spans, and behavioural patterns. YouTube, TikTok, and digital gaming platforms shape children's consumption tendencies from an early age, turning them into passive consumers. Indeed, recent studies show that children's daily screen time in Turkey is constantly increasing, while traditional play culture is weakening (RTÜK, 2023). This situation weakens authority within the family, as digital platforms create "alternative socialisation spaces" that are largely beyond parental control in children's daily lives.

This new form of socialisation produced by digital culture further complicates the parent-child relationship. As parents' capacity to set boundaries diminishes, children's digital expectations and consumption demands create new tensions within the family. Consumption content constantly circulating on digital platforms increases children's material expectations; thus, consumer culture becomes the fundamental determinant of family relationships. Consequently, media, advertising, and digital culture transform not only consumption behaviours but also the value system, authority structure, and emotional integrity of family relationships.

The Corrosive Effects of Consumer Culture on Family Values

Capitalist individualism is one of the most effective cultural currents eroding the collective values that ensure the historical continuity of the family institution. As Beck and Beck-Gernsheim (2002) emphasise, the modern individual places personal happiness, autonomy, and ideals of individual self-realisation at the centre of their life. This individualism directly conflicts with collective values such as sacrifice, commitment, reciprocity, and patience required for long-term relationships. While in traditional societies the family

offers a stable model of coexistence based on shared destiny, solidarity, and mutual responsibility, under modern conditions the family is increasingly becoming a fragile, individual-centred network of relationships woven with looser bonds. In Turkey, the rise in the age of marriage, the spread of individualistic lifestyles, the increase in non-marital cohabitation, and the steady rise in divorce rates are empirical indicators of this cultural transformation (TÜİK, 2023).

One of the elements that deepens the effects of modern individualism ideology on the family is the "ideology of happiness." As Eva Illouz (2012) points out, modern capitalist culture defines happiness through consumption rather than relational attachment; it links the source of happiness to pleasure, novelty, and the diversity of personal experiences. This approach weakens family bonds because family relationships require continuity, sacrifice, and selflessness. In consumer culture, permanence is replaced by changeability, commitment by abundance of choice, and sacrifice by individual satisfaction. Consequently, emotional fulfilment is sought not from the depth of relationships but from the instant gratification offered by consumption. This situation leads to rapid dissatisfaction within the family and the fragility of relationships for the modern individual.

The commercialisation of rituals is also a significant factor in the erosion of family values. The size of the wedding economy in Turkey, the gradual transformation of holidays into shopping-oriented events, and the outsourcing of special family occasions to professional event organisers obscure the historical meaning of rituals. Turner's (1969) observation regarding the role of rituals in producing social cohesion is losing its meaning in modern consumer society; because rituals are no longer symbolic actions that strengthen intergenerational bonds but have become status symbols and means of consumption performance. This situation reinforces competition, cost pressure and ostentatious culture within the family, while weakening the shared cultural world of meaning. The economic burden of rituals creates tension, particularly in lower and middle-class families, forcing family members to position themselves through material indicators.

Consumer culture is also eroding the value-producing function historically assumed by the family. Whereas the family was once the primary institution for transmitting cultural norms, moral values, and identity elements, today consumer culture has overshadowed this function, transforming the family from a value-producing institution into a consumption-oriented performance arena. Bauman's (2000) analysis of "liquid modernity," which states that relationships have become unstable, fragile, and temporary, clearly reflects this transformation. As forms of solidarity recede, they are replaced by an individualistic, competitive and consumption-based logic of relationships. Thus, the family is transformed into a social space shaped by the symbolic and cultural codes of the market, with a weakened capacity for meaning production.

The Family's Encounter with Consumer Culture in the Context of Turkey's Modernisation Experience

Unlike the transformations that developed organically over centuries in Western societies, Turkey's modernisation process has been carried out within a relatively short historical period and, in most cases, through state-centred interventions. For this reason, Turkish modernisation has followed a discontinuous, tense, and sometimes socially incompatible course in terms of both speed and content. As Şerif Mardin (1991) points out, modernisation in Turkey transformed the upper echelons of the social structure through top-down reforms, but everyday practices and traditional institutions were unable to adapt to this change at the same pace. This incompatibility led to encounters between the family and consumer culture that were harsher and more contradictory than in the West. While in the West, consumer culture spread in harmony with industrialisation, urbanisation and individualisation processes, in Turkey it was abruptly grafted onto a social context where the traditional family structure was strong, thus creating more damaging effects on the family (Vatandaş, 2025d).

One of the most important dynamics of this transformation is rapid urbanisation. The intense migration from rural to urban areas since the 1950s has led to the dissolution of the extended family structure and the dominance of the nuclear family. However, the economic costs of urban life, housing problems, job insecurity, and weak social support networks have made the family vulnerable both economically and psychologically. As Ayşe Buğra (2020) points out, the limitations of social policy mechanisms in Turkey have made the family a unit that bears the burden of both economic risks and cultural transformations alone. With the dissolution of traditional forms of solidarity, the family has become isolated and more open to the consumption patterns offered by the market. This void has created fertile ground for consumer culture to infiltrate the family through global desires, lifestyle ideals, and status symbols.

The rapid commercialisation of the media sector since the 1990s has accelerated the spread of consumer culture in Turkey. The proliferation of private television channels, the growth of the advertising industry, and the widespread availability of popular culture products have created a cultural atmosphere that presents consumption as natural and desirable. In particular, the spacious and luxurious living environments depicted in television series, brand-focused aesthetics , and idealised relationship models are significantly transforming both families' expectations and their perception of reality. In these series, the criteria for happiness, love, success, and family life are increasingly defined through material symbols; thus, consumption is presented as the fundamental source of emotional satisfaction. This leads families to compare their own lives with the idealised representations presented in the media; this comparison often increases feelings of inadequacy, dissatisfaction and deficiency (Kaya & Sunar, 2021).

Digitalisation has taken this transformation to a deeper and more comprehensive level. Since the 2000s, the proliferation of the internet, social media and mobile technologies has enabled consumer culture to reach not only adults but also children and young people from an early age. Visual content circulating on digital platforms produces powerful cultural codes that shape young people's identity-building processes, relationship patterns and lifestyle choices. The selective guidance of algorithms shapes the value systems of children and young people, creating a new cultural distance between parents and children. As Manuel Castells' (2010) analysis of the "network society" shows, digital online spaces create an alternative socialisation environment for young people, and this environment often produces norms that are incompatible with family values.

This cultural distance complicates negotiations of authority, expectations, and values within the family. While parents strive to uphold traditional values, children gravitate towards the fast-paced, individualistic, pleasure-seeking, and consumption-centred values offered by digital culture. Thus, the family becomes not only a space of intergenerational difference but also a site of conflict between two distinct cultural worlds. This situation makes the effects of consumer culture on the family in the Turkish context even more profound and problematic, because the effects of modernisation, media and digitalisation have not settled gradually into the social fabric, but rather through successive ruptures. Consequently, the transformation of the family is taking place not only within an economic or technological context, but also within a field of tension created by cultural discontinuities.

CONCLUSION

Capitalist consumer culture transforms the institution of the family not only as an economic structure but also as a multi-layered field extending from cultural meaning production to emotional bonds, from socialisation processes to identity formation. The functions historically associated with the family—production, care, solidarity, cultural transmission, and emotional integrity—are being encircled and increasingly eroded by new values dictated by market logic. The reduction of the family from a unit of production to a unit of consumption makes everyday life practices dependent on the needs imposed by the market; the commodification of socialisation processes transforms childhood experiences, parenthood and intergenerational relationships into an area open to the intervention of market actors. The weakening of emotional functions leads to relationships being based on transience rather than continuity, pleasure rather than sacrifice, and individual satisfaction rather

than solidarity; thus, the family becomes fragile on both psychological and cultural levels.

In the Turkish context, this transformation takes on a more pronounced appearance. Rapid modernisation, rural-urban migration, the spread of the nuclear family, and the weakening of extended family solidarity have left families more isolated, both economically and emotionally. The commercialisation of the media economy has reshaped families' expectations and behaviours by creating a cultural atmosphere that idealises consumption practices; digital platforms, in particular, distance younger generations from traditional values, making intra-family negotiation processes more complex. Neoliberal individualism, meanwhile, removes the family from its role as an institution of solidarity, transforming it into a sphere of relationships focused on personal happiness and performance.

Therefore, strengthening the family institution is possible not only through socio-economic support but also through a process of cultural and ethical reconstruction. Unless alternative forms of solidarity, relational responsibility understandings, and belonging practices are developed in areas colonised by the market, the corrosive effects of consumer culture will continue. The dissemination of media literacy, the enhancement of digital awareness, and the activation of social policy tools aimed at strengthening the family are important components of this process. Ultimately, what makes the family strong is that it is not merely an economic unit but a social space that produces

solidarity, reciprocity, love, and meaning. To the extent that the family does not succumb to the logic of the market—that is, as long as it can preserve its ethical and cultural capacity for solidarity in the face of commercialisation and individualism—it will continue to be one of the fundamental pillars of social continuity and human existence

REFERENCES

Aile ve Sosyal Hizmetler Bakanlığı. (2022). *Türkiye Aile Yapısı Araştırması*. Ankara.

Baudrillard, J. (1998). *The Consumer Society: Myths and Structures*. Sage.

Bauman, Z. (2000). *Liquid Modernity*. Polity Press.

Bauman, Z. (2007). *Liquid Times: Living in an Age of Uncertainty*. Polity Press.

Beck, U., & Beck-Gernsheim, E. (2002). *Individualization: Institutionalized Individualism and its Social and Political Consequences*. Sage.

Bourdieu, P. (1984). *Distinction: A Social Critique of the Judgement of Taste*. Harvard University Press.

Buğra, A. (2020). *Türkiye'de Sosyal Politika Yazıları*. İletişim.

Castells, M. (2010). *The Rise of the Network Society*. Wiley-Blackwell.

Cook, D. T. (2020). *The Moral Project of Childhood: Motherhood, Materiality, and Early Childhood Education*. NYU Press.
Erdoğan, N. (2019). Türkiye'de Orta Sınıf Ebeveynlik Pratikleri ve Kurs Kültürü Üzerine Bir Analiz. *Toplum ve Bilim*, 147, 45–72.
Göle, N. (2019). *Gündelik Hayat ve Modernlik*. Metis.
Han, B.-C. (2017). *The Transparency Society*. Stanford University Press.
Harvey, D. (2005). *A Brief History of Neoliberalism*. Oxford University Press.
Hochschild, A. R. (2012). *The Managed Heart: Commercialization of Human Feeling*. University of California Press.
Illouz, E. (2007). *Cold Intimacies: The Making of Emotional Capitalism*. Polity.
Illouz, E. (2012). *Why Love Hurts: A Sociological Explanation*. Polity Press.
Jhally, S. (1990). *The Codes of Advertising: Fetishism and the Political Economy of Meaning*. Routledge.
Kaya, A., & Sunar, L. (2021). Medya Temsilleri ve Tüketim Kültürü. *Yeni Medya Çalışmaları Dergisi*, 4(2), 35–58.
Mardin, Ş. (1991). *Türk Modernleşmesi*. İletişim.
OpenAI. (2025). *ChatGPT (GPT-4o model) [Yapay zekâ destekli dil modeli]*. https://openai.com/chatgpt
Rosa, H. (2013). *Social Acceleration: A New Theory of Modernity*. Columbia University Press.
RTÜK. (2023). *Çocuk ve Medya Araştırması*. Ankara.
Turner, V. (1969). *The Ritual Process: Structure and Anti-Structure*. Aldine.
TÜİK. (2023). *Aile Yapısı ve Toplumsal Göstergeler*.
TÜİK. (2023). *Evlilik, Boşanma ve Aile Yapısı İstatistikleri*. Ankara.
TÜİK. (2023). *Hanehalkı Tüketim Harcamaları Araştırması*. Ankara.
Vatandaş, C. (2025a). *Aile Durumu (Zayıflayan Bağlar ve Değişen Roller)*. Pınar.
Vatandaş, C. (2025b). *Aile Değeri (Köklerden Ufuklara: Aileyi Yaşatan İlkeler)*. Pınar.
Vatandaş, C. (2025c). *Aile Umudu (Değerin, Bağın ve Sevginin İzinde)*. Pınar.
Vatandaş, C. (2025d). *Aile Yorgunluğu (Tükenen Değerler ve Çözülen İlişkiler)*. Pınar.
Vatandaş, C.& Vatandaş, S. (2023). "Aile Kurumunun Tarihsel Serüveni ve Küresel Dünyadaki Durumu". (Edt. Saniye Vatandaş, Sezai Öztaş, Mehtap Polat). *Kimlik ve Kültür*, 59-96, Konya: Eğitim Yayınevi.
Vatandaş, S. (2020). "Mahremiyetin Dönüşümü ve İletişim Araçları". *Humanitas-Uluslararası Sosyal Bilimler Dergisi*. 8 (16). 437-458.

A Literature Review on the Impact of Artificial Intelligence on Aviation Activities[1]

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[1]This study is an expanded version of the paper entitled 'Investigation of the Legal and Ethical Dimensions of the Use of Artificial Intelligence in Aviation: A Literature Review', presented at the 5th International Conference on Recent Academic Studies (ICRES-2025) held in Konya, Turkey, on December 2-3, 2025

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ABSTRACT

Artificial intelligence (AI) applications have become one of the most important technologies in today's world. AI applications are also frequently used in the aviation sector. AI methods implemented in practice also attract considerable interest in the academic field. In this context, this study examines, through a literature review, the areas in which AI is used by aviation organizations, to investigate the direction in which academic literature is expanding. The study results reveal that while AI presents ethical and legal problems on one hand, it is also present in almost every area of aviation activities on the other. In terms of legal and ethical aspects, problems exist in the general frameworks related to accountability, transparency, and legal responsibility; however, AI also plays a significant role in ensuring aviation safety and security. Other findings of the study include: operational efficiency is achieved through autonomous decision-making systems; AI is now indispensable for supporting air traffic controllers; AI possesses superior qualities in optimizing airspaces; unmanned aerial vehicles have advanced significantly with AI; pilotless air transport may be possible in the future; and the impact of the human factor on safety and security can be optimized through AI.

Keywords – Artificial Intelligence, Aviation, Legal Responsibility, Ethical Rules, Aviation Safety And Security.

INTRODUCTION

In today's rapidly advancing technological world, the integration of Artificial Intelligence (AI) into the aviation sector appears poised to fundamentally transform not only flight mechanics but also the broader context of air transport management. This book chapter examines the multifaceted impacts of AI across various dimensions of the aviation industry through a literature review, addressing both its promising applications and the complex challenges it presents.

The synergy between unmanned systems and AI is transforming operational paradigms and necessitates research into how these technologies enhance autonomous flight systems and aviation safety (Verma, 2024; Sathyananda et al., 2024). With increasing reliance on AI for the automation of critical functions, from flight operations to air traffic control, understanding the technological frameworks and the human factors involved is of paramount importance (Zhou et al., 2018). Furthermore, aviation safety will significantly benefit from AI applications as advanced machine learning (ML) algorithms facilitate real-time threat detection and response, significantly improving existing security protocols (Rawat et al., 2022). Of course, these emerging innovations are not exempt from legal and ethical

dilemmas. Legal frameworks surrounding AI in aviation must evolve to address the rights and responsibilities associated with machine-based decision-making and its implications for human operators (Mou & Yang, 2023).

Since human-machine interaction shapes the effectiveness of AI solutions in the aviation context, the need to consider human factors in the application of AI is critical. Inappropriate integration can lead to safety vulnerabilities rather than improvements (Chang & Yeh, 2010). Ethical dimensions related to the use of AI in decision-making processes add further layers of complexity and necessitate discussion about guidelines that align AI functions with ethical standards to ensure safe and fair outcomes (Taddeo et al., 2019). In summary, this chapter examines the role of AI in the aviation sector through studies conducted in literature, offering insights into current applications, future trends, and the pressing ethical and legal considerations accompanying this technological evolution.

UNMANNED SYSTEMS AND ARTIFICIAL INTELLIGENCE

The integration of AI with UAM systems and Unmanned Aerial Vehicles (UAVs) represents a transformative approach to modern transportation. As cities face increasing traffic congestion and the need for efficient logistics solutions, leveraging AI technologies in UAM and UAV operations will enhance operational efficiency, safety, and service delivery. UAM refers to the use of both manned and unmanned electric vertical take-off and landing aircraft for transporting cargo and people in urban environments. This paradigm shift will be made possible by advancements in technologies that facilitate the safe and efficient operation of various aircraft, particularly artificial intelligence. Thipphavong et al. (2018) summarizes the technological maturity required for a successful UAM implementation, highlighting potential applications in emergency services, traffic monitoring, and logistics chains. The authors suggest that the success of UAM largely depends on integrated AI systems for route optimization, traffic management, and fleet coordination.

UAVs benefit significantly from AI through their advanced autonomous navigation and decision-making capabilities. Lerro and Battipede (2021) discuss the development of a certified Airborne Data System with synthetic sensors that can be scaled to UAVs and optimize their operational capabilities. This system provides enhanced situational

awareness, compliant with safe UAV operation requirements, and highlights the critical role of AI in the navigation autonomy of UAVs. Furthermore, the integration of communication systems such as cellular-enabled UAV communication contributes to collaborative operation while optimizing the communication of UAVs with existing terrestrial networks. Zhang et al. (2019) highlight the role of AI in minimizing latency and increasing data transmission efficiency, which is necessary for real-time operation in UAV scenarios, by offering insights into the challenges and solutions of providing reliable communication links.

As shown by Song et al. (2024), the synergy between UAVs and manned systems is further enhanced through collaborative operations. Their research on air-to-ground collaborative landing strategies outlines how UAVs can work alongside unmanned ground vehicles (UGVs) in logistical tasks, utilizing AI-assisted coordination strategies to optimize landing procedures while enhancing operational safety. This collaborative framework exemplifies the potential of integrating multiple air-to-ground systems, supported by AI technologies, to achieve comprehensive solutions in urban environments. Similarly, Yang et al. (2021) propose an AI-driven framework using non-orthogonal multiple access (NOMA) to improve connectivity in next-generation wireless networks for UAVs. This integration supports simultaneous multitasking among UAVs, demonstrating that AI can significantly enhance the functionality and deployment of UAV technologies in a variety of applications, including logistics and emergency response.

The urban environment presents various challenges for the application of UAV and UAM technologies in navigation and guidance. Özdemir et al. (2023) highlight the critical impact of urban features on UAV navigation systems, stating that AI can help overcome out-of-line-of-sight challenges typically encountered in dense environments, thus improving mission reliability. Furthermore, to ensure the success of UAM initiatives, urban air traffic management systems need to evolve rapidly in response to increasing air traffic. Shrestha et al. (2021) highlights the urgent need for advanced air traffic management services that can efficiently meet increasing air traffic demands by accommodating and integrating various aircraft. This study by the authors details how AI can provide predictive analytics for traffic flow management, user demand forecasting, and conflict resolution in increasingly populated airspaces.

The adoption of UAV technology in urban environments is also influenced by public perception. Çınar and Tuncal (2023) thematically analyzed public opinions on UAVs, highlighting concerns related to security, privacy, and environmental impacts. The integration of AI not only addresses operational challenges but also plays a vital role in ensuring transparency and trust in public opinion regarding UAV use. Regulatory frameworks remain a critical area for future research and development. Xu et

al. (2022) suggest that a hierarchical federated registry infrastructure can support scalability and security in UAM networks, emphasizing the need for robust regulatory mechanisms that guarantee secure and efficient operations as UAM technologies evolve.

The integration of AI into UAV and UAM operations is rapidly advancing, offering new opportunities for efficient urban transportation and logistics. As evidenced in the existing literature, AI plays a transformative role in enhancing navigation autonomy, operational efficiency, communication reliability, and public confidence in UAV technologies. Continuous research and innovation are essential to address the regulatory, safety, and public acceptance challenges accompanying this evolution. Future research focuses on developing comprehensive regulatory frameworks, enhancing AI algorithms for superior decision-making, and addressing public concerns through transparent communication about the benefits and risks associated with UAV and UAM applications.

ARTIFICIAL INTELLIGENCE IN AUTONOMOUS FLIGHT SYSTEMS

The integration of AI into autonomous flight systems represents a significant advancement that will reshape the roles of pilots in the aviation sector and enhance the safety and efficiency of air travel. The development of autonomous flight systems relies on the application of AI and MOD technologies. Du (2025), addressing the impact of automation systems on commercial aircraft, emphasizes that significant improvements in flight safety have been achieved through automation. However, reliance on autonomous systems raises concerns about the reduction of pilots' manual flight skills and the increased workload when encountering unexpected system behaviors. This phenomenon underscores a critical challenge in the evolution of autonomous flight systems: the need to increase automation while maintaining pilot competence. In this context, Pashakhanlou (2019) highlights the potential of pilotless aircraft driven by technological advancements in the field of autonomy. The exploration of fully autonomous aircraft raises a critical question: Will pilots still play a role, or will pilotless aircraft completely redefine air travel?

AI continues to transform the way aviation operations are conducted by improving decision-making processes in autonomous flight systems. Kabashkin et al. (2024) address the role of intelligent assistants that can

enable single-pilot operations and AI-assisted air traffic management in aviation. According to the study, the integration of AI-assisted tools and systems enhances flight safety by increasing pilots' situational awareness and decision-making abilities. This synergy is also noted in the study by Ortner et al. (2022). In Ortner et al.'s study, an augmented air traffic control system where AI acts as a digital support system is presented. This approach improves safety management by enabling more effective prediction and management of air traffic collisions. The ability of AI systems to analyze large datasets and identify patterns significantly enhances human capabilities, increasing the reliability of flight operations.

Despite advances in the field of AI, the role of human emotional intelligence remains critical, as highlighted in the research by Beling & Wild (2021). Their study examined the relationship between pilots' emotional intelligence and decision-making, concluding that emotional intelligence is vital for effective performance, particularly under pressure. The evolving nature of autonomous flight systems necessitates the integration of emotional intelligence with AI capabilities, as pilots will increasingly work alongside intelligent systems and require the use of human judgment alongside machine analytics. Furthermore, Dugger et al. (2022), by examining pilots' emotional intelligence characteristics, established a framework for understanding how pilots perceive emotional responses and how these can impact their capabilities in autonomous flight environments. This understanding has the potential to lead to more effective training programs that enhance both technical skills and emotional intelligence, thereby optimizing the interaction between humans and machines.

The transition to autonomous flight systems also presents challenges. As highlighted in the literature, pilots face increased cognitive loads when autonomous systems exhibit unexpected behaviors, leading to increased stress and potential operational risks (Du, 2025). Kirwan (2024) emphasizes the need for strong safety cultures to adapt to technological changes in aviation. Therefore, it is crucial to ensure that pilots are equipped for autonomous environments while maintaining basic human supervision. On the other hand, regulatory frameworks play a significant role in the future of autonomous flight systems. The study by Paramasivam et al. (2023) argues for addressing AI-related certification challenges in aviation, highlighting the importance of establishing guidelines that ensure the reliability and safety of autonomous technologies.

In conclusion, the future of autonomous flight systems is intertwined with the development of AI technologies, which promise significant transformations in the aviation world. While automation offers numerous advantages in terms of safety and operational efficiency, it also presents challenges requiring careful consideration of the roles of pilots and the emotional intelligence needed in these evolving systems. As autonomous flight systems become an indispensable part of air travel, the integration of

AI in aviation must balance technological innovation with the human element to ensure safety, efficiency, and public confidence.

ARTIFICIAL INTELLIGENCE IN AVIATION SAFETY

The integration of AI into aviation safety applications represents a significant shift toward enhancing operational reliability and risk management in the field. AI technologies, particularly AI algorithms and predictive analytics, are increasingly being used to interpret large amounts of data from aircraft operations, thus significantly contributing to flight safety (Borjalilu et al., 2023; Kabashkin et al., 2023; Sathyananda et al., 2024). The rapidly increasing technological advancements in the aviation sector are attracting researchers' attention to the role of AI in supporting safety across a wide range of areas, including pilot decision-making processes, system monitoring, and maintenance.

One of the primary contributions of AI to flight safety is the improvement in cockpit crew performance evaluation. Borjalilu et al. (2023) highlight the applicability of predictive analytics in real-time operational contexts by demonstrating how integrated AI models can predict safety performance based on flight data. Using a comprehensive approach involving decision frameworks, data preparation, and model evaluation, this study shows critical pathways to enhance cockpit safety through data-driven insights. Furthermore, understanding psychological factors influencing pilot behavior, such as stress, safety attitudes, and experience, demonstrates how AI can enhance human decision-making in high-risk environments (Gautam & Garg, 2021). Pilots' attitudes toward safety can significantly impact their operational effectiveness, and AI can potentially serve as a tool to improve awareness and implementation of safety measures.

On the other hand, the potential of AI to improve aircraft maintenance and reliability has become a significant research focus. As expressed in the studies conducted by X. Liu et al. (2023) and Nie et al. (2022), the effectiveness of predictive maintenance techniques supported by AI demonstrates how AI can improve the monitoring and evaluation of critical systems in aircraft, including engines and load estimations. By detecting potential failures before they occur, aviation safety is significantly enhanced, with reduced maintenance times and a greater emphasis on proactive maintenance strategies.

Air traffic management can also benefit from AI innovations in the context of enhancing safety. The adoption of AI in air traffic control systems can improve the analysis of flight trajectories and the detection of anomalies in these trajectories (Liu et al., 2023; Xie et al., 2021). Methods utilizing deep learning and pattern recognition techniques contribute to resolving collisions in areas with heavy air traffic and optimizing airspace utilization. This improvement in operational efficiency not only facilitates better management of flight routes but also minimizes the likelihood of dangerous encounters.

However, it should be noted that while the aviation sector adopts advanced technologies, it also faces various challenges, particularly in the interpretation and application of AI predictions. The non-transparent nature of many AI algorithms makes it difficult to build trust and acceptance among aviation professionals, which creates difficulties in establishing a positive safety culture (Kirwan, 2024). It is stated that establishing safety measures and transparency in AI applications will significantly contribute to the development of a safety culture (Kirwan, 2024). On the other hand, the analysis of comprehensive flight data is essential for gathering operational safety information. As stated in the study by Oehling and Barry (2019), AI has enabled the identification of urgent safety issues that traditional methods might overlook. A shift to a more data-driven approach requires a reassessment of existing safety monitoring frameworks and the inclusion of AI as a fundamental element in future aviation safety strategies.

ARTIFICIAL INTELLIGENCE APPLICATIONS IN AVIATION SECURITY

AI applications in aviation security refer to efforts aimed at both enhancing security and increasing efficiency in the air transport sector. For example, AI-powered surveillance systems have emerged as a crucial component of aviation security, significantly increasing the capacity to monitor and analyze security threats in real time. For instance, a study by Al. J. (2023) highlights the integration of advanced detection technologies into video surveillance, reducing latency and enabling uninterrupted monitoring even in low-bandwidth scenarios. This capability allows security personnel to respond quickly to urgent threats while also streamlining surveillance processes. Furthermore, Nikita et al. (2023) examine an advanced CCTV project utilizing AI, MCV, and OpenCV technology to improve video

analysis, enhance real-time monitoring, and increase the accuracy of threat detection. These systems, using AI for video analysis, have the potential to both optimize security performance and significantly reduce security risks at airports.

AI plays a critical role in risk assessment within aviation security frameworks, in addition to improving oversight. Research by Hu et al. (2025) highlights the need for intelligent automated detection algorithms to reduce inefficiencies common in manual security checks. This integration enhances security effectiveness by addressing human limitations such as fatigue and error-prone behavior. Furthermore, the framework proposed by Álvarez et al. (2023) for emergency management uses reinforcement learning to evaluate and develop AI-driven methodologies for managing various security issues. The emphasis on simulation environments ensures rigorous testing and validation of these systems before deployment, thus increasing confidence in AI applications in aviation security environments. However, the use of AI in aviation security also brings significant ethical and regulatory challenges. A study by Al. N. (2023) emphasizes the need for transparent decision-making processes, highlighting the necessity of developing explainable AI models to maintain ethical standards in security applications. With increasing public awareness of privacy and security issues, effective regulations should be implemented to regulate the use of these technologies and ensure compliance with ethical guidelines (Al, 2023). Furthermore, ongoing research on the effectiveness of AI tools should address potential risks associated with hostile M&A to prevent the exploitation of AI systems by malicious actors, as noted by Ijiga et al. (2024).

The intersection of emerging technologies such as AI and IoT devices adds another dimension to aviation security strategies. The application of AI together with IoT devices facilitates comprehensive monitoring capabilities that can rapidly detect and respond to complex security threats. Literature examining these synergies shows that sophisticated algorithms can optimize data analysis from numerous sources, thereby greatly enhancing situational awareness in airport operations (Haley et al., 2023).

In conclusion, the integration of AI into aviation security presents numerous opportunities to enhance security through improved oversight mechanisms, risk assessment frameworks, and automation of security procedures. However, these developments require careful consideration of ethical implications and regulatory compliance and necessitate continuous research and development to effectively overcome the related challenges.

ARTIFICIAL INTELLIGENCE IN HUMAN FACTORS

The emergence of AI in aviation has profound implications for the roles of both pilots and aircraft maintenance technicians. While AI technologies deliver improvements in safety, efficiency, and operational capabilities, they also necessitate a critical examination of the human factors involved in aviation. Kabashkin et al. (2021) highlight the need for a simultaneous reassessment of the training and skill sets required for aviation professionals as AI-assisted tools become more prevalent, from improving flight planning through preemptive management to enhancing maintenance processes through predictive analytics. This focus on technology and human capabilities confirms the importance of developing training programs that address the changing landscape of aviation work. Similarly, the study by Ning et al. (2021) examines operator models for decision-making in AI systems. Pilots and technicians must adapt to effectively using AI tools, which necessitates a shift towards more data-driven decision-making paradigms that complement traditional aviation practices. This study by the authors highlights the need for a deeper understanding of AI and related technologies in aviation training and education programs to enable personnel to effectively collaborate with these systems.

In aviation, safety depends not only on technical competence but also on the effectiveness of human factors in conjunction with AI technologies. Lang et al. (2024) emphasizes the importance of understanding human factors in AI integration, stating that effective collaboration between humans and AI can enhance the safety and reliability of aviation operations. Developing interfaces that facilitate seamless interaction between pilots and AI systems is crucial for minimizing the risk of errors and optimizing performance. Olaganathan (2024) specifically addresses the critical role of human resources in addressing the complexities and challenges associated with AI, particularly in operational environments. The interaction between human cognition and AI algorithms requires focusing on human factors such as workload management, communication, and teamwork, and designing systems to support rather than overwhelm operators.

As AI technologies become increasingly integrated into aviation operations, continuous training and adaptation are vital. The literature suggests that traditional training paradigms may be insufficient in preparing personnel for AI-assisted environments. According to Wu and Yang (2021), mixed reality and other data visualization techniques can enhance training for pilots and maintenance technicians by providing interactive and immersive learning experiences. This approach aims to prepare personnel for the complexities of AI integration in aviation by focusing on operational readiness and adaptation. Furthermore, the ability of AI systems to learn from human interactions is critical in improving their operational effectiveness. Altundağ's (2022) study on human-piloted drone racing

highlights how understanding human behavior and responses can influence the design of autonomous systems. Insights from such studies can facilitate the development of more intuitive AI systems that integrate well with human operators and enhance overall safety and performance.

As the aviation industry moves toward increasing automation, ethical considerations regarding the roles of pilots and maintenance technicians need to be addressed. The literature highlights the need for corporate governance structures that consider the impact of AI on job safety, professional identity, and the psychological aspects of working with AI systems. Research on AI in autonomous navigation by Altundag and Wynn (2024) provides an example of the ethical challenges (such as accountability in case of system failures or accidents) posed by developing AI in aviation. Furthermore, Borjalilu et al. (2023) argue that ongoing advancements in autonomous flight systems necessitate a proactive approach to training and operational protocols. Ensuring that pilots and technicians maintain their competence in an automated environment will be critical to maintaining safety standards and operational reliability.

The integration of AI into aviation is significantly transforming the roles of pilots and maintenance technicians, creating new demands in terms of skill sets, safety considerations, and training methodologies. While AI technologies have great potential to increase operational efficiency and safety, there is an urgent need to address the associated human factors. Future research should continue to explore the evolving dynamics between human operators and AI, focusing on training frameworks, ethical considerations, and the development of systems that enhance collaboration between humans and technology.

ARTIFICIAL INTELLIGENCE AND LEGAL ISSUES IN AVIATION

The intersection of AI and legal issues in aviation is becoming an increasingly critical area of study, driven by rapid technological advancements and the need for up-to-date regulatory frameworks. As AI systems become more integrated into aviation operations, questions arise regarding legal liability in incidents involving these technologies. Kamyshanskiy et al. (2021) highlight the complexities surrounding the attribution of liability when AI systems cause harm or loss. Traditional legal frameworks may struggle to accommodate the autonomous nature of AI,

leading to debates about how liability should be distributed among developers, operators, and users. This challenge necessitates a reassessment of existing legal structures to ensure accountability without hindering innovation. Furthermore, Wen and Tong (2023) focus on whether AI can be considered a legal issue. The authors argue that the widespread application of AI raises new legal issues regarding attribution of rights and responsibilities. In conclusion, understanding the legal status of artificial intelligence and clarifying its role in aviation is crucial for establishing a functional regulatory framework.

The ethical implications of AI in aviation encompass multifaceted concerns such as data privacy, safety, and potential biases inherent in AI algorithms. Nie's (2023) study highlights the need for robust legal and political legislation that supports ethical standards not only for the regulation of AI technologies but also for their applications. This perspective aligns with the roadmap published by the European Union Aviation Safety Agency (EASA), which emphasizes the need for ethical guidelines in the use of AI in aviation, as discussed by Emanuilov and Dheu (2021). On the other hand, parallel to the development of AI technologies in aviation, the regulatory environment is also evolving, with a significant emphasis placed on the certification of AI systems used in aviation applications. Kaddoura and Husseiny's (2023) study, highlighting the ethical issues arising from the integration of AI, states that the development of regulations should address ethical concerns to promote public trust and compliance with regulations.

The legal environment surrounding UAVs presents unique challenges, particularly as laws increasingly intersect with AI regulations. Scott et al. (2024), evaluating EU legal frameworks related to UAVs and AI, argue that a comprehensive examination of how existing regulations might impact the management of AI technologies in this specific context is necessary. The need for clear definitions, operational guidelines, and liability assessments for AI-incorporated UAVs is vital to ensuring safe and responsible operations. Furthermore, the application of AI in passenger management and operational logistics at airports also raises potential legal issues. Raafat (2023) addresses the operational impact of AI at airports, combining operational efficiency with regulatory compliance. The regulation of intelligent airport systems using AI for enhanced control and analysis necessitates updating the legal frameworks governing aviation operations.

The integration of AI into the legal framework in aviation requires addressing the inherent complexity of AI systems and their impact on traditional legal concepts. Kirwan (2024) notes that AI technologies can increase operational efficiency but also require safety cultures within aviation organizations to evolve to adapt to new operational paradigms. Additionally, regulatory bodies such as the International Civil Aviation Organization (ICAO) face significant challenges in developing consistent guidelines that reflect the needs of rapidly advancing AI technologies.

Paramasivam et al. emphasize the importance of creating a regulatory framework that balances innovation with safety, highlighting the need for guidelines that address the unique characteristics of AI (Wen and Tong, 2023).

The integration of AI into aviation presents significant legal opportunities and challenges. Literature emphasizes the need to develop legal frameworks that can accommodate the unique characteristics of AI while ensuring accountability and public safety. In this context, ongoing research should continue towards developing comprehensive regulatory structures that address the impacts of AI technologies in aviation and the ethical, safety, and operational concerns they raise.

THE ETHICAL DIMENSION OF ARTIFICIAL INTELLIGENCE IN DECISION-MAKING PROCESSES

The integration of AI into aviation decision-making processes raises several ethical dimensions requiring careful consideration and discussion. As AI technologies evolve, they increasingly intersect with operational aspects of aviation, impacting pilots, maintenance technicians, and regulatory practices. Accountability for AI-assisted decisions has become a major concern in the aviation sector. As AI systems become an integral part of operations, determining who is responsible in the event of failure or adverse consequences is vital. Jobin et al. (2019) highlighted concerns regarding the delegation of decision-making authority to AI systems, arguing that reliance on AI may lead to less scrutiny of the consequences of decisions made. This raises significant ethical questions about the potential for human operators to evade responsibility, thus making it difficult to assign accountability in critical aviation contexts. Fang (2024) emphasizes the need for an ethical assessment of AI applications, particularly in the aviation sector, where decision-making processes can have serious consequences. Focusing on issues such as privacy, discrimination, and erroneous results due to algorithmic bias, Fang highlights the need for frameworks that govern accountability in AI systems. This is critical to ensuring accountability without sacrificing innovation or operational efficiency.

On the other hand, establishing ethical codes for AI in aviation is essential. Laestadius et al. (2022) argue that AI development should prioritize transparency, fairness, and accountability. Furthermore, the ethical

implications of AI need to be integrated into regulatory frameworks to ensure public trust and safety in aviation operations. Emanuilov and Dheu (2021) discuss regulatory approaches, emphasizing that comprehensive and morally sound frameworks promote responsible AI integration in aviation, supporting safe operations while minimizing ethical risks. Additionally, Mittelstadt et al. (2016) argue that the complexity of AI systems and decision-making processes complicates our understanding of ethical implications. They also specifically call for an adaptable framework that can address the evolving landscape of AI technology as systems become more integrated into operational processes. Almpani et al. (2023) suggest that the ethical decision-making process in AI systems should focus on maintaining human oversight and ensuring that critical decisions remain subject to human judgment. This perspective supports the idea that while AI can increase efficiency, human input is indispensable for overcoming the ethical complexities of operational decisions in aviation.

The ethical challenges posed by AI go beyond compliance and regulation. They require a proactive approach to integrating moral frameworks into decision-making processes. As Ladak (2023) suggests, acknowledging the moral impact of AI systems is crucial for understanding their role in decision-making. Zhu and Chu (2025), analyzing the moral considerations surrounding interactions with AI assistants, highlight the need for ethical codes that reflect the moral responsibilities people have in interpersonal relationships. Such considerations are particularly important in aviation, where decisions can affect numerous stakeholders, including passengers, crew members, and aircraft operators.

The ethical dimensions of AI in aviation decision-making processes present numerous challenges and opportunities for future research. Academics and practitioners must continue to investigate how AI can be ethically integrated into aviation operations by ensuring accountability, enhancing safety, and fostering trust among stakeholders. The current literature highlights the importance of developing robust ethical frameworks, comprehensive training programs, and collaborative environments to effectively bridge the gap between human operators and AI systems. Consequently, as the aviation sector continues to adopt AI technologies, addressing the ethical implications of these innovations will be critical in shaping the future landscape of aviation decision-making. A continuous dialogue centered around accountability, transparency, and human factors will be vital for overcoming the complexities brought about by AI in aviation.

CONCLUSION

The integration of AI into aviation decision-making processes represents a transformative era that brings both extraordinary opportunities and significant ethical concerns. The emergence of AI technologies has the potential to increase operational efficiency, improve safety, and enhance decision-making accuracy across various aviation sectors, including flight operations and maintenance management. However, the deployment of AI raises urgent ethical questions regarding accountability, transparency, and the preservation of human oversight. As highlighted by Booyse and Scheepers (2023), ethical concerns surrounding AI decisions require robust frameworks that prioritize fairness and accountability, particularly in high-risk situations. The potential for bias in AI algorithms, especially when trained with non-representative data, underscores the need for careful consideration to ensure ethical standards are maintained in operational settings. Similarly, Paschen et al. (2020), discussing the impacts of AI on human work, emphasize the need for a collaborative approach where human intelligence complements AI capabilities. This symbiotic relationship is critical in maintaining the fundamental role of human judgment when faced with complex decision scenarios. Professionals must learn to interpret and critically evaluate AI-generated recommendations, reinforcing the importance of training programs that equip aviation personnel with the skills to act responsibly in this new environment. Additionally, literature by Benzinger et al. (2023) and Piano (2020) emphasizes the role of ethical frameworks in guiding the deployment of AI. Establishing comprehensive guidelines for responsible AI deployment in aviation is essential for building trust among stakeholders. This ethical governance should be adaptable to allow for the continuous evolution of AI technologies and their impacts.

In summary, while AI has the potential to transform aviation decision-making processes, addressing its ethical dimensions is of paramount importance. As industry continues to integrate AI into its operations, ongoing dialogue and collaboration among policymakers, industry stakeholders, and researchers are vital to establishing frameworks that promote ethical AI practices. These frameworks should enhance public trust in AI technologies by ensuring accountability and transparency, paving the way for a safer and more efficient aviation environment.

REFERENCES

Al., J. (2023). Innovative AI-driven automation system leveraging advanced perceptive technologies to establish an ideal self-regulating video surveillance model. TJIPT, 44(2). https://doi.org/10.52783/tjjpt.v44.i2.220

Al., N. (2023). AI in cybersecurity: threat detection and response with machine learning. TJIPT, 44(3), 38-46. https://doi.org/10.52783/tjjpt.v44.i3.237

Almpani, S., Stefaneas, P., & Frangos, P. (2023). Formalization of ethical decision making. International Journal of Extreme Automation and Connectivity in Healthcare, 5(1), 1-13. https://doi.org/10.4018/ijeach.320488

Alvarez, L. E., Brittain, M., & Breeden, K. (2023, October). Towards a standardized reinforcement learning framework for AAM contingency management. In 2023 IEEE/AIAA 42nd Digital Avionics Systems Conference (DASC) (pp. 1-6). IEEE. https://doi.org/10.1109/dasc58513.2023.10311174

Benzinger, L., Ursin, F., Balke, W., Kacprowski, T., & Salloch, S. (2023). Should artificial intelligence be used to support clinical ethical decision-making? a systematic review of reasons. BMC Medical Ethics, 24(1). https://doi.org/10.1186/s12910-023-00929-6

Booyse, D. and Scheepers, C. (2023). Barriers to adopting automated organisational decision-making through the use of artificial intelligence. Management Research Review, 47(1), 64-85. https://doi.org/10.1108/mrr-09-2021-0701

Borjalilu, N., Jolai, F., & Tavakoli, M. (2023). Cockpit crew safety performance prediction based on the integrated machine learning multi-class classification models and Markov chain. Aviation, 27(3), 152-161.

Chang, Y. and Yeh, C. (2010). Human performance interfaces in air traffic control. Applied Ergonomics, 41(1), 123-129. https://doi.org/10.1016/j.apergo.2009.06.002

Çınar, E. and Tuncal, A. (2023). The future of UAVs in urban air mobility: public perception and concerns. Türkiye İnsansız Hava Araçları Dergisi, 5(2), 50-58. https://doi.org/10.51534/tiha.1381175

Emanuilov, I. and Dheu, O. (2021). Flying high for AI? perspectives on EASA's roadmap for AI in aviation. Air and Space Law, 46(Issue 1), 1-28. https://doi.org/10.54648/aila2021001

Fang, S. (2024). Moral relevance approach for AI ethics. Philosophies, 9(2), 42. https://doi.org/10.3390/philosophies9020042

Gautam, A., & Garg, N. (2021). Impact of perceived stress safety attitude and flight experience on hazardous event involvement of aviators. Def Life Sci J, 6, 235-241.

Haley, J., Tucker, J., Nesper, J., Daniel, B., & Fish, T. (2023, June). Multi-agent collaboration environment simulation. In Synthetic data for artificial intelligence and machine learning: tools, techniques, and applications (Vol. 12529, pp. 208-213). SPIE. https://doi.org/10.1117/12.2663828

Hu, Y., Fang, Y., Qiu, Y., & Gao, Y. (2025, February). Research on the application of airport security target detection algorithm under the background of low-altitude economy. In Fourth International Computational Imaging Conference (CITA 2024) (Vol. 13542, pp. 1522-1538). SPIE. https://doi.org/10.1117/12.3057311

Ijiga, O., Idoko, I., Ebiega, G., Olajide, F., Olatunde, T., & Ukaegbu, C. (2024). Harnessing adversarial machine learning for advanced threat detection: ai-

driven strategies in cybersecurity risk assessment and fraud prevention. Open Access Research Journal of Science and Technology, 11(1), 001-004. https://doi.org/10.53022/oarjst.2024.11.1.0060

Jain, R. and Ramachandran, N. (2015). A dea study of airlines in India. Asia Pacific Management Review, 20(4), 285-292. https://doi.org/10.1016/j.apmrv.2015.03.004

Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of ai ethics guidelines. Nature Machine Intelligence, 1(9), 389-399. https://doi.org/10.1038/s42256-019-0088-2

Kabashkin, I., Misnevs, B., & Zervina, O. (2023). Artificial intelligence in aviation: New professionals for new technologies. Applied Sciences, 13(21), 11660.

Kabashkin, I., Mišņevs, B., & Zervina, O. (2023). Artificial intelligence in aviation: new professionals for new technologies. Applied Sciences, 13(21), 11660. https://doi.org/10.3390/app132111660

Kaddoura, S. and Husseiny, F. (2023). The rising trend of metaverse in education: challenges, opportunities, and ethical considerations. Peerj Computer Science, 9, e1252. https://doi.org/10.7717/peerj-cs.1252

Kamyshanskiy, V., Stepanov, D., Mukhina, I., & Kripakova, D. (2021). Digital society, artificial intelligence and modern civil law: challenges and perspectives. SHS Web of Conferences, 109, 01016. https://doi.org/10.1051/shsconf/202110901016

Kirwan, B. (2024). The impact of artificial intelligence on future aviation safety culture. Future Transportation, 4(2), 349-379. https://doi.org/10.3390/futuretransp4020018

Ladak, A. (2023). What would qualify an artificial intelligence for moral standing?. Ai and Ethics, 4(2), 213-228. https://doi.org/10.1007/s43681-023-00260-1

Laestadius, L., Bishop, A., Gonzalez, M., Illenčík, D., & Campos-Castillo, C. (2022). Too human and not human enough: a grounded theory analysis of mental health harms from emotional dependence on the social chatbot replika. New Media & Society, 26(10), 5923-5941. https://doi.org/10.1177/14614448221142007

Lerro, A. and Battipede, M. (2021). Safety analysis of a certifiable air data system based on synthetic sensors for flow angle estimation. Applied Sciences, 11(7), 3127. https://doi.org/10.3390/app11073127

Liu, X., Su, B., Zhang, C., & Liu, H. (2023, April 15-16, 2023). Research on aircraft automation warning model based on gradient boosting tree algorithm. 5th International Conference on Automatic Control and Mechatronic Engineering (ACME 2023), Chongqing, China.

Liu, Y., Wang, M., Zhong, Z., Zhong, K., & Wang, G. (2023). An efficient trajectory negotiation and verification method based on spatiotemporal pattern mining. International Journal of Aerospace Engineering, 2023(1), 5530977.

Magrabi, F., Ammenwerth, E., McNair, J., Keizer, N., Hyppönen, H., Nykänen, P., … & Georgiou, A. (2019). Artificial intelligence in clinical decision support: challenges for evaluating ai and practical implications. Yearbook of Medical Informatics, 28(01), 128-134. https://doi.org/10.1055/s-0039-1677903

Mittelstadt, B., Allo, P., Taddeo, M., Wachter, S., & Floridi, L. (2016). The ethics of algorithms: mapping the debate. Big Data & Society, 3(2). https://doi.org/10.1177/2053951716679679

Mou, B. and Yang, X. (2023). Analysis of the role of compliance plan in ai criminal risk prevention-take ai criminal risk in network communication as example. International Journal of Communication Networks and Information Security, 15(3), 154-167. https://doi.org/10.17762/ijcnis.v15i3.6242

Nguyen, B., Sonnenfeld, N., Finkelstein, L., Alonso, A., Gomez, C., Duruaku, F., … & Jentsch, F. (2023). Using AI tools to develop training materials for aviation: ethical, technical, and practical concerns. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 67(1), 1343-1349. https://doi.org/10.1177/21695067231192904

Nie, L., Xu, S., Zhang, L., Yin, Y., Dong, Z., & Zhou, X. (2022). Remaining useful life prediction of aeroengines based on multi-head attention mechanism. Machines, 10(7), 552.

Nie, J. (2023). Research on the relationship between achievement motivation and individual emotional state: the promoting effect of positive emotions. Applied & Educational Psychology, 4(10). https://doi.org/10.23977/appep.2023.041015

Nikita, M., Kashyap, L., Singh, B., & Tyagi, D. (2023). Ai enabled advance surveillance system. International Research Journal of Modernization in Engineering Technology and Science. https://doi.org/10.56726/irjmets37500

Oehling, J., & Barry, D. J. (2019). Using machine learning methods in airline flight data monitoring to generate new operational safety knowledge from existing data. Safety science, 114, 89-104.

Ozdemir, Y. E., Isik, O. K., Geragersian, P., Petrunin, I., Grech, R., & Wong, R. (2023). Performance enhancement of low-cost INS/GNSS navigation system operating in urban environments. In AIAA SCITECH 2023 Forum (p. 2241). https://doi.org/10.2514/6.2023-2241

Paschen, J., Wilson, M., & Ferreira, J. (2020). Collaborative intelligence: how human and artificial intelligence create value along the b2b sales funnel. Business Horizons, 63(3), 403-414. https://doi.org/10.1016/j.bushor.2020.01.003

Piano, S. (2020). Ethical principles in machine learning and artificial intelligence: cases from the field and possible ways forward. Humanities and Social Sciences Communications, 7(1). https://doi.org/10.1057/s41599-020-0501-9

Rawat, B., Bist, A., Apriani, D., Permadi, N., & Nabila, E. (2022). Ai based drones for security concerns in smart cities. Aptisi Transactions on Management, 7(2), 125-130. https://doi.org/10.33050/atm.v7i2.1834

Sathyananda S. H. V., Manoj, B. N., Zaiba, N. & Pandey, M. (2024). A Study of Artificial Intelligence in Aviation Management. QTanalytics Publication, 108–114. https://doi.org/10.48001/978-81-966500-8-7-11

Sathyananda, H. V. S., Manoj, N. B., Zaiba, N., & Pandey, M. (2024). A Study of Artificial Intelligence in Aviation Management. In A Modern Approach to AI- Integrating Machine Learning with Agile Practices. QTanalytics Publication. https://doi.org/https://doi.org/10.48001/978-81-966500-8-7-11

Scott, B., Custers, B., & Lahmann, H. (2024). Drone regulation and ai law: assessing the intersection of the EU legal frameworks for unmanned aircraft and artificial intelligence. Air and Space Law, 49(Issue 6), 565-584. https://doi.org/10.54648/aila2024044

Xu, R., Wei, S., Chen, Y., Chen, G., & Pham, K. (2022). Lightman: a lightweight microchained fabric for assurance-and resilience-oriented urban air mobility

networks. Drones, 6(12), 421. https://doi.org/10.20944/preprints202211.0015.v1
Yang, Z., Chen, M., Liu, X., Liu, Y., Chen, Y., Cui, S., … & Poor, H. (2021). Artificial intelligence-driven UAV-NOMA-MEC in next generation wireless networks. https://doi.org/10.48550/arxiv.2101.11681
Zhang, S., Zeng, Y., & Zhang, R. (2019). Cellular-enabled UAV communication: a connectivity-constrained trajectory optimization perspective. IEEE Transactions on Communications, 67(3), 2580-2604. https://doi.org/10.1109/tcomm.2018.2880468
Zhu, Y. and Chu, J. (2025). Should we express gratitude in human–ai interaction: the online public's moral stance toward artificial intelligence assistants in China Public Understanding of Science, 34(6), 717-733. https://doi.org/10.1177/09636625251314337
Zhou, T., Zhang, J., & Baasansuren, D. (2018). A hybrid HFACS-BN model for analysis of Mongolian aviation professionals' awareness of human factors related to aviation safety. Sustainability, 10(12), 4522. https://doi.org/10.3390/su10124522

Bibliometric Analysis in Tourism Research: The Structure, Thematic Transformations, and Development Dynamics of the Literature

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ABSTRACT

This study aims to examine the role, scope, and analytical contributions of bibliometric analysis in tourism research from a comprehensive perspective. The rapid growth of publication volume and the increasingly interdisciplinary nature of tourism studies have made it difficult to systematically monitor the literature using traditional review approaches. In this context, bibliometric analysis has emerged as a powerful methodological tool for organizing, comparing, and interpreting a fragmented and multilayered body of tourism knowledge.

The study discusses how bibliometric analysis enables the identification of thematic trends, shifts in research agendas, and the intellectual structure of the tourism field. By examining publication and citation patterns, keyword co-occurrence networks, leading authors and journals, and academic collaboration structures, the analysis reveals how tourism research has evolved around specific themes over time. In particular, the growing prominence of topics such as sustainability, digitalization, and smart tourism reflects broader social, technological, and economic transformations shaping the field.

Furthermore, bibliometric analysis facilitates the exploration of the intellectual architecture of tourism research by identifying influential scholars, core journals, knowledge production centers, and dominant theoretical frameworks. Insights into which theories are extensively applied and which perspectives remain underexplored contribute to the identification of research gaps and the development of new research directions. Owing to its data-driven, transparent, and reproducible nature, bibliometric analysis enhances methodological rigor and provides strategic guidance for academic decision-making processes, including journal selection, research planning, and institutional policy development.

In conclusion, this study demonstrates that bibliometric analysis should be regarded not merely as a quantitative descriptive technique but as a robust analytical approach for understanding the past evolution, current structure, and future trajectories of tourism research. In this sense, numerical indicators function as silent yet powerful narrators of the academic development of tourism studies.

Keywords – Tourism research, bibliometric analysis, research trends, intellectual structure, thematic evolution

INTRODUCTION

Bibliometric analysis is used in tourism-themed research to organize the expanding and multi-layered literature into a regular, comparable, and interpretable form. In the field of tourism, bibliometric analysis transforms scattered literature into a traceable landscape of thought (Hall, 2011:16).

Tourism research draws on various disciplines and has a rapidly growing volume of publications. Bibliometric analysis provides a comprehensive overview by structuring this scattered literature around specific themes, authors, journals, and time periods (Benckendorff and Zehrer, 2013:121). Thanks to bibliometric analysis, it is possible to objectively track which topics are on the rise, which themes are losing importance, and how the research agenda has changed over time. This is particularly important in dynamic fields such as sustainability, digitalization, and smart tourism. Bibliometric analysis examines the intellectual structure of the relevant field. The method reveals the intellectual architecture of the field by identifying leading authors, influential journals, academic collaboration networks, and knowledge production centers in tourism literature (Zupic and Čater, 2015:429).

Bibliometric analysis can be used to determine which theories are frequently used and which perspectives are limited. This allows for the development of new research topics and the justification of gaps in the literature (Donthu et al., 2021: 285). Traditional literature reviews are more open to interpretation. Bibliometric analysis, on the other hand, relies on numerical data, produces transparent and reproducible results, and increases methodological reliability. The findings obtained serve as a reference that supports researchers in selecting topics and journals, institutions in formulating research policies, and editors in developing publication strategies. In tourism-themed research, bibliometric analysis is used not only to count the literature but also to understand where the field has come from and where it is headed. In this context, numbers become silent but powerful narrators telling the academic story of tourism (Small, 1973:265).

Bibliometric analysis stands out as an effective method in tourism-themed research, organizing the increasingly expansive and multi-layered academic literature into a regular, comparable, and interpretable form. The rapid increase in the number of studies produced in the field of tourism and

their interdisciplinary nature make it difficult to evaluate the literature holistically; this situation increases the need for systematic and objective analysis methods. Bibliometric analysis transforms this scattered literature into a traceable landscape of thought, revealing the overall picture of the field (Aria and Cuccurullo, 2017:959).

Tourism research draws on various disciplines such as sociology, economics, geography, business, and technology, and this diversity leads to a continuous increase in the volume of publications. Bibliometric analysis structures this extensive literature around specific themes, authors, journals, and time periods, revealing the dynamics of the field's development. This method allows for the objective tracking of which topics are on the rise, which themes are losing importance over time, and how the research agenda is transforming. Such analysis plays a critical role in understanding current trends, particularly in rapidly developing areas such as sustainability, digitalization, and smart tourism (Mulet-Forteza et al., 2019:819).

Bibliometric analysis not only reveals thematic trends but also enables the intellectual structure of the tourism field to be deciphered. Leading authors, influential journals, academic collaboration networks, and knowledge production centers can be identified through this method, thereby revealing the intellectual architecture of the field more clearly. This also makes visible the theoretical frameworks around which tourism studies are concentrated and the perspectives that remain relatively limited (Koseoglu et al., 2016:1).

Bibliometric analysis can identify which theories are frequently used and which approaches are underrepresented in the literature, thereby enabling the development of new research topics and justifying gaps in the literature. Compared to the interpretive nature of traditional literature reviews, bibliometric analysis increases methodological reliability by relying on numerical data and producing transparent and reproducible results. The findings facilitate topic and journal selection for researchers, contribute to shaping research policies for institutions, and help editors determine publication strategies (Koseoglu et al., 2019:1).

In this context, bibliometric analysis in tourism-themed research is considered not merely a tool for numerically describing the literature, but rather an analytical approach that enables understanding the field's past, present, and future directions. In this context, numerical indicators become

fundamental reference points that silently yet powerfully describe the academic development process of tourism.

The Role and Importance of Bibliometric Analysis in Tourism Research

Bibliometric analysis in tourism research is positioned as one of the fundamental methods for understanding, guiding, and structuring the rapidly growing and increasingly interdisciplinary literature. As academic production in the field increases, the need to evaluate this production not only quantitatively but also conceptually and theoretically has emerged. Bibliometric analysis responds to this need by making the general framework of tourism studies visible.

Tourism literature is shaped at the intersection of various disciplines such as sociology, economics, geography, business, environmental sciences, and technology. This multidisciplinary structure leads to diversification in research topics and a rapid increase in the volume of publications. Bibliometric analysis systematically classifies this extensive literature, revealing the themes around which the field is concentrated, which approaches have become dominant, and how the research agenda has evolved over time (Salouw et al., 2024:1415). Thus, the development trajectory of tourism research can be tracked from a holistic perspective.

Another important contribution of bibliometric analysis is its ability to analyze the intellectual structure of the tourism field. Leading authors, influential journals, international academic collaborations, and knowledge production centers can be identified using this method; the field's knowledge networks and academic interactions can be analyzed with concrete data. This reveals which research centers and academic communities play a leading role in tourism studies.

Furthermore, bibliometric analysis enables the identification of theoretical concentrations and research gaps. This method reveals which theories are frequently used and which conceptual frameworks are limited, thus providing a solid basis for developing new research topics. Compared to traditional literature reviews, bibliometric analysis produces more objective, transparent, and reproducible results, making it methodologically robust. (Paul and Criado, 2020).

In conclusion, bibliometric analysis is not merely a technique for quantitatively examining the literature in tourism research; it is a strategic

academic tool that enables understanding the intellectual accumulation, transformation, and future directions of the field. In this regard, it plays a central role in positioning scientific studies in the field of tourism and establishing new research agendas.

The Interdisciplinary Structure of Tourism Literature and the Increase in Publication Volume

The interdisciplinary nature of tourism literature and the increase in publication volume indicate not only quantitative growth in terms of bibliometric analysis, but also the increasing complexity of knowledge production and its evolution into a multi-centered structure. This situation provides both a strong rationale and a rich ground for bibliometric analysis.

Tourism is inherently an interdisciplinary field of research that overlaps with sociology, economics, geography, business, environmental sciences, cultural studies, and, in recent years, information technologies. This interdisciplinary structure leads to the simultaneous use of different theoretical approaches, methods, and conceptual frameworks in the literature. Bibliometric analysis, at this point, makes visible the conceptual intersections, theoretical transfer, and information circulation between studies from different disciplines. Common citation and keyword co-occurrence analyses reveal which disciplines have influenced tourism studies more and which concepts serve as interdisciplinary bridges (Wider et al., 2023:4; de Bruyn et al., 2023:3).

The increase in publication volume is transforming tourism literature into an increasingly fragmented and difficult-to-track structure. The growing number of articles, journals, and authors highlights the limitations of traditional literature reviews. Bibliometric analysis enables the systematic classification of this dense information production, allowing for the analysis of thematic clusters in the literature, trends over time, and the evolution of research focus (Cobo et al., 2011:1382). Thus, the increase in publication volume is transforming from a chaotic pile into meaningful patterns.

In this context, bibliometric analysis transforms interdisciplinary diversity and growth in publication volume not into a problem area, but rather into an analytical advantage. The contributions of different disciplines and the increasing number of publications produce data sets that reflect the intellectual richness of the field; bibliometric methods use these data sets to

reveal the intellectual structure, centers of power, and developmental dynamics of tourism research more clearly.

In conclusion, the interdisciplinary nature of tourism literature and the increase in publication volume can be considered an indicator of the field's maturation process in terms of bibliometric analysis. Bibliometric analysis maps the academic landscape of tourism studies by making this maturation measurable, comparable, and interpretable.

Monitoring Research Trends and Thematic Shifts Using Bibliometric Analysis

Bibliometric analysis functions as a tool that keeps track of the pulse of academic time in monitoring research trends and thematic shifts (Kumar et al., 2024:123). Going beyond individual studies, it reveals which directions a field is moving in, which concepts are gathering at the center, and which are slowly being pushed aside.

From a bibliometric analysis perspective, research trends are interpreted through increases or decreases in the number of publications, citation patterns, and changes in keyword usage. Concepts that are frequently repeated during a specific period emerge as themes that set the agenda for the field, while concepts that lose visibility over time indicate that research interest has shifted to other areas. In this context, bibliometric analysis allows for the tracking of thematic continuities and discontinuities in the literature using quantitative data (Nguyen et al., 2023:2).

Thematic shifts, however, are becoming clearer through keyword co-occurrence and time-based analyses. For example, while topics such as demand, destination marketing, or seasonal fluctuations were prominent in tourism literature during a certain period, the emergence of themes such as sustainability, digitalization, experience economy, and smart tourism as central topics in subsequent years can be interpreted as a concrete indicator of this transformation. Bibliometric analysis reveals such transitions not only intuitively but also through measurable patterns. This method tracks research trends while also indirectly reflecting the field's relationship with its social, technological, and economic contexts. Thematic shifts often parallel global crises, technological innovations, or policy priorities. Thus, bibliometric analysis demonstrates how tourism research interacts not only with academic but also with social dynamics (Bashir and Singh, 2022).

Finally, bibliometric analysis provides researchers with a strategic perspective for interpreting thematic shifts. This method can be used to determine which themes have reached saturation, which topics are on the rise, and where research gaps exist. In this respect, bibliometric analysis goes beyond being a tool for describing the past and serves as an analytical compass for the future direction of tourism research.

Examining the Intellectual Structure of the Tourism Field Through Bibliometric Analysis

Examining the intellectual structure of the tourism field through bibliometric analysis allows us to read the literature not merely as a collection of publications, but as a living ecosystem composed of relationships, influences, and information flows. This approach reveals who shapes tourism studies, through which intellectual lines, and in which centers.

Bibliometric analysis examines intellectual structures, particularly through citation, co-citation, and co-authorship networks. Citation analysis reveals which studies and authors have a decisive influence on the field, while co-citation analysis uncovers theoretical clusters and intellectual traditions in tourism literature through studies that are frequently cited together (Cobo et al., 2011:1384). These clusters are important in that they show which theoretical frameworks the field is structured around and which approaches occupy a central position.

Co-authorship and inter-institutional collaboration analyses reveal the geographical and institutional distribution of knowledge production in the field of tourism. Bibliometric indicators can be used to track which countries, universities, or research centers play a more active role in the development of the field. This shows that tourism research is shaped not only by individual academic efforts but also by institutional and international collaborations.

Bibliometric analysis also reveals the dynamic nature of intellectual structures. Through time-based analyses, it can be observed that certain authors or theoretical approaches come to the fore during specific periods, while some lines of thought lose their influence over time. This situation demonstrates that the field of tourism is not static; rather, it possesses a

structure that is constantly reshaped alongside social, economic, and technological changes (de Bruyn et al., 2023:1).

In this context, bibliometric analysis is a powerful method for mapping the intellectual structure of the tourism field. By making the field's intellectual centers, their surroundings, and the interactions between them visible, it offers researchers the opportunity to both position existing literature and contextualize new studies within this intellectual network. Thus, bibliometric analysis becomes an analytical guide that reads the past of tourism research and shapes its future.

Theoretical Concentrations, Research Gaps, and Identification of New Areas of Study

Bibliometric analysis allows us to read the literature as an intellectual topography that reveals which ideas are at the center and which are on the periphery, enabling us to identify theoretical concentrations, research gaps, and new areas of study (Donthu et al., 2021:285). In this respect, the method does not merely describe existing knowledge; it also serves as an analytical tool that shapes future research agendas.

Theoretical concentrations are revealed in bibliometric analysis, particularly through citation, co-citation, and keyword co-occurrence analyses. The frequent citation of specific theories or conceptual frameworks indicates that these approaches occupy a central place in the field's intellectual discourse. In tourism literature, the concentration of frameworks such as sustainability, experience economy, stakeholder theory, or service-dominant logic during specific periods provides strong indicators of the theoretical lines along which the field is progressing. Bibliometric analysis goes beyond intuitive assessments by supporting these concentrations with numerical data.

Research gaps are often interpreted through silences in bibliometric analysis. Topics with low citation rates, limited use of keywords, or weak collaboration networks indicate that certain perspectives are not sufficiently addressed. In particular, emerging regions, alternative theoretical approaches, or new methodological perspectives may be found within such gaps. Bibliometric analysis makes these gaps visible, facilitating researchers' ability to move beyond the dominant trends in the literature (Guerrero-Moreno and Oliveira-Junior, 2024:1).

Identifying new areas of research is made possible by the temporal sensitivity of bibliometric analysis. Time-based keyword analyses and citation bursts indicate emerging concepts and themes that have not yet reached saturation. In the field of tourism, topics such as digitalization, artificial intelligence, smart destinations, or crisis and resilience rapidly gaining visibility during certain periods can be considered concrete examples of this process. Such indicators serve as early warning signals for researchers, pointing to productive areas of future research.

In this context, bibliometric analysis can be considered a comprehensive method that maps theoretical concentrations, justifies research gaps, and systematically identifies new areas of study. In tourism research, this approach redraws the intellectual boundaries of the field and sheds light not only on the past but also on the possible futures of academic production (Çıkı and Tanriverdi, 2024:1).

Methodological Advantages of Bibliometric Analysis and Its Contribution to Academic Decision-Making Processes

The methodological advantages of bibliometric analysis and its contribution to academic decision-making processes elevate it beyond being merely an analytical technique to a strategic academic tool. This approach stands out for the clarity and consistency that numerical data provides in the production, evaluation, and direction of academic knowledge.

Methodologically, the most significant advantage of bibliometric analysis is that it is based on the principles of objectivity and reproducibility. Since analyses are conducted using open data sets, defined search strategies, and specific criteria, the results obtained can be reproduced by different researchers. This reduces the impact of subjective interpretations that are inevitable in traditional literature reviews and strengthens scientific reliability. Numerical indicators allow trends in the literature to be evaluated in a measurable way rather than intuitively (Passas, 2024:1016).

Bibliometric analysis also provides a holistic perspective. Its ability to work with large datasets allows it to analyze hundreds or thousands of publications simultaneously, revealing the overall structure of the field beyond individual studies. Citation networks, co-authorship relationships, and thematic clusters make the structural patterns underlying academic production visible (Yan et al., 2025:3). This feature provides a significant

methodological advantage, particularly in fields such as tourism literature, which is growing rapidly and becoming fragmented.

In terms of academic decision-making processes, bibliometric analysis provides a multifaceted reference framework. This method can be used to determine which topics have reached saturation, which themes are on the rise, and which journals occupy a central position in specific subjects. This information serves as a guide in many academic decisions, from selecting a research topic to formulating a publication strategy.

Bibliometric analysis at the institutional level plays an important role in determining research policies and priorities (Waltman and Noyons, 2018). Universities and research centers can evaluate their field-based publication performance, collaboration networks, and international visibility through bibliometric indicators. Similarly, journal editors and editorial boards can shape their publication policies by monitoring the thematic orientations of the field and emerging research areas.

In conclusion, bibliometric analysis provides a strong foundation that supports academic decision-making processes with its methodological robustness. This approach, supported by numerical data, makes academic production more transparent, traceable, and strategic, establishing itself as an important reference point that determines the direction of scientific knowledge in many fields, particularly tourism research.

A Bibliometric Approach to Understanding the Development Dynamics of Tourism Literature

The bibliometric approach offers a powerful perspective for understanding the developmental dynamics of tourism literature, enabling the analysis of the field's academic output across temporal, thematic, and relational layers (Pereira et al., 2025:2). This approach treats tourism research not as a static body of knowledge, but as a constantly evolving field of thought.

Firstly, bibliometric analysis reveals the temporal evolution of tourism literature. Analyses based on publication and citation data reveal which topics came to the fore during specific periods, which themes remained relatively in the background, and how the research agenda changed. This allows for a clearer understanding of the historical and social contexts within which tourism studies took shape.

Another important contribution of the bibliometric approach is the tracking of thematic shifts in the literature (Muritala et al., 2020:1). Keyword co-occurrences and thematic clusters reveal new research axes and conceptual shifts emerging in the field of tourism. For example, the shift from traditional destination marketing studies to topics such as sustainability, the experience economy, and digital tourism can be concretely tracked through bibliometric indicators.

This approach also allows for an analysis of the intellectual and institutional structure of tourism literature (Chakraborty et al., 2025:88). Leading authors, influential journals, international collaborations, and knowledge production centers are identified through bibliometric data, revealing which actors drive the field. This demonstrates that tourism research develops through networks and collaborations rather than individual studies.

Bibliometric analysis also allows us to distinguish continuity and discontinuity points in tourism literature (Wang et al., 2022:3). The long-term persistence of certain theoretical frameworks or the rapid emergence of new concepts as central themes provide important clues about the field's intellectual maturation process. In this respect, the bibliometric approach analyzes not only the current state of the literature but also its direction of development.

In conclusion, the bibliometric approach contributes to understanding the developmental dynamics of tourism literature in a systematic, comparable, and comprehensive manner. While mapping the field's history, it clarifies current trends and enables the prediction of future research directions. Therefore, bibliometric analysis can be considered one of the fundamental tools for analyzing the academic trajectory of tourism research.

RESULTS AND DISCUSSION

This study comprehensively examines the role, functions, and analytical possibilities of bibliometric analysis in tourism-themed research. The findings and discussions reveal that bibliometric analysis is more than just a technique for quantitatively describing tourism literature; it is a strategic method for understanding the intellectual structure, thematic orientations, and developmental dynamics of the field. The increasing

volume of publications and interdisciplinary diversity make it difficult to track tourism literature using traditional methods; in this context, bibliometric analysis fills an important methodological gap by making the literature systematic, comparable, and interpretable.

The findings discussed in this study show that tourism research has focused on specific themes over time and that these themes are closely related to social, technological, and economic transformations. The increased visibility of concepts such as sustainability, digitalization, the experience economy, and smart tourism in recent years reveals that tourism literature has been shaped not only by academic internal dynamics but also by global developments. Bibliometric analysis tracks these thematic transformations through measurable indicators, clearly revealing the intellectual breaks and continuities that the field has undergone.

Another important contribution of the research is the visibility of the intellectual structure of the tourism field. Citation networks, co-authorship relationships, and journal-centered analyses show that certain authors, institutions, and countries have played central roles in the development of the field. This reveals that tourism research is a field of knowledge shaped by institutional and international collaborations, beyond individual academic production. At the same time, bibliometric analysis can be used to identify which theoretical approaches have become dominant and which perspectives remain limited.

These findings also provide important clues for justifying research gaps in the literature. Themes with low visibility, limited theoretical diversity, or insufficient representation of specific geographies can be considered potential research areas for future studies. Bibliometric analysis contributes to the creation of new research agendas by revealing these gaps through numerical and transparent indicators rather than intuition.

From a methodological perspective, bibliometric analysis' objectivity, reproducibility, and capacity to work with large data sets make it a reliable tool in tourism research. The findings obtained not only support researchers' individual academic decisions, such as topic and journal selection, but also provide a guiding reference for institutions and editors in shaping research policies and publication strategies. In this respect, bibliometric analysis contributes not only analytically but also strategically to the academic knowledge production process.

In conclusion, this study demonstrates that bibliometric analysis plays a central role in understanding the history of tourism literature, analyzing its current state, and predicting its future trends. Patterns revealed through numerical indicators make the academic history of the field of tourism visible; bibliometric analysis stands out as a powerful method that enables a systematic and critical reading of this history. In future research, the use of bibliometric analysis in conjunction with qualitative approaches will contribute to a more in-depth and multidimensional understanding of tourism literature.

Limitations of the Study

The findings of this study should be evaluated within the analytical possibilities offered by the bibliometric approach used. Firstly, while bibliometric analysis is powerful in revealing generalizable trends across large-scale data sets, it does not have the capacity to directly analyze the content depth and contextual meanings of studies. Therefore, citation counts or keyword frequencies may not always fully reflect a study's theoretical contribution or qualitative importance.

Another limitation is that the analyses are restricted to specific databases. Indexes such as Web of Science or Scopus cover journals with high international visibility; however, they may not adequately represent tourism studies produced locally, regionally, or in different languages. This situation can lead to academic production in developing countries being relatively less visible in the literature. Therefore, the findings obtained reflect only a specific part of the tourism literature, not the entirety.

Furthermore, while bibliometric analysis strongly reveals existing trends in the literature, it may show a delayed effect in identifying new topics that are represented by a limited number of studies. In this context, emerging research areas that have not yet reached sufficient saturation in terms of citation and publication volume may not be sufficiently visible in bibliometric indicators.

Future Research

For future research, the use of bibliometric analyses in conjunction with qualitative content analysis, systematic literature reviews, or critical theoretical examinations will contribute to a more in-depth understanding of

tourism literature. Furthermore, comparative studies using different databases can reflect the geographical and linguistic diversity of the literature in a more balanced way. Repeating time-based analyses with current data sets will enable the early detection of new trends in tourism research.

Finally, supporting bibliometric analyses with more micro-level studies focused on subfields can contribute to a more detailed understanding of the internal dynamics of specific themes such as sustainable tourism, digital tourism, or crisis and resilience. Such studies will increase the intellectual diversity of the tourism field, providing a more solid theoretical and methodological foundation for future academic production.

REFERENCE

Aria, M., and Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Bashir, A., and Singh, R. (2022). Mapping the research journey of Tourism Analysis: A bibliometric study. Tourism Analysis, 28(1), 101048. https://doi.org/ 10.3727/108354222X16534530194787

Benckendorff, P., and Zehrer, A. (2013). A network analysis of tourism research. Annals of Tourism Research, 43, 121-149. https://doi.org/10.1016/j.annals.2013.04.005

Chakraborty, P. P., Suresh, A. S., Singhal, P., Singh, V. B., and Singhal, P. (2025). Sustainability in hospitality: A bibliometric synthesis of growth dynamics, intellectual structure, and thematic trajectories. Advances in Consumer Research, 2(2), 88-103.

Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., and Herrera, F. (2011). Science mapping software tools: Review, analysis, and cooperative study among tools. Journal of the American Society for Information Science and Technology, 62(7), 1382-1402. https://doi.org/10.1002/asi.21525

Çıkı, K. D., and Tanriverdi, H. (2024). Mapping the past to guide the future: Bibliometric insights into last chance tourism. Anais Brasileiros De Estudos Turísticos, 14(1), 1-11. https://doi.org/10.5281/zenodo.12763131

de Bruyn, C., Said, F. B., Meyer, N., and Soliman, M. (2023). Research in tourism sustainability: A comprehensive bibliometric analysis from 1990 to 2022. Heliyon, 9(8), e18874, 1-22. https://doi.org/10.1016/j.heliyon.2023.e18874

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., and Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. Journal of Business Research, 133, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Guerrero-Moreno, M. A., and Oliveira-Junior, J. M. B. (2024). Approaches, trends, and gaps in community-based ecotourism research: A bibliometric analysis

of publications between 2002 and 2022. Sustainability, 16(7), 2639, 1-21. https://doi.org/10.3390/su16072639

Hall, C. M. (2011). Publish and perish? Bibliometric analysis, journal ranking and the assessment of research quality in tourism. Tourism Management, 32(1), 16-27. https://doi.org/10.1016/j.tourman.2010.07.001

Koseoglu, M. A., Sehitoglu, Y., Okumus, F., and Cobanoglu, C. (2019). Bibliometric studies in tourism and hospitality: Past, present and future. Journal of Hospitality Marketing & Management, 28(2), 1-30. https://doi.org/10.1016/j.annals.2016.10.006

Koseoglu, M. A., Rahimi, R., Okumus, F., and Liu, J. (2016). Bibliometric studies in tourism. Tourism Management Perspectives, 18, 1-4. https://doi.org/10.1016/j.annals.2016.10.006

Kumar, A., Armah, L. K., and Malik, G. (2024). Tourism and hospitality research trends in South Asia: A comprehensive bibliometric analysis from 1992-2021. Journal of Scientometric Research, 13(1), 123-136. https://doi.org/10.5530/jscires.13.1.11

Mulet-Forteza, C., Genovart-Balaguer, J., Mauleon-Mendez, E., & Merigó, J. M. (2019). A bibliometric research in the tourism, leisure and hospitality fields. Journal of Business Research, 101(C), 819-827. https://doi.org/10.1016/j.jbusres.2018.12.002

Muritala, B., Sánchez-Rebull, M., and Hernandez, A. B. (2020). A bibliometric analysis of online reviews research in tourism and hospitality. Sustainability, 12(23), 9977, 1-18. https://doi.org/10.3390/su12239977

Nguyen, P. M. B., Pham, X. L., and Truong, G. N. T. (2023). A bibliometric analysis of research on tourism content marketing: Background knowledge and thematic evolution. Heliyon, 9(2), e13487, 1-17. https://doi.org/10.1016/j.heliyon.2023.e13487

Passas, I. (2024). Bibliometric analysis: The main steps. Encyclopedia. 4(2), 1014-1025; https://doi.org/10.3390/encyclopedia4020065

Paul, J., and Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know? International Business Review, 29(4). https://doi.org/10.1016/j.ibusrev.2020.101717

Pereira, J. M., Almeida, P., and Almeida, G. G. F. (2025). Bibliometric analysis of key variables in tourism: Destination, competitiveness, image, quality, and tourist satisfaction (2000-2023). Administrative Sciences, 15(2), 69, 1-22 https://doi.org/10.3390/admsci15020069

Salouw, E., Setiawan, B., Roychansyah, M. S., and Sarwadi, A. (2024). Bibliometric analysis of tourism and community participation research: A comparison of Scopus and Web of Science databases. International Journal of Sustainable Development and Planning, 19(4), 1415-1422. https://doi.org/10.18280/ijsdp.190419

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. Journal of the American Society for Information Science, 24(4), 265-269. https://doi.org/10.1002/asi.4630240406

Waltman, L., and Noyons, E. (2018). Bibliometrics for research management and research evaluation. Universiteit Leiden. cwts.nl/pdf/CWTS_bibliometrics.pdf

Wang, T., Yang, Z., Chen, X., and Han, F. (2022). Bibliometric analysis and literature review of tourism destination resilience research. International Journal of Environmental Research and Public Health, 19(9), 5562, 1-16. https://doi.org/10.3390/ijerph19095562

Wider, W., Gao, Y., Chan, C. K., Lin, J., Li, J., Tanucan, J. C. M., and Fauzi, M. A. (2023). Unveiling trends in digital tourism research: A bibliometric analysis of co-citation and co-word analysis. Environmental and Sustainability Indicators, 20, 100308, 1-10. https://doi.org/10.1016/j.indic.2023.100308

Yan, D., Marzuki, A. B., Yang, J., Zhou, J., and Tao, S. (2025). Bibliometric analysis of smart tourism destination: Knowledge structure and research evolution (2013-2025). Tourism and Hospitality, 6(4), 194, 1-34. https://doi.org/10.3390/tourhosp6040194

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. Organizational Research Methods, 18(3), 429-472. https://doi.org/10.1177/1094428114562629

The Long-run Influence of Exchange Rate on Exports in Turkiye

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INTRODUCTION

In the new world order, globalization is showing its effects in all areas, including the economy. As a result of globalization, the economic order is no longer determined within national borders. Since the economy is a highly interactive system connected to the outside world, foreign trade and exchange rates are of great importance. Therefore, import and export variables, the building blocks of foreign trade, are of great significance. Many studies have examined these two macroeconomic variables from various perspectives in the literature. Although it is a frequently studied topic, each period has its own importance and characteristics, necessitating repeated examination. This study examines the long-term impact of the exchange rate on exports using the Turkish example.

Literature Review

The literature contains numerous studies on foreign trade and exchange rates. Some examples from this literature review are presented below in four paragraphs. First, studies related to exchange rates are discussed, followed by separate analyses of import and export variables related to foreign trade. Finally, examples of studies on exchange rates, exports and imports are provided.

A study on exchange rate volatility;The study concludes that some predicted trade effects of exchange rate volatility vary significantly across sectors. Furthermore, it states that the impact can be positive or negative depending on the degree of credit constraints(Lin et al.,(2018). Several similar studies have also analyzed exchange rate volatility(Gayaker, S. (2025);Klein, M.W. (1990);Arize et. al.(2017)). Exchange rates, a crucial variable in the economy, have been addressed in many different ways throughout history; the examples given above are just a few.

Now, some examples are given from studies related to imports and exports, two important elements of foreign trade. These two variables have gained even more importance with globalization. The import variable shows a country's productivity and dependence on foreign countries. Exports, on the other hand, give us information about how strong or weak a country's production sector is. A comprehensive analysis of China's exports between 1994 and 2006 was conducted using panel data analysis. The analysis yielded results related to labor productivity (Koyuncu, C. and Yilmaz, R., (2010a); Koyuncu, C. and Yilmaz, R., (2010b)). Another study on Turkey examined the relationship between exports and investment variables (Unver,M., and Koyuncu,C.,(2018); Okşak, Y. (2018); Yalçınkaya Koyuncu, J. and Unver,

M., (2021a)). Another study analyzed the exports variable in some transition economies between 1989-2008 (Yalçınkaya Koyuncu, J. and Yılmaz, R. (2015)).

Imports are a variable that is desired to be kept to a minimum in the balance of foreign trade in the economy. This is because as imports increase, the country's economic and production dependence on foreign countries also increases. For this reason, many studies related to this variable can be found in the literature.The long-term effects of the import variable can mostly be measured in the economy. Some studies examining the long-term relationship between economic growth and imports use panel models, while others utilize NARDL models (Yalcinkaya Koyuncu, J., and Unver, M., (2020); Sarıtaş, T., and Okşak, Y. (2020); Koyuncu, C., and Ünver, M(2018)). These studies are just a few that support our analysis. As a result of these studies, it has been observed that there is a bidirectional relationship between imports and growth variables. Another analysis of investments and imports examined their long-term impact on Türkiye (Yalcinkaya Koyuncu, J., and Unver, M., (2021b)). In a study on growth and energy imports, the long-term impact on Türkiye was examined (Koyuncu, C., and Ünver, M, (2019)).

Imports, exports, and exchange rate, which are part of the three-legged stool, have actually been correlated in most studies. The examples given in the previous paragraphs show imports, exports, and exchange rate examined separately. In reality, even if these variables are not directly included in the models in the studies, they are definitely included as control variables. While the interaction between these three variables is clearly visible, they have been repeatedly examined in every period or under every condition. For example, the exchange rate and the effect of exchange rate volatility on imports and exports have been studied (Alev, N. (2020)). In another similar study, while exports and imports variables were considered together, the exchange rate variable was included in the model as a control variable (Koyuncu, C., and Unal, H.,S.,(2019)). As seen in some of the given examples, exports and imports are two inseparable variables, but they also interact with the exchange rate. This study aims to evaluate the relationship between exports and the exchange rate in a more up-to-date manner.

Data and Methodology

In this study we investigate the long term impact of exchange rate on exports by using an annual data set of Turkiye spanning from 19770 to 2022. All analyses were conducted by employing ARDL estimation method. We also added general globalization index (GLOBAL) into our models as control variable. Variable of exports (EXPORTS) is given by the percentage share of exports of goods and services in gross domestic product and variable of exchange rate (EXCHRATE) is official exchange rate and measured as period

average LCU per US$. We collected the data for EXPORTS and EXCHRATE variables from World Development Indicators (WDI) of the World Bank whereas the data for globalization was gathered from KOF Index. Meanwhile we utilized the logarithmic forms of all variables in all analyses. Higher exchange rate makes domestic goods and services relatively cheaper for other countries and in turn exports of goods and services enhance. Thus positive coefficient estimation is expected for EXPORTS variable.

Our first long-run analysis is to see if EXPORTS and EXCHRATE variables move together in the long-run. Hence firstly co-integration analysis via ARDL bounds test was conducted by estimating following model:

$$\Delta \text{EXPORTS}_t = \alpha_0 + \sum_{i=1}^{p} \delta_i \Delta \text{EXPORTS}_{t-i} + \sum_{i=0}^{q} \phi_i \Delta \text{EXCHRATE}_{t-i} + \sum_{i=0}^{r} \omega_i \Delta \text{GLOBAL}_{t-i} + \theta_0 \text{EXPORTS}_{t-1} + \theta_1 \text{EXCHRATE}_{t-1} + \theta_2 \text{GLOBAL}_{t-1} + \varepsilon_t \quad (1)$$

The explanation of symbols In Equation 1 above as follows: θ_0, θ_1, and θ_2 symbols are long-run coefficients; δ_i, ϕ_i, and ω_i symbols represent short-run coefficients; Δ symbol shows first degree difference operator; α_0 symbol is intercept term of the model, and ε_t symbol stands for white noise error term of the model.

The null hypothesis (H_0: $\theta_0=\theta_1=\theta_2=0$) of ARDL bounds test claims the non-existence of co-integrating relationship among relevant variables while the alternative hypothesis (H_0: $\theta_0\neq\theta_1\neq\theta_2\neq0$) of ARDL bounds test asserts the presence of co-integrating relationship among relevant variables. As long as F-statistic value of ARDL bounds test exceeds the critical value of upper limit at a given significance level, we are able to deduce that the series of exports, exchange rate and globalization are co-integrated and thus they move together in the long-run. On the other hand any F-statistic value smaller than the critical value of lower limit at a given significance level leads to a conclusion of absence of co-integrating relationship among relevant variables and any F-statistic value falling into between the two critical values leaves us indecisive about co-integration association.

Short-term and long-term coefficients were gathered by computing following equation:

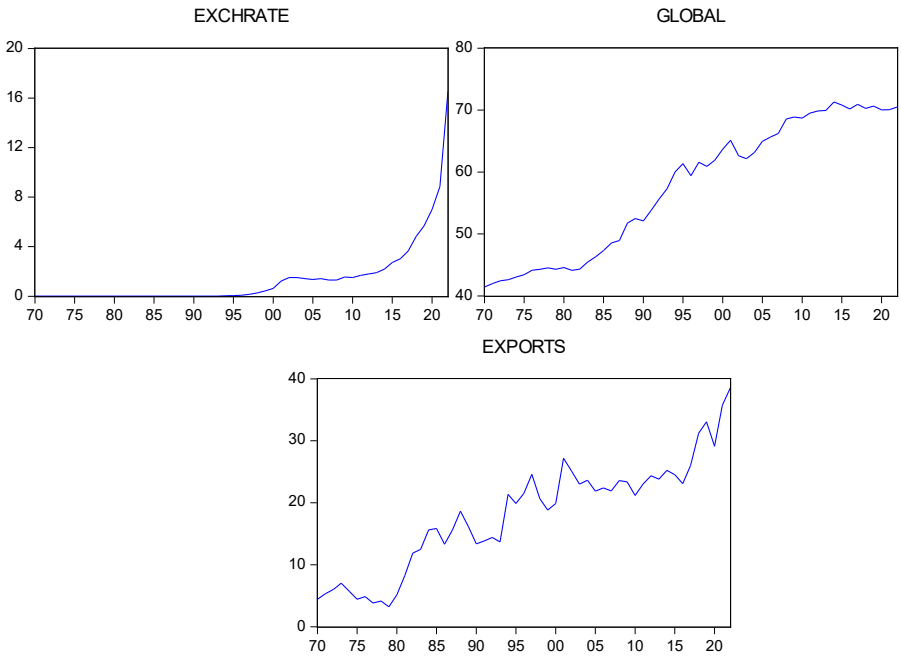
$$EXPORTS_t = \beta_0 + \sum_{i=1}^{p} \alpha_i \Delta EXPORTS_{t-i} + \sum_{i=0}^{q} \mu_i \Delta \text{EXCHRATE}_{t-i} + \sum_{i=0}^{r} \lambda_i \Delta \text{GLOBAL}_{t-i} + \gamma ECM_{t-1} + \varepsilon_t \quad (2)$$

The meaning of symbols in Equation 2 as follows: α_i, μ_i, and λ_i symbols give the dynamic coefficients which bring the model back to the balance in the long term; ECM term is error correction term of the model; γ is the speed of adjustment at which the model return back to long-run given a shock occurred

in the short-run. Meantime the coefficient for the speed of adjustment term must possess negative coefficient estimation and be statistically significant at conventional significance levels.

We provided individual graphs of variables of EXPORTS, EXCHRATE, and GLOBAL to find out how they change overtime in Graph 1. As indicated by the graph EXCHRATE variable experiences sharp increases after 2013. The other two variables (i.e., EXPORTS and GLOBAL variables) rise steadily over the estimation period with an upward trend but increases in EXPORTS variable is sharper than GLOBAL variable.

Graph 1: Graphs for EXPORTS, EXCHRATE, and GLOBAL Variables



Estimation Results

ARDL bounds test in co-integration analysis can be used if the relevant series is integrated order zero or one. Put it differently ARDL bounds test in co-integration analysis can be used if the integration order of series is less than two. Hence we firstly attempted to figure out the integration order of variables of EXPORTS, EXCHRATE, and GLOBAL by performing Phillips-Perron (PP) unit root test. PP unit root test results in Table 1 disclose the stationarity of all variables in first differences at least at %5 significance level. This means that variables of EXPORTS, EXCHRATE, and GLOBAL are integrated order

one and hence we are eligible to use ARDL bounds test for co-integration analysis.

Table 1. Results of PP Unit Root Test

Null Hypothesis: EXCHRATE has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		***0.234443***	***0.9728***
Test critical values:	1% level	-3.536587	
	5% level	-2.90766	
	10% level	-2.591396	
Null Hypothesis: D(EXCHRATE) has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		***-3.516325***	***0.0106***
Test critical values:	1% level	-3.538362	
	5% level	-2.90842	
	10% level	-2.591799	
Null Hypothesis: EXPORTS has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		***-2.134194***	***0.2323***
Test critical values:	1% level	-3.536587	
	5% level	-2.90766	
	10% level	-2.591396	
Null Hypothesis: D(EXPORTS) has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		***-8.582001***	***0.0000***
Test critical values:	1% level	-3.538362	
	5% level	-2.90842	
	10% level	-2.591799	
Null Hypothesis: GLOBAL has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		***-1.327641***	***0.6100***
Test critical values:	1% level	-3.562669	
	5% level	-2.918778	
	10% level	-2.597285	
Null Hypothesis: D(GLOBAL) has a unit root			
		Adj. t-Stat	Prob.
Phillips-Perron test statistic		***-6.572155***	***0.0000***
Test critical values:	1% level	-3.56543	
	5% level	-2.919952	
	10% level	-2.597905	

Before implementing long term analysis we should decide on optimal lag length of our model. For that purpose we prefered to utilize AIC criterion for the selection of optimal lag length. After evaluation of 180 different models via AIC criterion, Figure 1 and Table 2 point out that ARDL(4,1,5) model is the best model in terms of optimal lag length. Therefore we performed all of our analyses with ARDL(4,1,5) model.

Figure 1. Top 20 ARDL Models Based on AIC Criterion

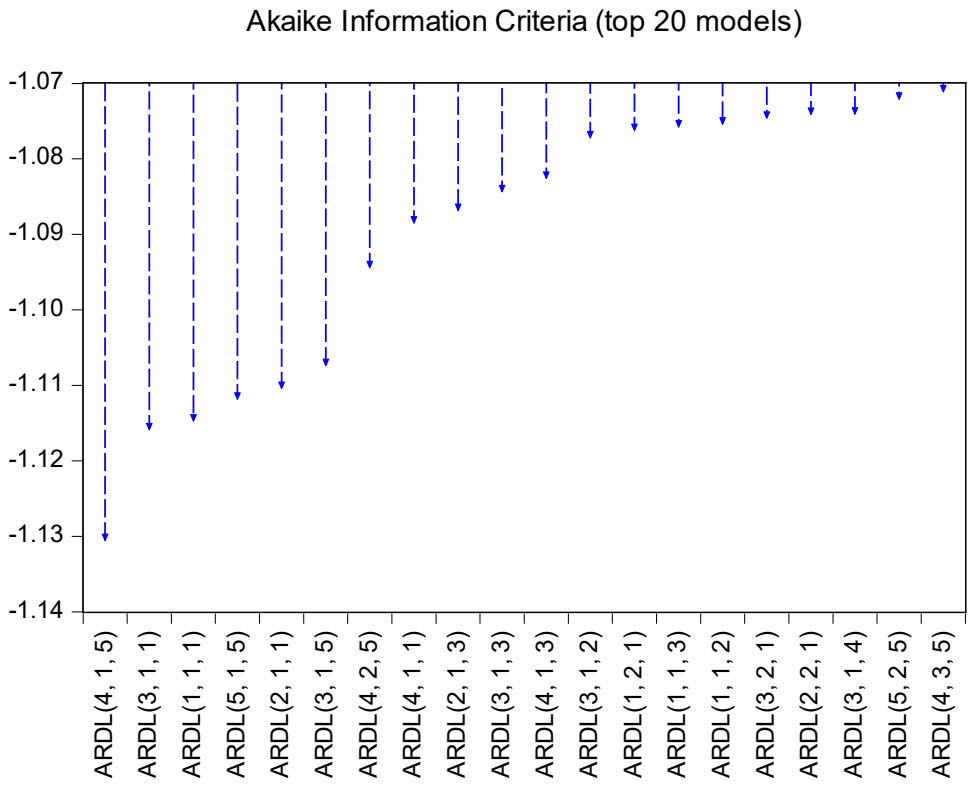


Table 2. 180 Distinct ARDL Models Evaluated

Model	**AIC***	Specification	Model	**AIC***	Specification	Model	**AIC***	Specification
61	**-1.130072**	**ARDL(4, 1, 5)**	166	-1.036471	ARDL(1, 2, 2)	88	-0.996575	ARDL(3, 3, 2)
101	-1.115433	ARDL(3, 1, 1)	123	-1.035197	ARDL(2, 3, 3)	9	-0.995397	ARDL(5, 4, 3)
173	-1.114272	ARDL(1, 1, 1)	94	-1.035105	ARDL(3, 2, 2)	37	-0.995386	ARDL(4, 5, 5)
25	-1.111363	ARDL(5, 1, 5)	79	-1.034901	ARDL(3, 4, 5)	83	-0.994887	ARDL(3, 4, 1)
137	-1.109945	ARDL(2, 1, 1)	115	-1.034595	ARDL(2, 4, 5)	73	-0.993839	ARDL(3, 5, 5)
97	-1.106893	ARDL(3, 1, 5)	89	-1.033255	ARDL(3, 3, 1)	86	-0.993147	ARDL(3, 3, 4)
55	-1.093945	ARDL(4, 2, 5)	92	-1.032996	ARDL(3, 2, 4)	132	-0.993085	ARDL(2, 2, 0)
65	-1.088019	ARDL(4, 1, 1)	130	-1.031954	ARDL(2, 2, 2)	109	-0.992994	ARDL(2, 5, 5)
135	-1.086349	ARDL(2, 1, 3)	128	-1.030509	ARDL(2, 2, 4)	148	-0.992697	ARDL(1, 5, 2)
99	-1.083857	ARDL(3, 1, 3)	56	-1.028794	ARDL(4, 2, 4)	77	-0.987311	ARDL(3, 5, 1)
63	-1.082086	ARDL(4, 1, 3)	51	-1.028346	ARDL(4, 3, 3)	52	-0.986157	ARDL(4, 3, 2)
100	-1.076722	ARDL(3, 1, 2)	85	-1.024987	ARDL(3, 3, 5)	103	-0.984539	ARDL(3, 0, 5)
167	-1.075761	ARDL(1, 2, 1)	121	-1.024417	ARDL(2, 3, 5)	75	-0.984114	ARDL(3, 5, 3)
171	-1.075303	ARDL(1, 1, 3)	116	-1.022756	ARDL(2, 4, 4)	112	-0.983812	ARDL(2, 5, 2)
172	-1.074923	ARDL(1, 1, 2)	81	-1.021317	ARDL(3, 4, 3)	158	-0.982923	ARDL(1, 3, 4)
95	-1.074138	ARDL(3, 2, 1)	58	-1.015613	ARDL(4, 2, 2)	3	-0.982494	ARDL(5, 5, 3)

131	-1.07361	ARDL(2, 2, 1)	21	-1.015314	ARDL(5, 2, 3)	14	-0.981218	ARDL(5, 3, 4)
98	-1.073589	ARDL(3, 1, 4)	28	-1.014911	ARDL(5, 1, 2)	110	-0.98109	ARDL(2, 5, 4)
19	-1.071632	ARDL(5, 2, 5)	124	-1.014277	ARDL(2, 3, 2)	147	-0.980913	ARDL(1, 5, 3)
49	-1.070624	ARDL(4, 3, 5)	160	-1.013827	ARDL(1, 3, 2)	44	-0.980138	ARDL(4, 4, 4)
133	-1.070195	ARDL(2, 1, 5)	159	-1.012107	ARDL(1, 3, 3)	138	-0.978447	ARDL(2, 1, 0)
136	-1.06836	ARDL(2, 1, 2)	111	-1.011698	ARDL(2, 5, 3)	118	-0.978379	ARDL(2, 4, 2)
91	-1.065889	ARDL(3, 2, 5)	119	-1.010755	ARDL(2, 4, 1)	157	-0.977412	ARDL(1, 3, 5)
62	-1.065792	ARDL(4, 1, 4)	67	-1.010727	ARDL(4, 0, 5)	154	-0.975415	ARDL(1, 4, 2)
134	-1.061273	ARDL(2, 1, 4)	122	-1.010107	ARDL(2, 3, 4)	22	-0.973948	ARDL(5, 2, 2)
64	-1.05652	ARDL(4, 1, 2)	31	-1.010077	ARDL(5, 0, 5)	168	-0.973428	ARDL(1, 2, 0)
129	-1.055158	ARDL(2, 2, 3)	20	-1.009472	ARDL(5, 2, 4)	152	-0.969622	ARDL(1, 4, 4)
27	-1.053289	ARDL(5, 1, 3)	53	-1.008877	ARDL(4, 3, 1)	47	-0.968147	ARDL(4, 4, 1)
125	-1.050522	ARDL(2, 3, 1)	164	-1.00866	ARDL(1, 2, 4)	17	-0.967376	ARDL(5, 3, 1)
26	-1.049848	ARDL(5, 1, 4)	87	-1.007063	ARDL(3, 3, 3)	2	-0.965723	ARDL(5, 5, 4)
117	-1.049105	ARDL(2, 4, 3)	23	-1.006832	ARDL(5, 2, 1)	74	-0.964907	ARDL(3, 5, 4)
59	-1.048356	ARDL(4, 2, 1)	113	-1.006411	ARDL(2, 5, 1)	76	-0.96483	ARDL(3, 5, 2)
29	-1.046886	ARDL(5, 1, 1)	80	-1.005853	ARDL(3, 4, 4)	39	-0.964396	ARDL(4, 5, 3)
57	-1.046841	ARDL(4, 2, 3)	149	-1.005771	ARDL(1, 5, 1)	82	-0.96294	ARDL(3, 4, 2)

13	-1.046338	ARDL(5, 3, 5)	45	-1.003387	ARDL(4, 4, 3)	60	-0.960948	ARDL(4, 2, 0)
170	-1.046153	ARDL(1, 1, 4)	174	-1.002651	ARDL(1, 1, 0)	151	-0.960495	ARDL(1, 4, 5)
93	-1.044027	ARDL(3, 2, 3)	50	-1.002449	ARDL(4, 3, 4)	41	-0.955342	ARDL(4, 5, 1)
161	-1.042642	ARDL(1, 3, 1)	163	-1.001312	ARDL(1, 2, 5)	96	-0.953484	ARDL(3, 2, 0)
127	-1.041181	ARDL(2, 2, 5)	1	-1.001251	ARDL(5, 5, 5)	126	-0.952894	ARDL(2, 3, 0)
7	-1.038447	ARDL(5, 4, 5)	155	-1.001056	ARDL(1, 4, 1)	46	-0.944581	ARDL(4, 4, 2)
165	-1.037356	ARDL(1, 2, 3)	8	-1.000855	ARDL(5, 4, 4)	16	-0.944507	ARDL(5, 3, 2)
169	-1.036672	ARDL(1, 1, 5)	153	-1.000138	ARDL(1, 4, 3)	120	-0.942247	ARDL(2, 4, 0)
43	-1.036504	ARDL(4, 4, 5)	15	-0.996968	ARDL(5, 3, 3)	40	-0.941454	ARDL(4, 5, 2)

Table 2. Continued

Model	**AIC***	Specification	Model	**AIC***	Specification	Model	**AIC***	Specification
102	-0.940798	ARDL(3, 1, 0)	48	-0.882444	ARDL(4, 4, 0)	105	-0.822899	ARDL(3, 0, 3)
146	-0.940579	ARDL(1, 5, 4)	18	-0.880021	ARDL(5, 3, 0)	69	-0.81576	ARDL(4, 0, 3)
38	-0.939173	ARDL(4, 5, 4)	104	-0.867589	ARDL(3, 0, 4)	141	-0.806904	ARDL(2, 0, 3)
66	-0.938267	ARDL(4, 1, 0)	32	-0.864057	ARDL(5, 0, 4)	107	-0.805287	ARDL(3, 0, 1)
145	-0.935652	ARDL(1, 5, 5)	42	-0.863193	ARDL(4, 5, 0)	33	-0.800301	ARDL(5, 0, 3)
5	-0.934928	ARDL(5, 5, 1)	68	-0.85171	ARDL(4, 0, 4)	176	-0.786315	ARDL(1, 0, 4)
162	-0.932178	ARDL(1, 3, 0)	6	-0.845659	ARDL(5, 5, 0)	106	-0.786013	ARDL(3, 0, 2)

114	-0.929768	ARDL(2, 5, 0)	12	-0.841401	ARDL(5, 4, 0)	143	-0.782781	ARDL(2, 0, 1)
11	-0.926506	ARDL(5, 4, 1)	175	-0.837774	ARDL(1, 0, 5)	177	-0.777151	ARDL(1, 0, 3)
4	-0.922623	ARDL(5, 5, 2)	140	-0.823005	ARDL(2, 0, 4)	71	-0.767265	ARDL(4, 0, 1)
54	-0.921562	ARDL(4, 3, 0)	70	-0.75872	ARDL(4, 0, 2)	179	-0.765594	ARDL(1, 0, 1)
24	-0.919388	ARDL(5, 2, 0)	142	-0.750833	ARDL(2, 0, 2)	108	-0.565875	ARDL(3, 0, 0)
90	-0.912021	ARDL(3, 3, 0)	178	-0.74593	ARDL(1, 0, 2)	72	-0.546451	ARDL(4, 0, 0)
156	-0.91172	ARDL(1, 4, 0)	35	-0.729708	ARDL(5, 0, 1)	36	-0.524586	ARDL(5, 0, 0)
150	-0.908452	ARDL(1, 5, 0)	34	-0.71828	ARDL(5, 0, 2)	10	-0.902959	ARDL(5, 4, 2)
84	-0.904597	ARDL(3, 4, 0)	180	-0.609766	ARDL(1, 0, 0)	78	-0.890733	ARDL(3, 5, 0)
139	-0.904183	ARDL(2, 0, 5)	144	-0.600483	ARDL(2, 0, 0)	30	-0.903587	ARDL(5, 1, 0)

We reported co-integration test results of ARDL bounds test in Table 3 below. As can be seen from Table 3, F-statistic value of 6.126659 is beyond the upper limit critical values at %5 and %10 significance levels for finite samples and this is true at all significance level for asymptotic sample. This finding confirms that there is cointegration association among variables of EXPORTS, EXCHRATE, and GLOBAL.

Table 3. Results of ARDL Bounds Test

Test Statistic	Signif.	I(0)/Lower Limit	I(1)/Upper Limit
F-statistic: **6.126659**			
		Asymptotic: n=1000	
	10%	3.38	4.02
k: 2	5%	3.88	4.61
	2.5%	4.37	5.16
	1%	4.99	5.85
Actual Sample Size: 48		Finite Sample: n=50	
	10%	3.573	4.288
	5%	4.225	5.03
	1%	5.805	6.79
		Finite Sample: n=45	
	10%	3.625	4.33
	5%	4.335	5.078
	1%	5.878	6.87

We obtained long term coefficient estimations from ARDL(4,1,5) model and findings are displayed in Table 4. As pointed out by the results in Table 4, positive coefficient estimation for EXCHRATE, as expected, was obtained and it is statistically significant at %1 significance level. Based on this finding we can say that one percent rise in exchange rate is followed by an increase in exports of goods and services by %0.25. On the other hand we got statistically significant negative coefficient estimation (i.e., -5.66) for GLOBAL variable and this result indicate that %1 jump in globalization level causes %5.66 drop in exports of goods and services.

Table 4. Results of Long-run Coefficient Estimations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCHRATE	0.2504	0.0428	5.8445	0.0000
GLOBAL	-5.6602	1.4389	-3.9336	0.0004
TREND	0.0374	0.0104	3.5777	0.0011
EC=EXPORTS-(0.2504*EXCHRATE-5.6602*GLOBAL+0.0374*TREND)				

Short-run coefficient estimations of ARDL(4,1,5) model is given in Table 5. All of the estimated short-run coefficients of EXPORTS variable are positive and statistically significant at least at %10 significance level. Short-run

coefficient estimation of EXCHRATE variable is positive and statistically significant at %1 significance level. All of the estimated short-run coefficients of GLOBAL variable are positive and statistically significant at least at %10 significance level. Lastly the estimated coefficient of error correction term (i.e., -0.6850), as required, is negative and statistically significant at %1 significance level and this means that a shock taken place in short term will be absorbed in 8-9 months.

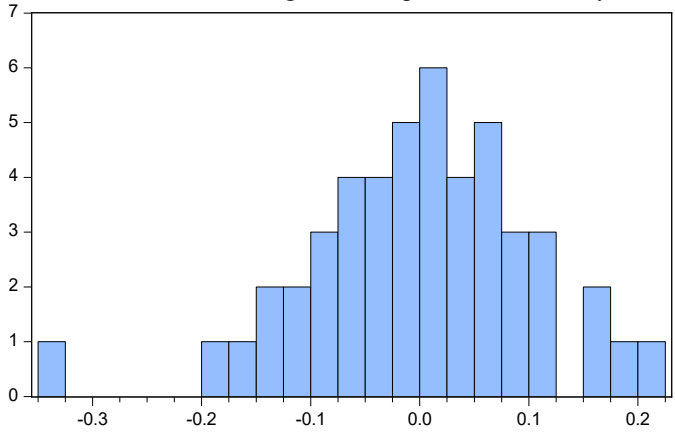
Table 5. Results OF ECM Regression Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTANT	16.9968	3.2969	5.1554	0.0000
D(EXPORTS(-1))	0.2807	0.1095	2.5626	0.0150
D(EXPORTS(-2))	0.2616	0.1194	2.1904	0.0354
D(EXPORTS(-3))	0.2019	0.1186	1.7024	0.0978
D(EXCHRATE)	0.3984	0.0777	5.1300	0.0000
D(GLOBAL)	2.5117	1.0783	2.3294	0.0259
D(GLOBAL(-1))	3.4617	1.5697	2.2053	0.0343
D(GLOBAL(-2))	3.6862	1.3398	2.7512	0.0094
D(GLOBAL(-3))	2.1140	1.2159	1.7387	0.0911
D(GLOBAL(-4))	2.4762	1.1874	2.0853	0.0446
ECM(-1)	-0.6850	0.1327	-5.1642	0.0000
R-squared	0.6496	Mean dependent var		0.0397
Adjusted R-squared	0.5548	S.D. dependent var		0.1754
S.E. of regression	0.1170	Akaike info criterion		-1.2551
Sum squared resid	0.5066	Schwarz criterion		-0.8263
Log likelihood	41.1217	Hannan-Quinn criter.		-1.0930
F-statistic	6.8580	Durbin-Watson stat		2.0020
Prob(F-statistic)	0.0000			

We finally conducted several diagnostic tests (i.e., Jerque-Bera normality test, Breusch-Godfrey serial correlation LM test for autocorrelation, ARCH test for heteroskedasticity, Ramsey RESET test for model specification error, and CUSUM-square test for parameter stability) in order to check how reliable our results obtained from ARDL(4,1,5) model are.

In Figure 2 we show the findings of Jerque-Bera normality test and the test findings hint that residuals of our ARDL(4,1,5) model are normally distributed at %1 significance level.

Figure 2. Jarque-Bera Normality Test



Series: Residuals	
Sample 1975 2022	
Observations 48	
Mean	8.30e-16
Median	0.012761
Maximum	0.202015
Minimum	-0.347379
Std. Dev.	0.103818
Skewness	-0.583413
Kurtosis	4.305580
Jarque-Bera	6.132045
Probability	0.046606

Table 6 below exhibits the results of autocorrelation test and the test results imply that the residuals of our ARDL(4,1,5) model do not possess autocorrelation problem.

Table 6. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.728603	Prob. F(2,32)	0.4904
Obs*R-squared	2.090608	Prob. Chi-Square(2)	0.3516

We gave the results of heteroscedasticity test in Table 7 below and the results of ARCH heteroscedasticity test reveal that our ARDL(4,1,5) model does not suffer from heteroscedastic variance problem.

Table 7. ARCH Heteroskedasticity Test

F-statistic	0.202482	Prob. F(1,45)	0.6549
Obs*R-squared	0.210534	Prob. Chi-Square(1)	0.6463

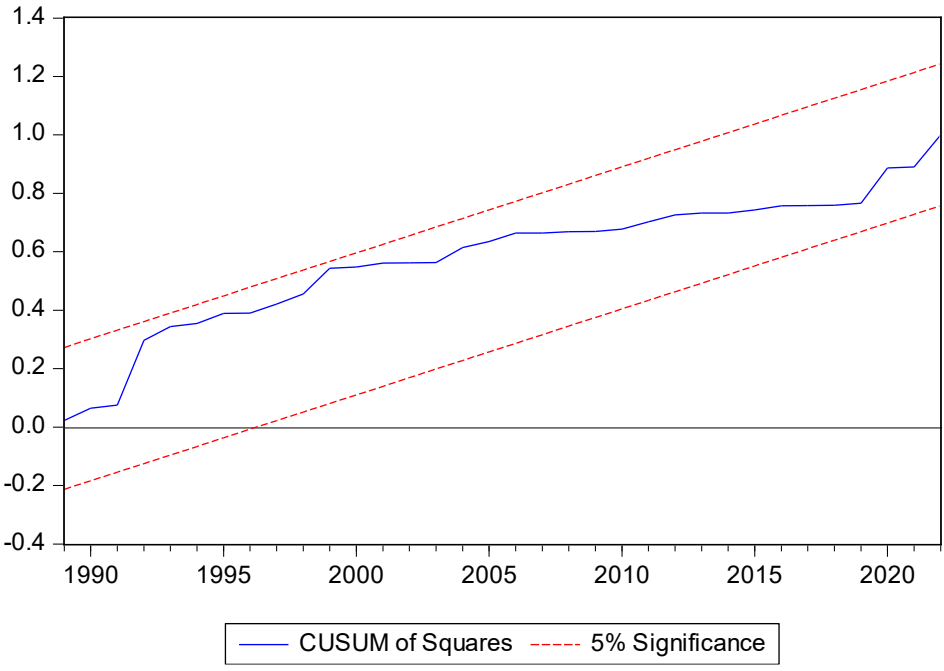
Table 8 displays the results of model misspecification test of Ramsey RESET test and the findings in Table 8 show that our ARDL(4,1,5) model is free from model misspecification problem at %1 and %5 significance levels.

Table 8. Ramsey RESET Test

	Value	df	Probability
F-statistic	2.562627	(3, 31)	0.0727

Figure 3 below reflects the findings of parameter stability tests of CUSUM-square test. As can be concluded from Figure 3, parameters of our ARDL(4,1,5) model are stable.

Figure 3. Parameter Stability Test



CONCLUSION

The main purpose of this study is to disclose the long term influence of exchange rate on exports of goods and services in Turkiye for the period of 1970-2022. We preferred to employ ARDL technique to conduct our all analyses. PP unit root test was used to identify the integration order of our variables. According to the results of PP unit root test, variables of exports of goods and services, exchange rate, and globalization are stationary at first differences and hence we conclude that the integration order of those three

variables are one. Since our variables are integrated order one, we are granted to utilize ARDL bounds test for co-integration analysis. Based on the findings of ARDL bounds test, we identified co-integrating relationship among the variables of exports of goods and services, exchange rate, and globalization and thus we say that variables of exports of goods and services, exchange rate, and globalization move together in the long run in Turkiye over the estimation period. We obtained statistically significant positive long-run coefficient estimation for EXCHRATE variable and statistically significant negative long-run coefficient estimation for GLOBAL variable. More specifically, if exchange rate goes up by %1 then exports of goods and services rise by %0.25 and if globalization level jumps by %1 then exports of goods and services decline by %5.66. The findings of diagnostic tests reveal that our ARDL(4,1,5) model does not contain the problems of non-normal distribution, model specification error, autocorrelation, heteroscedasticity, and parameter instability.

REFERENCES:

Alev, N. (2020). Döviz kuru ve döviz kuru volatilitesinin ihracat ve ithalata etkisi. Ömer Halisdemir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 13(4), 606-623.

Arize, A. C., Malindretos, J., ve Igwe, E. U. (2017). Do exchange rate changes improve the trade balance: An asymmetric nonlinear cointegration approach. International Review of Economics & Finance, 49, 313-326.

Gayaker, S. (2025). Döviz Kuru Politikası ve Döviz Kuru Oynaklığının İhracat Üzerindeki Etkisi: Türkiye Örneği. Üçüncü Sektör Sosyal Ekonomi Dergisi, 60(3), 3032-3052.

Klein, M.W. (1990). Sectoral Effects of Exchange Rate Volatility on United States Exports, Journal of International Money and Finance, 9, 299-308.

Koyuncu,C. and Yilmaz,R.,(2010a) "China's Export Surge and World Poverty", Transformation in Business and Economics, Volume:9,No:2(20), , pages 86-94.

Koyuncu,C. and Yilmaz,R.,(2010b) "Chinese Exports and Productivity Gains: Panel Evidence", Asian Pacific Economic Literature Journal, 24(2), pages 161-170.

Koyuncu, C., and Unal, H.,S., "IS THERE AN ASYMMETRIC RELATIONSHIP BETWEEN EXPORTS AND IMPORTS IN TURKEY?: AN EMPIRICAL EVIDENCE", Sosyal Bilimler Metinleri, 2019/02, sayfa: 7-13.

Koyuncu,C. and Yilmaz,R., "The Impact of Imports from China on the Productivity and Unemployment Levels of Developing Countries",The Empirical Economics Letters, Volume:5, Issue:3, (2006), pages 147-158.

Koyuncu, C., and Ünver, M., "Is There a Long-term Relationship Between Imports and Economic Growth?: The Case of Turkey", VIII. IBANESS Congress Series , 21-22 Nisan, 2018, sayfa 337-342, Plovdiv / Bulgaria.

Koyuncu, C., and Ünver, M., “An Empirical Analysis of a Long-Term Relationship between Energy Imports and Economic Growth in Turkey”, XI. IBANESS Congress Series, 9-10 Mart 2019, sayfa 911-916, Tekirdag / Turkey.

Lin, S., Shi, K. & Ye, H. (2018). Exchange Rate Volatiltiy and Trade: The Role of Credit Constraints, Review of Economic Dynamics, 30, 203-222.

Okşak, Y. (2018). Cointegration and causality analysis of globalization and exports for Turkey. Journal of Economics Bibliography, 5(2), 122-128.

Sarıtaş, T., & Okşak, Y. (2020). OECD Ülkelerinde Petrol Tüketiminin İhracat İthalat ve Büyümeye Etkisi. Gaziantep Üniversitesi Sosyal Bilimler Dergisi, 19(3), 805-822.

Ünver,M., and Koyuncu,C., “Investments and Exports in Turkey: ARDL Analysis”, VIII. IBANESS Congress Series , 21-22 Nisan, 2018, sayfa 343-347, Plovdiv / Bulgaria.

Yalcinkaya Koyuncu, J., and Unver, M., (2020). Long-run Asymmetric Association between Imports and Economic Growth in Turkey. BALKAN SOSYAL BILIMLER DERGISI, 9 (18), 58-64.

Yalcinkaya Koyuncu, J., and Unver, M., (2021a). Causality and Long-term Analysis between Investments and Exports in Turkey. The Journal of International Scientific Researches, 6(3), 250-260.

Yalcinkaya Koyuncu, J., and Unver, M., (2021b). Are Investments and Imports Associated in the Long-term?: Evidence from Turkey. BALKAN SOSYAL BILIMLER DERGISI, 10(19), 36-44.

Is There Any Relationship between Freedom of Speech and Female Labor Force Participation: Evidence from Türkiye

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INTRODUCTION

Women's participation in the workforce, thanks to years of resistance, has recently proven its immense potential. While it may not yet have reached its full potential, it's safe to say it has demonstrated its importance to the world. Facing numerous obstacles, women's participation in the workforce has been subject to many geographical and demographic barriers. Although it hasn't fully overcome these obstacles, it can be said that significant progress has been made. These obstacles primarily include factors such as marital status, number of children, religious beliefs, political freedom, and freedom of expression. Each of these factors has been extensively studied in the literature, as the potential for women's participation in the workforce is significant and should not be underestimated. Through this potential, countries aim to achieve higher levels of production and productivity in many areas. Therefore, this study examines the relationship between women in the workforce and freedom of expression, investigating its direction and extent. Before moving on to this research, some examples of similar studies in the literature are summarized below.

Literature Review

It can be said that women's labor force participation is a complex variable that needs to be addressed from multiple perspectives. This is because women, both as the cornerstone of the family and as part of the workforce in the production process, require a multifaceted approach. Therefore, studies on women in the labor force have been examined from both demographic and freedom perspectives.

A study examining the relationship between employment and freedom of expression highlights the importance of human rights (Vickers, L., (2002); McCarry, G. J. (1980)). The relationship between religion and female labor force participation, among demographic variables, is one of the relationships studied in the literature and needs to be constantly updated in the changing world order. In one of the studies on religion and female labor force participation, concrete results were obtained using the panel data analysis method (Koyuncu, C. and Okşak, Y. (2018)). Another study on the relationship between religion and female labor force participation was conducted using a sample from India(Kar,S.,(2025)). Another study conducted using the cross-sectional empirical method between 1985 and 2005 also examined the relationship between religion and women's labor force participation(Bayanpourtehrani, G., & Sylwester, K. (2013)).

One study examining female labor force participation in relation to some key macroeconomic variables investigated the relationship between inflation and

female labor force participation; another examined the relationship between labor productivity and female labor force participation; and yet another study investigated the relationship between gross value added and female labor force participation(Koyuncu,C. and Okşak,Y. (2021); Yalcinkaya Koyuncu,J., Yilmaz,R. ve Ünver,M., (2016); Unal, H.S. ve Koyuncu,C., (2021)). Another study that examines women's labor force participation from a different perspective investigates the relationship between ICT and women's labor force participation (Okşak, Y. and Koyuncu, C. (2020); Ngoa, G. B. N., & Song, J. S. (2021)).

A study on women's labor force and freedoms, which are the two main variables of our study, has been conducted in Konya. This study focused on economic freedom (İçli, S. (2020)). Another study conducted in Türkiye on women's participation in the workforce, the obstacles they face, and their solutions, also emphasized economic freedom among the freedoms in question(Kılıç, D., & Öztürk, S. (2014)).

Women's participation in the workforce, which remains dormant and whose full potential has not been utilized, is like an untouched forest waiting for the obstacles in its path to be removed. The differences created by each geography, each culture, and each religious viewpoint lead to very different outcomes regarding women's participation in the workforce. Therefore, although women's participation in the workforce has been extensively researched in the literature for each region, society, and religion, these studies need to be constantly updated. This study aims to contribute to the literature by presenting one of these current versions.

Data and Methodology

Degree of freedom of speech in a country may play an important role for female labor participation rate. Higher degree of freedom of speech may result in higher participation of female to labor force since freedom of speech is one of the most important pillars of democratic society. In this context, we attempt to examine long-run impact of freedom of speech on female labor participation rate in Turkiye for the period of 1990-2022 by utilizing ARDL estimation method. The variable of female labor force participation rate (PARTRATE_FEMALE) is given by percentage of females in female population ages 15 or more (modeled ILO estimate). Freedom of speech (FREESPEECH) variable indicates the extent to which freedoms of speech and press are affected by government censorship, including ownership of media outlets. Censorship is any form of restriction that is placed on freedom of the press, speech or expression. It is scored as 0 (i.e., complete government censorship on freedom of the press, speech or expression), 1 (i.e., some government censorship on freedom of the press, speech or expression), and 2

(i.e., none government censorship on freedom of the press, speech or expression).

Firstly we conduct cointegration analysis to see if PARTRATE_FEMALE and FREESPEECH variables move together in the long-run. We preferred to employ ARDL bounds test for cointegration analysis and thus we estimated following model:

$$\Delta \text{PARTRATE\_FEMALE}_t = \alpha_0 + \sum_{i=1}^{p} \delta_i \Delta \text{PARTRATE\_FEMALE}_{t-i} + \sum_{i=0}^{q} \phi_i \Delta \text{FREESPEECH}_{t-i} + \theta_0 \text{PARTRATE\_FEMALE}_{t-1} + \theta_1 \text{FREESPEECH}_{t-1} + \varepsilon_t \quad (1)$$

The explanation of notations used in Equation 1 is as follows: θ_0 and θ_1 notations stand for the long-run coefficients of the model; δ_i and ϕ_i notations represent short-run coefficients of the model; Δ notation gives first degree difference operator; α_0 reflects intercept term of the model, and ε_t is white noise error term of the model.

The null hypothesis of ARDL bounds test is formed as $H_0: \theta_0 = \theta_1 = 0$ and claims the non-existence of co-integrating relationship between freedom of speech and female labor force participation rate. The alternative hypothesis of ARDL bounds test is formed as $H_1: \theta_0 \neq \theta_1 \neq 0$ and asserts the existence of co-integrating association between freedom of speech and female labor force participation rate. Regarding to decision rule in ARDL bounds test, if F-statistic value is bigger than the critical value of upper limit at an acceptable significance level then we come to a conclusion that freedom of speech and female labor force participation rate variables are co-integrated. On the other hand if F-statistic value is smaller than the critical value of lower limit at an acceptable significance level then we reach at a conclusion that freedom of speech and female labor force participation rate variables are not co-integrated. Meantime any F-statistic value falls in between two critical values then we are indecisive about the presence or absence of co-integrating relationship between freedom of speech and female labor force participation rate variables.

We also obtained short-run and long-run coefficients by estimating following model:

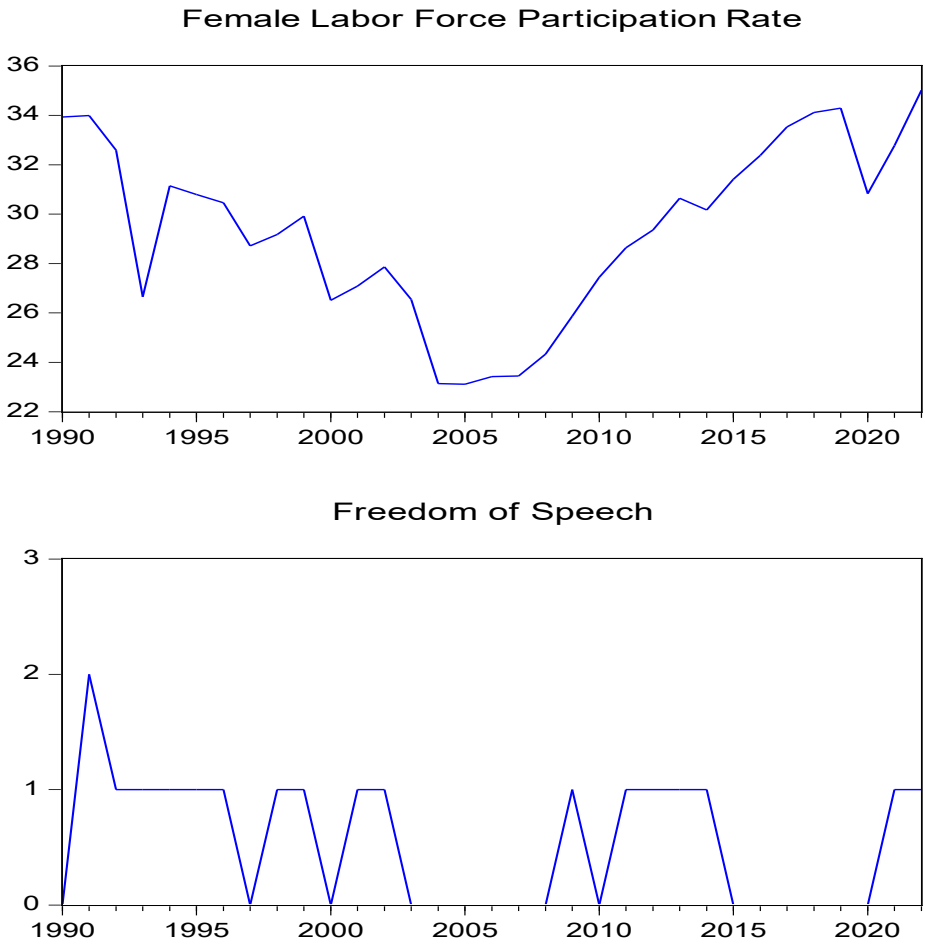
$$\text{PARTRATE\_FEMALE}_t = \beta_0 + \sum_{i=1}^{p} \alpha_i \Delta \text{PARTRATE\_FEMALE}_{t-i} + \sum_{i=0}^{q} \mu_i \Delta \text{FREESPEECH}_{t-i} + \gamma ECM_{t-1} + \varepsilon_t \quad (2)$$

The explanation of notations used in Equation 2 is as follows: α_i and μ_i notations show dynamic coefficients returning the model back to the balance in the long-run; ECM notation represents error correction term of the model; γ notation stands for the speed of adjustment at which the model goes back to the long-run in response to a shock occurred in the short-run. By the way

negative and statistically significant coefficient estimation for the speed of adjustment term must be obtained.

Graph 1 below depicts the behavior of freedom of speech and female labor force participation rate variables over the estimation period. Female labor force participation rate shows a pattern like parabolic function with a decrease until 2005 and with an increase after that. Freedom of speech variable takes the value of 2 just for 1991 and for the remaining years it takes value of 0 or 1.

Graph 1. Freedom of Speech and Female Labor Force Participation Rate Overtime



Estimation Results

We have to have series with integration order zero or one in order to be able to use ARDL bounds test for cointegration analysis. Therefore we employed Augmented Dickey-Fuller (ADF) unit root test to find out integration order of variables of freedom of speech and female labor force participation rate. As can be deduced from the results of ADF unit root tests given in Table 1, freedom of speech variable is stationary at level and female labor force participation rate variable is stationary at first difference. This finding reveals that our variables are integrated order either zero or one and thus we are eligible to utilize ARDL bounds test for cointegration analysis.

Table 1. ADF Unit Root Test

Null Hypothesis: PARTRATE_FEMALE has a unit root.			
		t-Statistic	Prob.
ADF test statistic		-1.820416	0.6726
Test critical values:	1% level	-4.252879	
	5% level	-3.54849	
	10% level	-3.207094	
Null Hypothesis: D(PARTRATE_FEMALE) has a unit root.			
		t-Statistic	Prob.
ADF test statistic		-6.786426	0.0000
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	
Null Hypothesis: FREESPEECH has a unit root.			
		t-Statistic	Prob.
ADF test statistic		-4.501752	0.0060
Test critical values:	1% level	-4.28458	
	5% level	-3.562882	
	10% level	-3.215267	

We must use optimal lag lengths of our dependent and independent variables in ARDL model to be estimated. For that reason we used AIC criterion to decide on optimal lag lengths of ARDL model. As indicated by Figure 1 and Table 2, the ARDL model with the lowest AIC score is ARDL(1,3) model and thus the best model with optimal lag length, which will be used in the analyses, is ARDL(1,3) model.

Figure 1. Twelve ARDL Models

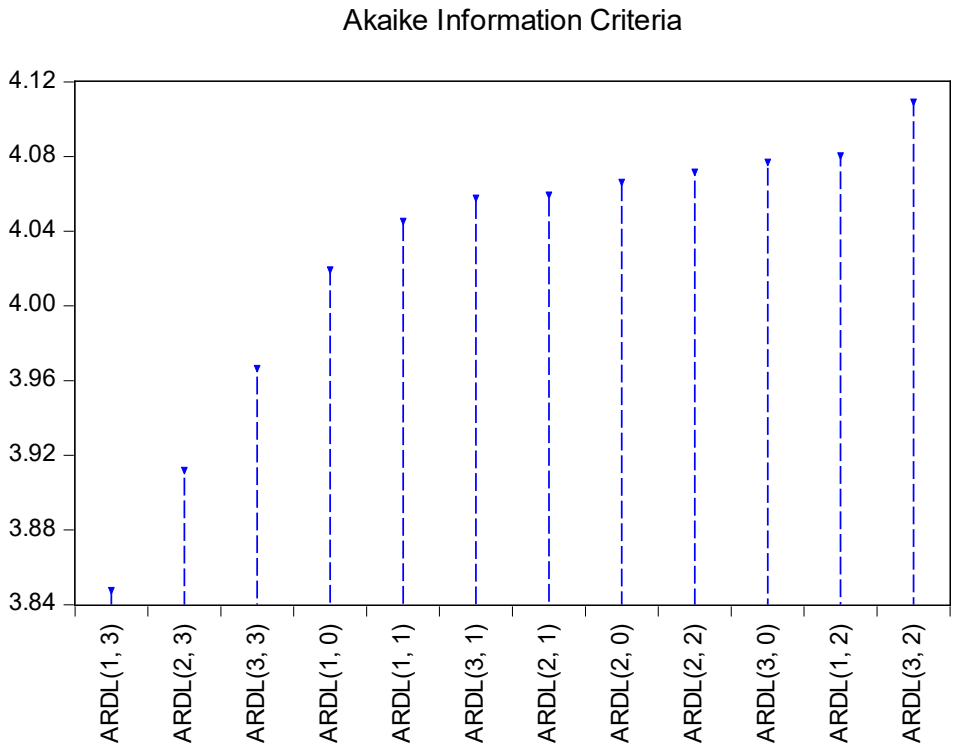


Table 2. Optimal Lag Length Selection

Model	LogL	**AIC***	BIC	HQ	Adj. R-sq	Specification
9	-43.020814	**3.847755**	4.186473	3.945294	0.787697	**ARDL(1, 3)**
5	-42.856845	3.912065	4.299172	4.023538	0.778711	ARDL(2, 3)
1	-42.566929	3.966687	4.402182	4.092094	0.770862	ARDL(3, 3)
12	-48.253207	4.019477	4.213031	4.075214	0.725788	ARDL(1, 0)
11	-47.59192	4.045532	4.287474	4.115203	0.726978	ARDL(1, 1)
3	-45.752152	4.057858	4.396576	4.155396	0.738060	ARDL(3, 1)
7	-46.773392	4.059492	4.349822	4.143096	0.730820	ARDL(2, 1)
8	-47.862615	4.066355	4.308297	4.136025	0.721233	ARDL(2, 0)
6	-45.932634	4.071741	4.410459	4.169280	0.734398	ARDL(2, 2)
4	-47.002463	4.077113	4.367443	4.160717	0.726035	ARDL(3, 0)
10	-47.046079	4.080468	4.370798	4.164072	0.725114	ARDL(1, 2)
2	-45.421549	4.109350	4.496457	4.220823	0.730450	ARDL(3, 2)

In Table 3, we reported the findings of ARDL bounds test. F-statistic value is statistically significant at 5% and 10% significance levels for finite sample

size of 35 it is so at 10% significance level for finite sample size of 30. As a result, freedoms of speech and female labor force participation rate variables are co-integrated and they move together in the long-run.

Table 3. ARDL Bounds Test

Test Statistic	Signif.	Lower Limit	Upper Limit
F-statistic: **5.857605**			
		Asymptotic: n=1000	
	10%	4.05	4.49
k: 1	5%	4.68	5.15
	2.5%	5.3	5.83
	1%	6.1	6.73
Actual Sample Size: 28		Finite Sample: n=35	
	10%	4.38	4.867
	5%	5.233	5.777
	1%	7.477	8.213
		Finite Sample: n=30	
	10%	4.427	4.957
	5%	5.377	5.963
	1%	7.593	8.35

Table 4 below reports the findings of long-run coefficient estimation for ARDL(1,3) model. Statistically significant positive coefficient estimation was obtained at %1 significance level. According to the this finding, If freedom of speech level goes up by one unit then female labor force participation rate increases by 9.497 unit in Turkiye between 1990-2022.

Table 4. Long-run Coefficient Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FREESPEECH	9.497198	3.335656	2.847175	0.0097
TREND	0.474921	0.215391	2.204922	0.0387

EC = PARTRATE_FEMALE - (9.4972*FREESPEECH + 0.4749*TREND)

We displayed ECM regression estimation results of ARDL(1,3) model for short-run coefficients in Table 4. Statistically significant positive short-run

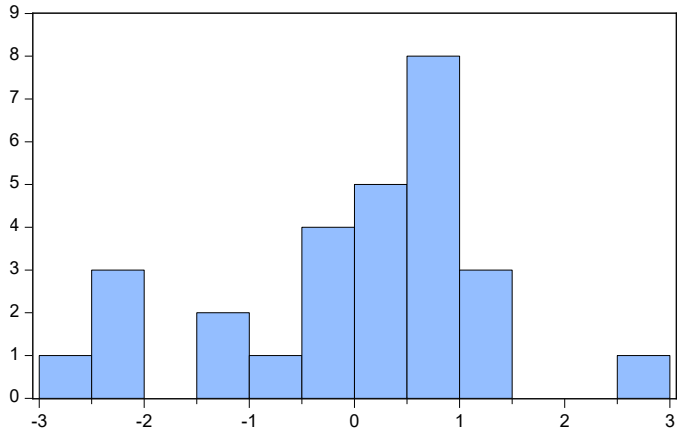
coefficient estimation was obtained for current period of FREESPEECH variable and statistically significant negative short-run coefficient estimation was obtained for second lag of FREESPEECH variable. Also the coefficient of ECM term is statistically significant and possesses negative sign at %1 significance level.

Table 4. ECM Regression Results for Short-run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.600543	0.289854	2.071877	0.0508
D(FREESPEECH)	1.450834	0.491578	2.951383	0.0076
D(FREESPEECH(-1))	-0.522241	0.529971	-0.985414	0.3356
D(FREESPEECH(-2))	-1.347544	0.44007	-3.062116	0.0059
ECM(-1)	-0.292305	0.066629	-4.387074	0.0003
R-squared	0.606437	Mean dependent var		0.094179
Adjusted R-squared	0.537992	S.D. dependent var		1.999856
S.E. of regression	1.359326	Akaike info criterion		3.612288
Sum squared resid	42.49864	Schwarz criterion		3.850181
Log likelihood	-45.57203	Hannan-Quinn criter.		3.685014
F-statistic	8.860128	Durbin-Watson stat		2.410208
Prob(F-statistic)	0.000176			

In addition to that several diagnostic tests were performed to find out if our ARDL(1,3) model has any problem. Firstly we implemented Jarque-Bera normality test to check if the residuals of ARDL(1,3) model are normally distributed. Jarque-Bera normality test findings are provided in Figure 2 and as seen from the test results, residuals of ARDL(1,3) model are normally distributed.

Figure 2. Jarque-Bera Normality Test



Secondly Breusch-Godfrey serial correlation LM test was conducted for autocorrelation problem and the findings were given in Table 5. Since we have statistically insignificant test statistic for Breusch-Godfrey serial correlation LM test, we conclude that the residuals of ARDL(1,3) model do not possess autocorrelation problem.

Table 5. Breusch-Godfrey Autocorrelation Test

F-statistic	0.6190	Prob. F(2,19)	0.5490
Obs*R-squared	1.7129	Prob. Chi-Square(2)	0.4247

Thirdly we checked the variances of the residuals of ARDL(1,3) model via Harvey heteroskedasticity test and the findings of Harvey heteroskedasticity test are shown in Table 6 below. As indicated by the test results in Table 6, the residuals of ARDL(1,3) model are homoskedastic.

Table 6. Harvey Heteroskedasticity Test

F-statistic	1.6009	Prob. F(6,21)	0.1962
Obs*R-squared	8.7878	Prob. Chi-Square(6)	0.1859
Scaled explained SS	6.2947	Prob. Chi-Square(6)	0.3910

Fourthly we implemented model misspecification test of Ramsey RESET test and the test results are shown in Table 7. The findings of Ramsey RESET test disclose that ARDL(1,3) model is not misspecified.

Table 7. Ramsey RESET Test

	Value	df	Probability
t-statistic	0.649071	20	0.5237
F-statistic	0.421293	(1, 20)	0.5237

Lastly we implemented parameter stability test via CUSUM test and CUSUM-Square test for the parameters of ARDL(1,3) model. As seen from Figure 3 and 4 below, parameters of ARDL(1,3) model are stable.

Figure 3. CUSUM Test

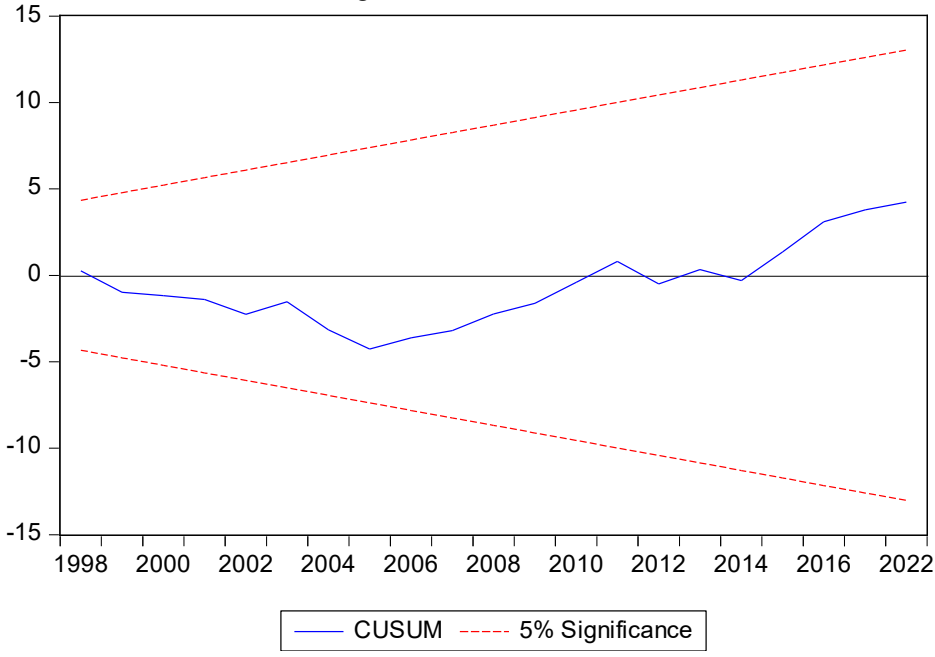
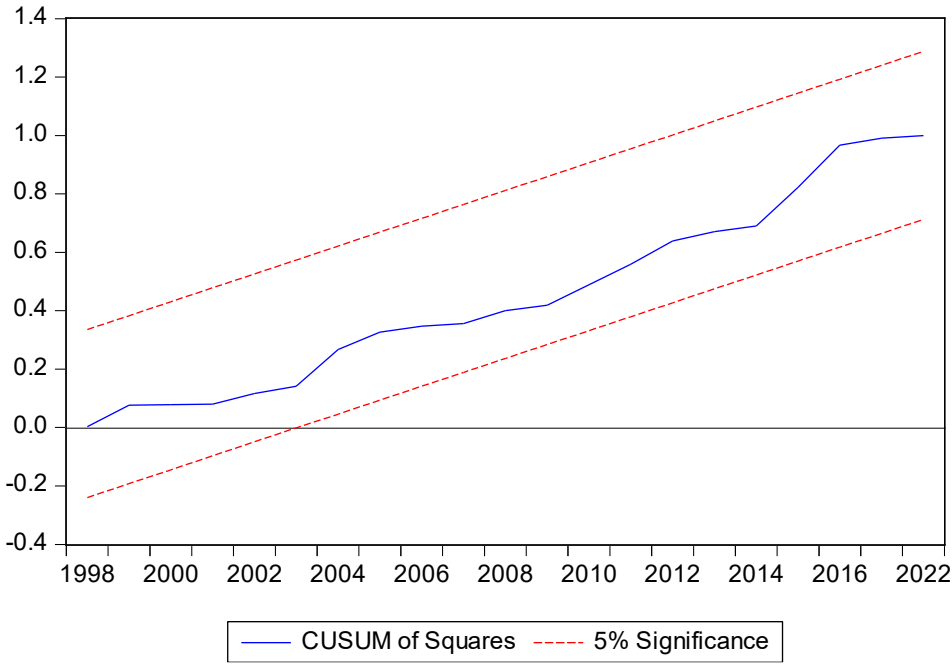


Figure 4. CUSUM-Square Test



CONCLUSION

In this study we attempt to investigate long-run relationship between freedom of speech and female labor force participation rate in Turkiye. This study employs ARDL estimation technique to conduct cointegration analysis between freedom of speech and female labor force participation rate and obtain long-run coefficient estimations. We performed Augmented Dickey-Fuller unit root test in order to check integration order of variables of freedom of speech and female labor force participation rate. The results of Augmented Dickey-Fuller unit root test imply that freedom of speech variable is integrated order zero and female labor force participation rate variable is integrated order one. After figuring out stationarity status of variables of freedom of speech and female labor force participation rate, we conducted cointegration analysis by using ARDL bounds test. According to the results of ARDL bounds test, variables of freedom of speech and female labor force participation rate are co-integrated over the estimation period of 1990-2022 in Turkiye. Therefore freedom of speech and female labor force participation rate move together in the long-run in Turkiye during the estimation period. Regarding to the long-run coefficient estimation, positive statistically significant coefficient estimation was obtained for freedom of speech variable. More specifically, if freedom of speech level increases by one unit then female labor force participation rate goes up by 9.497 unit in Turkiye between 1990-2022. Moreover diagnostic test results indicate that the model used in the analyses

does not have any problem of non-normality, autocorrelation, heteroscedasticity, model misspecification, and parameter instability.

REFERENCES:

Bayanpourtehrani, G., & Sylwester, K. (2013). Female labour force participation and religion: a cross-country analysis. *Bulletin of Economic Research*, *65*(2), 107-133.

İçli, S. (2020). *Kadınların çalışma hayatı ve ekonomik özgürlük algısı: Konya örneği* (Master's thesis, Necmettin Erbakan University (Turkey)).

Kar, S. (2025). Religion and female labor force participation in India. *Review of Development Economics*, *29*(2), 917-948.

Kılıç, D., & Öztürk, S. (2014). Türkiye'de kadınların işgücüne katılımı önündeki engeller ve çözüm yolları: Bir ampirik uygulama. *Amme İdaresi Dergisi*, *47*(1), 107-130.

Koyuncu,C. and Okşak,Y. (2021), Does More Inflation Mean More Female Labor Force Participation?: The Case of Turkey. Balkan and Near Eastern Journal of Social Sciences, 7 (2), 115-123.

Koyuncu,C. and Okşak,Y. (2018), "Religion and Female Labor Force Participation" in Studies on Balkan and Near Eastern Social Sciences-Volume 2 Edited by Rasim Yilmaz and Günther Löschnigg, pp. 137-144. Berlin: PETER LANG. ISBN 978-3-631-74727-8.

McCarry, G. J. (1980). The contract of employment and freedom of speech. Sydney L. Rev., 9, 333.

Ngoa, G. B. N., & Song, J. S. (2021). Female participation in African labor markets: The role of information and communication technologies. Telecommunications Policy, 45(9), 102174.

Okşak, Y. and Koyuncu,C. (2020), "Is There Any Relationship Between Female Labor Force Participation and ICT Penetration?: Panel Study" in Studies on Balkan and Near Eastern Social Sciences-Volume 4 Edited by Rasim Yilmaz and Günther Löschnigg, pp. 43-55. Berlin: PETER LANG. ISBN 978-3-631-81910-4.

Unal, H.S. ve Koyuncu,C., (2021), Female Labor Force Participation and Gross Value Added: Long-run Analysis for OECD Sample. Balkan and Near Eastern Journal of Social Sciences, 7 (1), 102-108.

Vickers, L. (2002). Freedom of speech and employment. OUP Oxford.

Yalcinkaya Koyuncu,J., Yilmaz,R. ve Ünver,M., (2016), “The Relationship Between Female Labor Force Participation and Labor Productivity: Panel Data Analysis”, Eskişehir Osmangazi Üniversitesi İİBF Dergisi, Ağustos 2016, 11(2), 237- 249.

The Impacts of Mass Migration on Family Structure in the Context of Marriage and Divorce: Some Case Evidences from Sanliurfa, Türkiye[1]

Recep BAYDEMİR[2]

1- This study is derived from the doctoral thesis entitled Toplumsal Mekânın Üretimi: Şanlıurfa Şehrinde Suriyeli ve Şanlıurfalıların Karşılaşması (2023) [The Production of Social Space: Encounter of Syrians and People from Sanliurfa in the Sanliurfa City].

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ABSTRACT

In this study, I aim to evaluate marriage and divorce practices between *the host community* and *migrants* based on the findings of a study conducted on Syrians in Sanliurfa. While I use data obtained from a literature review in my research, I primarily draw on my doctoral thesis, which I conducted in Sanliurfa between April and September 2020. I discuss marriage and divorce practices between *the host community* and *migrants* based on data obtained from Syrians and Sanliurfa residents in Sanliurfa. The findings of my research show that social contact between the two communities has increased significantly, particularly through marriages, but that these relationships are asymmetrical due to 'different social positions,' 'perceptions,' and 'power dynamics.' Looking at the results regarding marriage and divorce patterns, it is seen that the divorce rate among Syrian participants after migration is low (8 per cent). In contrast, approximately half of the Syrians stated that one of their family members got married after migration. While 80 per cent of marriages after migration took place among Syrians, 20 per cent were with individuals from Sanliurfa. The data I have obtained clearly indicates that there is a significant level of contact between the two communities based on marriage. However, from the perspective of the Sanliurfa participants, the fact that 66 per cent of participants stated that they would be uncomfortable if a member of their family married a Syrian indicates that the cultural distance between the two communities persists and that marriage serves as an important boundary for the Sanliurfa participants. The most important finding I reached in my research was that Sanliurfa participants tended to conceal their relationships with Syrians. This situation can be explained by 'negative social perceptions' towards Syrians, 'othering discourses' and 'the host community's desire to see itself in a primary position'. Therefore, it is understood that reporting kinship relationships leads to being perceived as a 'loss of status' or 'degradation and humiliation.' Based on these important findings, I argue that kinship and marriage relationships between *migrants* and *the host community* are shaped in the context of the 'dominant community' and 'power relations.'

Keywords – Forced Mass Migration, Marriages and Divorces, Family Structure, Syrians, Sanliurfa/Türkiye.

INTRODUCTION

Undoubtedly, forced mass migration movements are multi-layered sociological processes that transform demographic structures, social structures, family relationships, cultural norms, and perceptions of identity. The mass migration from Syria to Türkiye after 2011 has had significant effects on various aspects of daily life, particularly in border cities. One such city, Sanliurfa, has become an area densely populated by Syrians, both due to its historical cultural proximity to Syrian communities and its geographical location (see: İçduygu & Millet, 2016). In this context, the areas where encounters between the two communities are most clearly observable include marriage, kinship relations, and family structures.

The impact of migration on family structures in the context of marriages and kinship relations is a frequently discussed topic in both Turkish and international literature (see: Van der Klaauw, 2004; Hense & Schorch, 2013; Merali et al., 2014; Cohen, 2016; Hyndman-Rizk, 2016; Brettell, 2017; Foster et al., 2024), examining it within the context of the unique dynamics of local social encounters is of particular importance. There are limited studies on how interactions between Syrians and *the host community* in Türkiye are established, particularly through marriage and kinship relations (Çelik & Vural, 2018; Erdoğan, 2020; Mercan et al., 2023). Existing research indicates that such encounters are shaped by unequal power relations, social perceptions, and economic conditions, despite cultural proximity (Kaya, 2017; 2018).

Our field research conducted specifically in Sanliurfa shows that marriages between Syrians and people from Sanliurfa are not solely based on individual preferences. Rather, they are shaped by the socio-economic pressures created by migration, family norms, social expectations, cultural similarities and, most importantly, the context of the 'dominant group' and 'power relations'. In particular, the increase in the practice of taking a second wife, known as 'kuma (secondary marriage),' economic factors such as 'low dowry and bride price,' the expectation of male children, and the social fragility created by the war have been shown to be effective in the emergence of marriages with Syrian women (see: Kaya, 2017; 2018). However, the fact that a significant portion of *the host community* finds marriage with Syrians 'disturbing' indicates that the cultural distance between the two communities persists.

Within this framework, my research aims to discuss the forms of rapprochement and distancing between the two communities after migration, the sociocultural background of marriage practices, and how social boundaries are rebuilt through the institution of the family, based on the findings I obtained from *the host community* in Sanliurfa and the Syrians.

RESEARCH UNIVERSE AND SAMPLE

As mentioned earlier, this research is derived from my doctoral thesis entitled *Toplumsal Mekânın Üretimi: Şanlıurfa Şehrinde Suriyeli ve Şanlıurfalıların Karşılaşması* [*The Production of Social Space: Encounter of Syrians and People from Sanliurfa in the Sanliurfa City*]. For this reason, I am drawing on data from my doctoral thesis, particularly from the sections where I attempted to unravel the marriage and kinship relations between the two communities. My doctoral thesis is, of course, much more comprehensive. However, here I am only using the parts of the data I obtained within the scope of my thesis that are relevant to this study. For more detailed information, please refer to my thesis (see: Baydemir, 2023). The universe of this research consists of Syrians living within the boundaries of the central districts of Sanliurfa, Haliliye and Eyyübiye, and the people from Sanliurfa population. Undoubtedly, Sanliurfa is one of the provinces with the highest concentration of Syrian population in Türkiye. For this reason, it is a province where noticeable changes have occurred in the demographic and social structure following migration (see: Erdoğan, 2020). The main reason for selecting these two districts is both the high concentration of Syrian population and the fact that social encounters and interactions are more visibly experienced at the neighbourhood level. In this context, the research population encompasses all neighbourhood members in these two districts where Syrians and Sanliurfa residents coexist, and where marriage and kinship relationships may be formed. I should emphasise that defining the research universe in this way is consistent with Creswell's (2009) emphasis on the decisive role of spatial context in determining social behaviour in field research.

The sample for my research consists of a total of 720 participants selected using *random sampling techniques* from individuals living in 45 neighbourhoods in the Haliliye and Eyyübiye districts of Sanliurfa province. Half of the sample comprises 360 Syrians, while the other half comprises 360 people from Sanliurfa. The sample size was determined using criteria employed in the social sciences that aim to increase representativeness in areas with large local populations (see: Neuman, 2014). The neighbourhood-based distribution strengthened the spatial diversity of the research; it also allowed for a comparison of the situations of Syrians and Sanliurfa' residents in settlements with different socio-economic characteristics. It is also worth noting that I included the mukhtars (heads) of 37 neighbourhoods in the sampling process. As part of the research, I conducted telephone and face-to-face interviews with the mukhtars of the 37 neighbourhoods with the highest concentration of Syrians.

RESEARCH METHODOLOGY

This study was conducted using a mixed-methods approach that combines quantitative and qualitative data collection techniques. Mixed-methods design is a frequently preferred approach, particularly in migration studies, as it allows for the simultaneous analysis of both individual experiences and social structures and norms (see: Maxwell, 2013; Creswell & Clark, 2017). However, a total of 720 individuals were surveyed face-to-face. Although the questionnaire was extensive within the scope of my doctoral thesis and contained questions on many topics, it also included questions aimed at measuring marriage, divorce, kinship ties, and social perceptions among Syrians and people from Sanliurfa. Conducting the surveys face-to-face is consistent with the literature indicating that factors such as language, literacy, and trust relationships can affect data quality in studies on migrant groups.

Additionally, semi-structured interviews were conducted with 37 neighbourhood representatives (mukhtars) as part of the field research. The representatives were considered critical actors in generating knowledge about social changes at the neighbourhood level. This qualitative approach is based on classical ethnographic studies that utilise 'community knowledge providers' in field research (see: Hammersley & Atkinson, 2019). Also, this research adhered to ethical principles. Ethical approval was obtained from the Harran University Social and Human Sciences Ethics Committee with decision number 2020/31 dated April 07, 2020.

RESEARCH FINDINGS

Firstly, in order to determine whether there was any intermingling between the two participant groups in terms of kinship relations, Sanliurfa participants were asked, 'Do you have any kinship relations with Syrians?' 90% of Sanliurfa participants answered "no" to this question, while 10% answered 'yes' (Figure 1). As can be seen, only 10% of the Sanliurfa participants stated that they had kinship ties with Syrians.

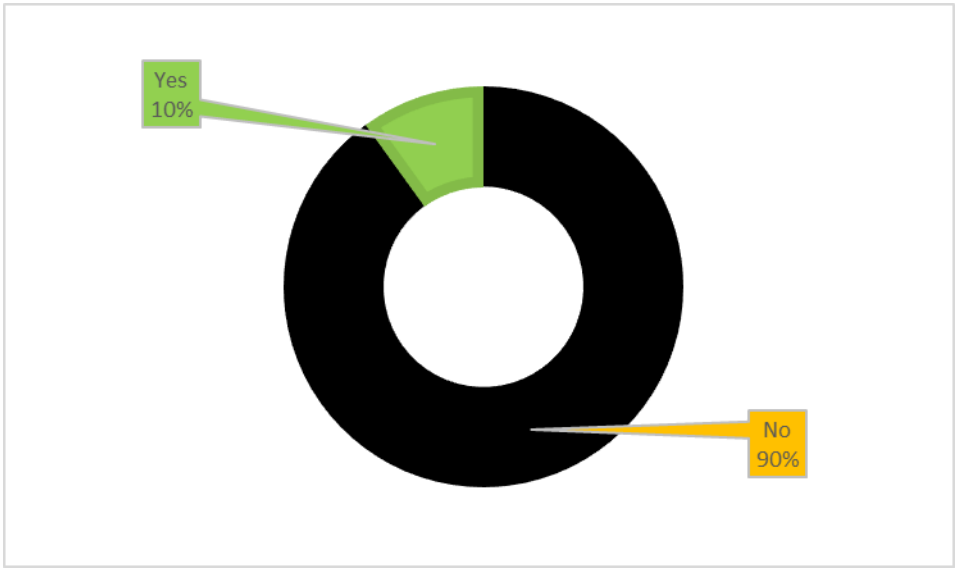

Figure 1: Whether Participants from Sanliurfa Have Kinship Ties with Syrians

Some of the participants from Sanliurfa who stated that they had kinship ties with Syrians indicated that these ties dated back to before the migration, meaning that they had kinship ties with Syrians while they were still in Syria. Some of the participants also stated that kinship ties began after the migration through new marriages with Syrians. However, the percentage of those who stated that they had kinship ties with Syrians was found to be lower than the actual known kinship ties between the two groups. The most important reason for this is that the participants from Sanliurfa were reluctant to state that they had kinship ties with Syrians, and some of them concealed this fact. Indeed, both during the interviews and in field observations, it was noted that some participants attempted to conceal this. The reason for this stems from the general perception of Syrians, both among themselves and within society.

Therefore, it is understood that some participants did not want this to be known, as they perceived their kinship ties with a 'bad' and 'undesirable' community as 'diminishing' and "degrading". This is evident from some participants' implicit statements such as 'yes, we have kinship ties, unfortunately' and 'I wish we didn't, but we do'. Furthermore, data on the kinship ties between Syrian participants and those from Sanliurfa also confirms this. Indeed, we understand from the responses of Syrian participants that the majority cited 'having relatives in Sanliurfa before migrating' as their reason for choosing Sanliurfa when migrating. In this sense, while Sanliurfa participants tend to conceal their kinship ties with Syrians, Syrian participants do not see any problem in mentioning their kinship ties with Sanliurfa residents and openly state this. The fact that some

Sanliurfa participants conceal their kinship ties with Syrians is partly related to power relations. Indeed, as discussed in the perceptions and judgements section of this study, this is also a situation related to the existence of rigid perceptions and judgements towards Syrians. Here, the host community is in the primary position, while Syrians are in the secondary position. The unacceptable nature of appearing alongside an identity that is generally marginalised and secondary in society, from the perspective of t*he host community* that positions itself as primary, can also be explained by power relations.

Furthermore, when Sanliurfa participants were asked, 'Would you be uncomfortable if someone in your family married a Syrian?' 66.1% responded 'yes,' 24.4% responded 'unsure,' and 24.4% responded 'no.' As can be seen, the percentage of participants from Sanliurfa who would feel uncomfortable if there were any marriages with Syrians is quite high.

In contrast, when looking at marriage and divorce among Syrians, 89 per cent of Syrian participants answered "no" to the question of whether any member of their family had divorced after migration. Eight per cent of Syrian participants stated that someone in their family had divorced after migration, while 3 per cent responded 'I don't know' (Figure 2).

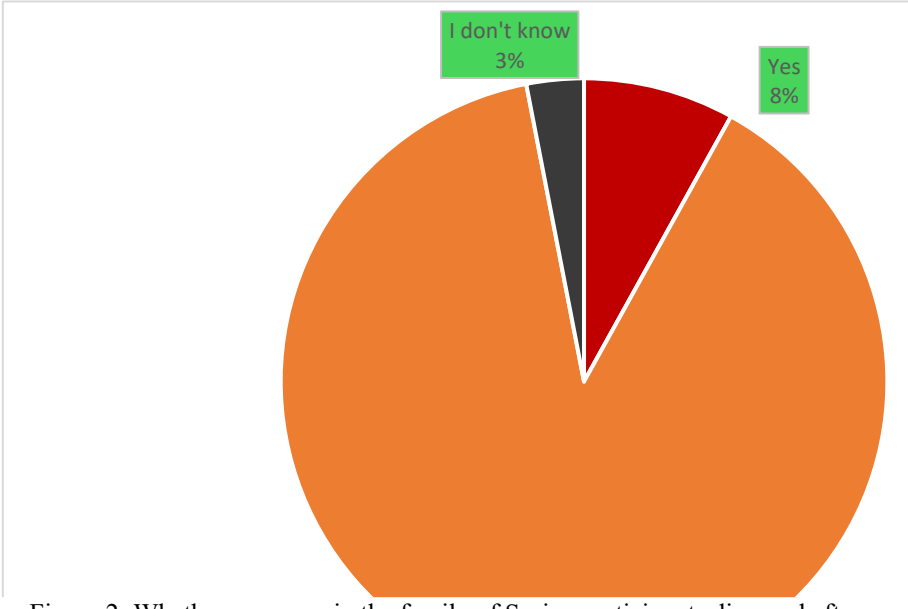

Figure 2: Whether someone in the family of Syrian participants divorced after migration in Türkiye

On the other hand, when asked whether any member of their families had married after migration, half of the Syrian participants (50%) answered ‘no’, 47% answered “yes” and 3% answered ‘I don’t know’ (Figure 3). As can be seen, nearly half of the Syrian participants stated that someone in their family had married after migration.

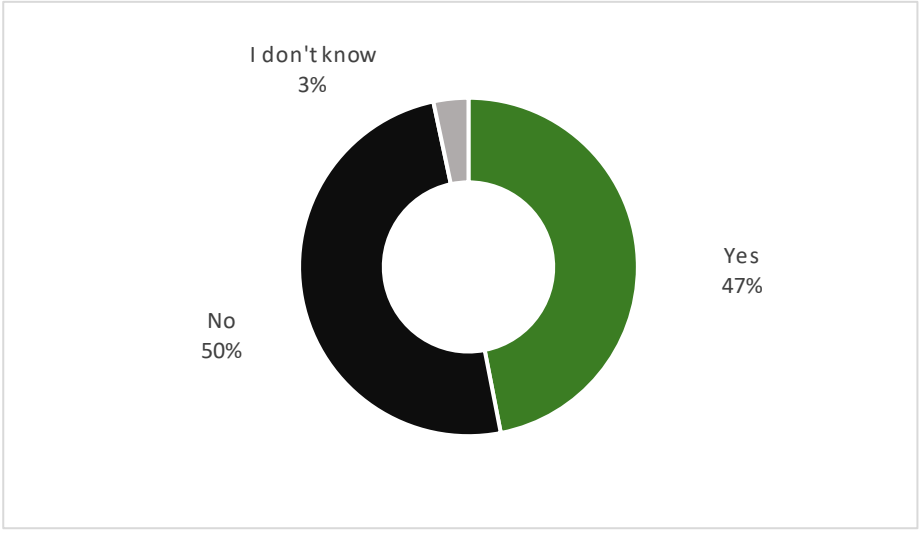

Figure 3: Whether someone in the participants' families had married after migration

In addition, Syrian participants who stated that someone in their family had married after migration were also asked where the person they married was from. Accordingly, 80% of Syrian participants who stated that someone in their family had married after migration said they had married someone who was ‘Syrian’ and 20% said they had married someone who was ‘from Sanliurfa’ (Figure 4).

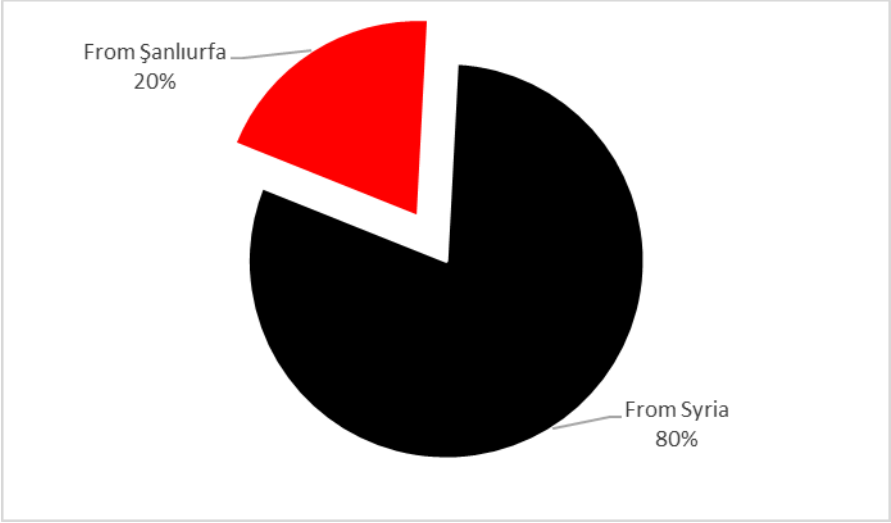

Figure 4: Where the Person Married by the Syrian Individual is From

In interviews with village headmen, they frequently stated that divorce rates had increased in their neighbourhoods after the arrival of Syrians and that marriages with Syrians had increased. Based on the interviews and field observations, it was observed that there was an increase in divorce rates and polygamous marriages in the city after the arrival of Syrians. What one of the mukhtar said was quite interesting: '*The man who lives in the building opposite me divorced his wife. He paid dowry to two Syrian women and married them. A week later, they left him, took the gold and money, and ran away. The man still says to me, 'Hey, mukhtar, find me another Syrian woman'. He still hasn't learned his lesson. He's old, but he's gone mad*.' (Mukhtar, face-to-face interview).

As can be seen, the marriages that Syrians enter into after migration are mostly among themselves (with other Syrians). However, the proportion of marriages outside the Syrian community is not insignificant. Indeed, one in five Syrians who married after migration married someone from Sanliurfa. Therefore, it is evident that the intermingling between people from Sanliurfa and Syrian communities also occurs through marriage.

Kaya, who examines the encounters and intermingling of Syrians and people from Sanliurfa in the context of marriage and kinship relations in Sanliurfa, states that marriages with Syrians are preferred and that there are various reasons for this, primarily historical and social background. It is particularly known that men from Sanliurfa marry Syrian women more frequently. Kaya states that the factors determining Sanliurfa people's preference for Syrians as marriage partners include '*childlessness, the male child system, love, the war environment, low dowry or bride price, the cost*

of marriage in Türkiye, (...) incompatibility between spouses, the relative neatness and beauty of Syrian women, and religious and cultural values' (Kaya, 2017: 78).

Almost all of the village headmen interviewed as part of the research stated that with the arrival of Syrians, arranged marriages had increased in the city and marriages with Syrians had become more common. According to the mukhtar, second marriages with Syrians were particularly common in neighbourhoods with large Arab populations. They even stated that there were cases of men divorcing their wives and marrying Syrian women. Indeed, one of the mukhtar interviewed stated, '*There were men who rented their houses to him but took his daughter. Exactly like that. I witnessed this happen to many people. Many men divorced their wives and took Syrian women. Some even had two marriages. They brought in a second wife.*' (Mukhtar 20, face-to-face interview). Mukhtar 20 stated that this situation was more prevalent when the Syrians first arrived, but that it was later reduced through state pressure and intervention. However, according to the mukhtar, it was so exaggerated at first that it almost reached the level of 'prostitution' (Mukhtar 20, face-to-face interview).

The mukhtar (headman) of another neighbourhood where Syrians live in large numbers and where there is a relatively high proportion of Arabs from Sanliurfa also stated that relations between the two communities were good, that there were no problems, and that they, like other residents of the neighbourhood, had many Syrian relatives. He added: '*Everyone knows each other in this area because they are tribes. Many people have Syrian relatives. We are all relatives. We have exchanged daughters in marriage. Marriages have taken place since the Syrians arrived. There are 'kuma (secondary marriages)' marriages. But this already existed before the Syrians arrived.*' (Mukhtar 19, face-to-face interview). As can be seen, as emphasised by Mukhtar 19, polygamous marriages were already a phenomenon that existed before the Syrians came to Sanliurfa. However, with the Syrians, polygamous marriages have increased in the city. In other words, the phenomenon of migration has played an important role in the increase of polygamous marriages in the city.

DISCUSSION

Findings obtained within the scope of the research indicate that only 10 per cent of participants from Sanliurfa stated that they had kinship ties with Syrians. However, qualitative observations from the field and statements from Syrian participants suggest that this percentage is actually higher. The tendency of Sanliurfa residents to conceal these relationships is explained by 'negative social perceptions' towards Syrians, 'othering discourse' and 'the host community's desire to see itself in a primary

position'. Consequently, reporting kinship ties leads to it being perceived as a 'loss of status' or 'humiliation and degradation.'

However, interviews with village heads indicate a marked increase in marriages involving Syrians, particularly in the early years of migration, and especially in the practice of taking a second wife, known as 'kuma'. This increase is explained by both economic reasons (low dowry and bride price, rising marriage costs) and cultural and social factors. Some village headmen's accounts reveal that this process created an area open to abuse in some cases and was partially restricted by state intervention. Furthermore, according to the research findings, 'kuma' marriages are relatively more common in Arab neighbourhoods with a high concentration of Syrians, and this practice did not emerge entirely with the arrival of Syrians but gained momentum after migration.

Another important finding of this study concerns the intertwining of the two communities through marriage and kinship ties. Almost all of the mukhtars interviewed for the study stated that with the arrival of Syrians, polygamous marriages had increased in the city and marriages with Syrians had become more common. According to the village headmen, especially in neighbourhoods with a large Arab population, second marriages with Syrians were more common. It was even stated that there were cases of men divorcing their wives and marrying Syrian women. Undoubtedly, polygamous marriages were already a phenomenon in the city before the Syrians arrived in Sanliurfa. However, with the arrival of Syrians, polygamous marriages have increased even more in the city. In fact, it can be said that the phenomenon of migration has played a significant role in the increase of arranged marriages in the city. However, there is another important point here. Among the Syrian participants interviewed for the study, 20% of those who stated that someone in their family had married in Sanliurfa indicated that these marriages were with people from Sanliurfa. It was said that in these marriages, Syrian women married Sanliurfa men. In a patriarchal society, this situation should be interpreted as a strategy of an individual, group or mass that is 'subordinated' to establish a relationship with the 'dominant group' that subordinates them and to 'gain acceptance' from it. In this sense, the desire of Syrians to marry their daughters to men from Sanliurfa stems from their desire to be 'accepted' by that dominant group or neighbourhood.

CONCLUSION

The reluctance of participants from Sanliurfa to explain their kinship ties with Syrians is closely related to *the host community'*s general perceptions of Syrians. This situation is consistent with the environment of 'pseudo-integration' defined by İçduygu and Millet (2016) for the Syrian population in Türkiye; although visible contact and daily interaction exist, social acceptance, equality, and mutual legitimacy occur at a limited level. In

this context, the concealment of kinship ties indicates that the lower social status attributed to Syrians is perceived as a symbolic threat by the local population.

Data obtained regarding marriage and divorce practices reveal that migration has reshaped the family institution in various ways. The low divorce rates and high marriage rates in Syrian households indicate that family strategies have been reorganised following migration. Undoubtedly, this trend we have identified is parallel to findings in the literature. Previous studies have emphasised that the economic and social vulnerabilities caused by migration have transformed the institution of marriage into a means of providing both security and social support (see: Cohen, 2016; Kaya, 2017, 2018). The high rate of marriage among Syrians themselves can certainly be linked to a tendency to preserve cultural continuity. The significant number of marriages with people from Sanliurfa also shows us the effect of cultural proximity and geographical integration.

Moreover, our interviews with village heads confirm that the arrival of Syrians in the city has led to an increase in the practice of 'kuma' and second marriages. These observations are consistent with the literature showing that women's vulnerability increases where migration intersects with patriarchal structures. In particular, the proliferation of marriage forms that are not reflected in official records leads to a weakening of the social and legal safeguards for both Syrian and women from Sanliurfa, making inequalities within the family more visible.

Our findings strikingly demonstrate that, despite cultural proximity, marriage and kinship relations between people from Sanliurfa and Syrian communities do not create an egalitarian inter-community relationship. On the contrary, these relationships are shaped in most cases by asymmetrical power positions, social perceptions and economic conditions. This situation shows that the institution of family and marriage formed in the context of migration is, in a sense, an area where social hierarchies, identity negotiations and social boundaries are reproduced.

Consequently, these important findings, captured through the example of Sanliurfa, provide us with a critical area for understanding the effects of forced mass migration on family structures. Marriage and kinship relations between Syrians and Sanliurfa residents create areas of encounter, interaction, and cultural proximity on the one hand, while reproducing social distance, prejudice, and power inequalities on the other. Therefore, it is important that future studies develop designs that combine both quantitative and qualitative methods, making informal practices visible and examining gender-based power relations in greater depth.

REFERENCE

Brettell, C. B. (2017). Marriage and migration. Annual Review of Anthropology, 46(1), 81-97.

Baydemir, R. (2023). Toplumsal mekânın üretimi: Şanlıurfa şehrinde Suriyeli ve Şanlıurfalıların karşılaşması. (Doctoral dissertation). Harran University Social Sciences Institute, Sanliurfa.

Çelik, İ. A., & Vural, F. (2018). Suriyeli mülteci kadınların kuma dramı: Kilis ili örneği. OPUS International Journal of Society Researches, 8(14), 341-382.

Cohen, R. (2016). Migration and its enemies: Global capital, migrant labour and the nation-state. Routledge.

Creswell, J. W. (2009). Research designs. Qualitative, quantitative, and mixed methods approaches. SAGE Publications.

Creswell, J. W., & Clark, V. L. P. (2017). Designing and conducting mixed methods research. Sage publications.

Erdoğan, M. M. (2020). Suriyeliler barometresi 2019: Suriyelilerle uyum içinde yaşamın çerçevesi. Ankara: Orion Kitabevi.

Foster, A. D., Gökçe, M. B., & Kırdar, M. G. (2024). Intergenerational power shift and the rise of nonarranged marriages among refugees. Demography, 61(5), 1427-1454.

Hammersley, M., & Atkinson, P. (2019). Ethnography: Principles in practice. Routledge.

Hense, A., & Schorch, M. (2013). Arranged marriages as support for intra-ethnic matchmaking? A case study on Muslim migrants in Germany. International Migration, 51(2), 104-126.

Hyndman-Rizk, N. (2016). No arranged marriages here: Migration and the shift from relations of descent to consent in the Lebanese diaspora. Journal of Intercultural Studies, 37(3), 303-319.

İçduygu, A., & Millet, E. (2016). Syrian refugees in Turkey: Insecure lives in and environment of pseudo-integration. Istituto affari internazionali.

Kaya, M. (2017). Türkiye'deki Suriyeliler: iç içe geçişler ve karşılaşmalar. İstanbul: Hiperlink.

Kaya, M. (2018). İki hukuk arasında arafta: Suriyeli kadın mültecilerin informel evlilikleri ve boşan(ama)ma krizi. Journal of Social and Humanities Sciences Research (JSHSR), 5 (31), 4709-4721.

Maxwell, J. A. (2013). Qualitative research design: An interactive approach (3rd ed.). Sage Publications.

Merali, N., Bajwa, J., Yousaf, T., & Sehgal, S. (2014). Immigration fraud patterns in arranged marriages between South Asian Canadians and foreign nationals: The case for policy and procedural change. Immigrant integration: Research implications for future policy, 279-294.

Mercan, M. A., Cebeci, A. F., Karaduman, H. A., Barlın, H., & Beğen, N. (2023). Suriyeli göçünün türkiye'deki evlilik ve boşanmaya etkisi. Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi, 45(1), 71-94.

Neuman, L. W. (2014). Social Research Methods-Qualitative and Quantitative Approaches. British Library Cataloguing-in-Publication Data.

Van der Klaauw, J. (2004). Irregular Migration and Asylum-Seeking: Forced Marriage or Reason for Divorce?. In Irregular Migration and Human Rights: Theoretical, European and International Perspectives (pp. 115-135). Brill Nijhoff.

Mapping the QVAR Connectedness Literature: A Bibliometric Analysis and a Narrative Systematic Review of Top-Cited Studies

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ABSTRACT

This study bibliometrically maps the QVAR connectedness literature. It also systematically compiles the core findings of the field through a structured narrative review, focusing on the most cited studies. The bibliometric analysis was carried out in the R environment using the "bibliometrix" package and its interactive web interface, Biblioshiny. A dataset covering the period 2020–2025 was created using the keywords "qvar connectedness" and "quantile VAR connectedness"; 289 studies published in 95 sources were included in the analysis. The findings show that the literature accelerates significantly after 2022, with annual productivity increasing from 1 publication in 2020 to 109 publications in 2025. Citation dynamics reveal that early studies (2020–2021) stand out as founding references, while publications from 2024–2025 have lower average citations, as they have not yet reached a sufficient citation age. The author and collaboration structure demonstrates a strong network character in the field (an average of 3.56 co-authors per study and 61.25% international co-authorship). Thematic analyses show that the conceptual core is concentrated around connectedness, quantile connectedness, spillovers, volatility, and risk, while application clusters are particularly concentrated in areas sensitive to shocks such as energy/oil, crypto assets, uncertainty, and COVID-19. A review of the most cited studies supports the common conclusion that connectedness increases in tails, directional spillovers are redistributed according to regimes, and diversification benefits weaken during periods of stress. Finally, the study highlights gaps in strengthening inferential testing, standardizing design sensitivities, and integrating early warning applications with macro determinants.

Keywords – Quantile VAR (QVAR), Bibliometric Analysis, Systematic Narrative Review, Systemic risk, Volatility Spillovers, Tail Dependence, Financial Network, R package "bibliometrix", Biblioshiny

INTRODUCTION

Quantitative mapping of research outputs provides systematic answers to questions such as which themes are core, which themes are on the rise, how collaboration networks are formed, and which studies become reference points in fields where the scientific literature is rapidly expanding and methodological diversity is increasing. According to Pritchard (1969), the bibliometric approach used for this purpose refers to the examination of knowledge production and dissemination processes through the analysis of documents constituting scientific communication using mathematical and statistical methods. The acceleration of bibliometric analyses in the modern sense is closely related to the idea of systematically indexing citation data. Garfield's (1955) "citation indexing" approach has made it possible to establish traceable links between studies in literature, facilitating both historical information flow and current literature review. Subsequently, applications for the evaluation use of citation indexes have developed (Garfield & Sher, 1963). Concepts such as the distribution of scientific productivity and the formation of "core" publications in literature have emerged. These concepts are supported by classical regularities such as Lotka's Law (Lotka, 1926), Bradford's Law (Bradford, 1934), and Zipf's Law (Zipf, 1935). Furthermore, Price's (1963) work provides a more holistic framework regarding the growth dynamics of production.

However, bibliometric mapping should not be reduced solely to publication and citation counts. Methods developed since the 1970s have made it possible to analyze the intellectual organization of fields in more detail by revealing the implicit structures in literature. Co-citation analysis aims to capture sub-themes based on patterns of co-citation of specific works in the literature (Marshakova, 1973; Small, 1973). Similarly, co-word analysis performs subject mapping through the network structure of concepts that appear together in texts (Callon et al., 1979). These approaches, along with science mapping tools such as co-authorship networks, thematic evolution, and conceptual structure analyses, make visible both the methodological core and thematic transformation of fields. The widespread use of bibliometric indicators in the current literature strengthens the role of metrics in research evaluation, while also highlighting criticisms of the drawbacks of decisions

based on a single indicator. The DORA declaration emphasizes the risks of over-reliance on single, journal-based metrics (DORA, 2012), while the Leiden Manifesto highlights the principles of context, transparency, and multidimensionality in evaluation (Hicks et al., 2015). In this context, the "metric-wiseness" approach points to the importance of bibliometric literacy by advocating for the purpose-oriented and conscious use of indicators (Rousseau & Rousseau, 2015). In parallel, Rousseau, Egghe, and Guns (2018) bring the metric literacy discussion to a practical level by offering a comprehensive guide for researchers to correctly interpret and appropriately use bibliometric indicators. The altmetrics approach, which argues that online interactions should also be included in impact measurement, as suggested by Priem et al. (2010), offers a complementary perspective that makes non-citation channels visible.

This study examines the rapidly growing Quantile Vector Autoregressive (QVAR) Connectedness literature using bibliometric methods. The generated dataset covers the period 2020–2025 and consists of a total of 289 documents obtained from 95 sources (journals/books, etc.). Productivity over the years shows that the field accelerated significantly after 2022. While there were a limited number of studies in the 2020–2021 period, the number of publications increased to 30 in 2022, reaching 58 in 2023, 85 in 2024, and 109 in 2025, indicating a rapid expansion of the literature. Citation cohorts, especially those of early studies between 2020 and 2021, indicate that these studies form the methodological core of the field with their high citation density. The study shows that the citation density per article has evolved into a more balanced structure with the increasing volume of publications since 2022. Simultaneously, author collaboration patterns are noteworthy: an average of 3.56 authors per document and an international co-authorship rate of 61.25% reveal that the QVAR connectedness literature has developed within a strongly international and collaborative network. Looking at the most prolific authors, it is observed that a significant portion of publications are concentrated around a core group of authors, and this core group shapes the methodological and applied orientations of the field.

This bibliometric mapping offers three key insights into the conceptual and thematic structure of the QVAR connectedness literature. First, common keyword and thematic map findings indicate that the concepts of "impulse-

response analysis," "quantile connectedness," and "connectedness" serve as the driving themes and form the methodological backbone of the field. Second, the clean/renewable energy–price axis at the intersection of energy transition and financial markets appears to be the "core theme" but still offers room for further exploration in terms of intensity. Third, clusters such as quantile-on-quantile connectedness, artificial intelligence, and clean energy stocks emerge as "niche" themes, while the contagion–systemic risk–transmission axis is positioned as a theme that is emerging/shifting with low intensity. These results demonstrate that the core of the method is clearly established, but application areas and advanced methodological combinations still present a broad research agenda.

In this context, the study's contribution to literature is twofold. Firstly, this study comprehensively presents the productivity and citation dynamics in the field of QVAR connectedness, quantitatively discussing the developmental stages of the field, such as the early core period, rapid spread, and institutionalization. Secondly, it clarifies core themes in the literature through thematic mapping, while showing where niche and emerging themes are concentrated, thus proposing a clear research agenda for future studies. The relatively limited concentration of studies on quantile-on-quantile approaches, AI integrations, and systemic risk/contagion, in contrast to the centrality of energy transition, crypto assets, and hedge/safe haven discussions, creates a significant gap in the literature, indicating potential for both methodological and sectoral expansion. Therefore, this study aims to classify the QVAR connectedness literature in terms of both methodological core and application clusters, providing a conceptual map where subsequent empirical research can be positioned.

BIBLIOMETRIC MAPPING

This section presents a bibliometric analysis of scientific publications obtained using the keywords "QVAR connectedness" and "quantile VAR connectedness". In this study, bibliometric analysis was carried out in the R environment using the "bibliometrix" package and its interactive web interface, Biblioshiny. The "bibliometrix" package offers a comprehensive set of tools that allows for the systematic examination of scientific output

performance indicators (productivity, citation structure, author/country collaboration) and structural features of the literature through scientific mapping outputs (thematic maps, keyword networks, core sources). Biblioshiny, on the other hand, enhances the repeatability and reportability of the analysis process by enabling the application of the same methodological framework through an interface that reduces the need for coding (Aria & Cuccurullo, 2017).

The aim is to systematically reveal how this methodology has developed during the 2020–2025 period; its productivity, citation dynamics, author and institutional networks, and conceptual/thematic structure. The analysis results show that the quantile VAR connectedness approach has become an important subfield of financial econometrics, both at methodological and applied levels. A search of the Web of Science (WoS) database using the keywords "QVAR connectedness" and "quantile connectedness" yielded 289 documents and 95 different sources (journals, books, etc.) covering the period 2020–2026. While the annual growth rate technically appears close to zero for this period, this result can be attributed to the fact that the time period is not yet complete, and the publications are quite evenly distributed across the years. Therefore, it can be said that literature is not stagnant but rather exhibits a structure that has been steadily expanding in a short period of time.

The average age of the documents is 1.09 years, and the average number of citations per article is calculated as 21.36. When these two findings are evaluated together, it is seen that quantile VAR connectedness studies have received significant citations in a short time, despite belonging to very young literature. This situation shows that the methodology has become a rapidly adopted and referenced tool.

In terms of content, the dataset contains 382 Keywords Plus and 853 author keywords. The high number of author keywords shows that the QVAR connectedness approach is applied to completely unique types of markets, assets, and risks, and that a rich conceptual network has formed around it. Examining the author profile reveals that 731 different researchers have contributed to this literature. There are only 18 single-authored studies; the average number of authors per document is 3.56. In addition, the international co-authorship rate is 61.25%. These indicators reveal that the QVAR

connectedness field is a highly collaborative, multinational, and multicentered research area.

We observe that nearly all document types in the literature revolve around peer-reviewed articles. The dataset comprises 265 articles, 23 early access articles, and only one conference paper. This structure suggests that the quantile VAR connectedness methodology entered international literature directly through journal articles rather than conference proceedings.

Productivity Dynamics by Year

The number of articles by year was 1 in 2020, 5 in 2021, 30 in 2022, 58 in 2023, 85 in 2024, and 109 in 2025, respectively. These values clearly show how QVAR connectedness studies have gained momentum in a very short period of time.

2020 and 2021 can be interpreted as a pioneering period in which only a few studies were published. The jump in the number of articles to 30 in 2022 indicates a diffusion phase in which the quantile VAR connectedness approach became visible in the finance literature and began to be applied to different markets. The increase in the number of articles to 58 and 85 in 2023 and 2024, respectively, shows that this evolution continues to strengthen. Reaching 109 articles in 2025 demonstrates that the method is now accepted as an established methodological framework and that its application area is expanding. The growth rate shows a dramatic growth exceeding sixfold between 2021 and 2022, an almost twofold increase in 2022–2023, a strong but relatively slow increase in 2023–2024, and a more moderate growth in 2024–2025 are observed. This pattern shows that the QVAR connectedness literature initially exhibits explosive growth, followed by a high but gradually stabilizing production dynamic.

Citation Dynamics and Cohort Analysis

Table 1 presents the total number of citations per article (MeanTCperArt), the number of articles (N), the average annual citations per article (MeanTCperYear), and the number of years in which citations can be received (CitableYears). So, it allows to understand the citation dynamics of the QVAR connectedness literature more clearly. Although 2020 is represented by a single article, this study received 128 citations per article,

reaching an average of 21.33 citations per year. The 2021 cohort consists of five articles; for these articles, the average number of citations per article is 191.6, and the average annual citation is 38.32. These figures demonstrate that studies published in 2020 and especially in 2021 have become core, high-impact references in literature. These studies can be considered pioneering publications that define the theoretical limits of the QVAR connectedness method and inspire subsequent application studies.

Table 1. Citation Dynamics

Year	(MeanTCperArt)	(N)	(MeanTCperYear)	(CitableYears)
2020	128	1	21.33	6
2021	191.6	5	38.32	5
2022	72.53	30	18.13	4
2023	27.6	58	9.2	3
2024	11.25	85	5.62	2
2025	3.24	109	3.24	1

In 2022, while the number of articles increased to 30, the total citations per article decreased to 72.53, and the annual average citations decreased to 18.13. This decrease is a natural consequence of the continued concentration of citations in pioneering works. Despite this, the 2022 cohort still has a fairly strong citation performance. In 2023, 2024, and 2025, while the number of articles continues to increase (58, 85, and 109), there is a gradual decrease in the total citations per article and the average annual citations. The average annual citations for the 2023 cohort are 9.2, for 2024 5.62, and for 2025 3.24. There are two main reasons for this pattern. First, there is the time window effect: studies published in 2023–2025 have a much shorter citation horizon compared to studies in 2020–2021; therefore, the total citation accumulation is naturally lower. Second, there is the rapid increase in publication volume. As the number of studies in literature increases, citations are spread over a wider area, and the citation density differs between pioneering studies and new application studies. Therefore, the relatively low citation density observed in cohorts after 2023 should be interpreted as a natural reflection of the maturation and diversification process of literature.

Relationships Between Institutions, Authors, and Keywords

Figure 1 presents a three-field plot constructed using institutions–authors–keywords, revealing the institutional and individual production network of the QVAR connectedness literature. Examining the institutions in the left column, it is seen that universities such as Pusan National University, University of Economics Ho Chi Minh City, Sultan Qaboos University, University of Tunis El Manar, University of Lisbon, University of South Australia, University of Sousse, Lebanese American University, and United Arab Emirates University are represented by relatively large nodes and have numerous connections. These institutions stand out as leading research centers where QVAR connectedness studies are produced. The geographical distribution shows that the literature is particularly concentrated along the Asia, Middle East, and Europe/Australia axes.

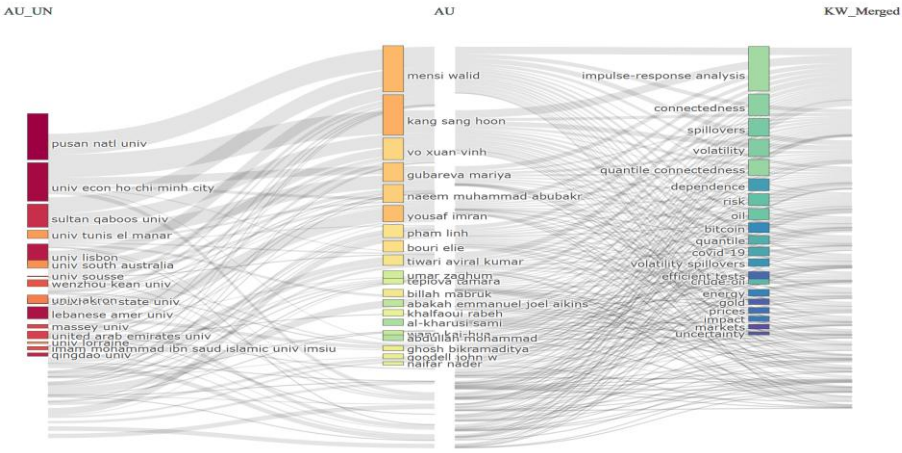

Figure 1. Three-Field plot of Institutions, Authors, and Keywords

From the perspective of the authors in the middle column, Mensi Walid, Kang Sang Hoon, Vo Xuan-Vinh, Gubareva Mariya, Naeem Muhammad Abubakr, Yousaf Imran, Pham Linh, Bouri Elie, Tiwari Aviral Kumar, and several others stand out. These authors are central to literature, both for their productivity within their institutions and for their inter-institutional collaborative authorship. The numerous institutional connections demonstrate

the existence of collaborative research networks that transcend national borders within the QVAR connectedness field. The keywords in the right column indicate the conceptual axes around which these authors and institutions focus. The words “impulse-response analysis”, “connectedness”, “spillovers”, “volatility”, “quantile connectedness”, “dependence”, “risk”, “oil”, “bitcoin”, “quantile”, “covid-19”, “volatility spillovers”, “efficient tests”, “crude oil”, “energy”, “gold”, “prices”, “markets”, and “uncertainty” indicate that QVAR connectedness studies methodologically focus on impulse-response and connectedness measurements, and empirically, particularly on volatility and risk transfer in energy, commodity, and cryptocurrency markets.

Most Prolific Authors

The “Most relevant authors” graph in Figure 2 reveals the authors who produced the most articles in the dataset. Mensi Walid is by far the most prolific researcher with 21 articles. He is followed by Kang Sang Hoon with 18 articles, Gubareva Mariya with 12 articles, Yousaf Imran with 11 articles, Bouri Elie with 10 articles, and Vo Xuan-Vinh with 9 articles. Pham Linh and Umar Zaghum each have 8 articles, while Billah Mabruk and Ghosh Bikramaditya each have 6 articles.

The total output of the top 10 authors is 109 articles, which corresponds to approximately 38% of the 289 documents in the corpus. This finding shows that while QVAR connectedness literature is supported by a broad range of authors, a significant portion of the publications are concentrated around a narrow core group of authors. The fact that Mensi and Kang together have reached 39 articles suggests that these two researchers are leading reference figures in the field, both in terms of methodological development and application to different markets.

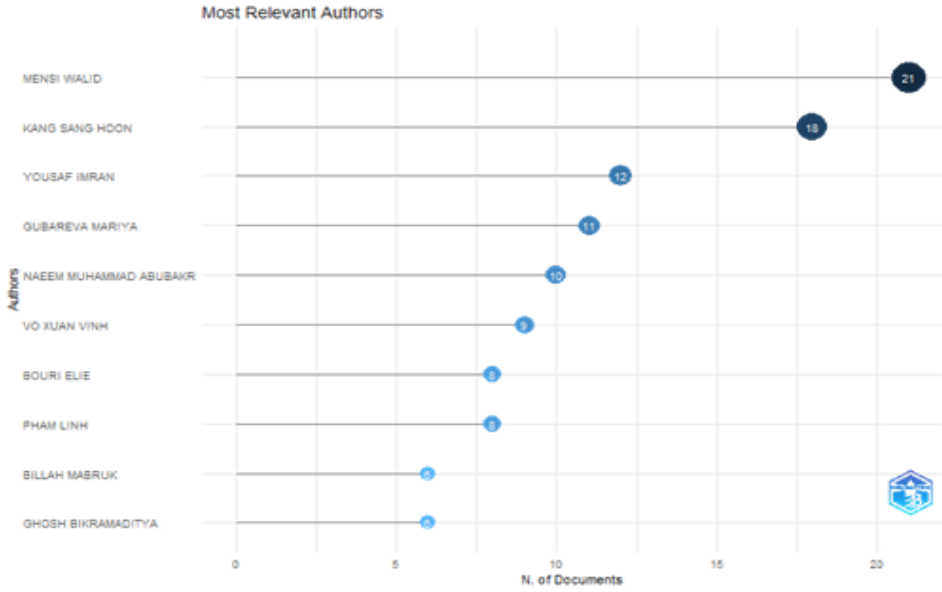

Figure 2. Most Relevant Authors Graph

Conceptual Structure: Keyword Co-op Network

The keyword co-op network, which is presented in Figure 3, reveals the conceptual map of the QVAR connectedness literature. At the center of the network is a node that is much larger than the others: "impulse-response analysis". Concepts surrounding this node, such as "volatility", "spillovers", "risk", "oil", "markets", "uncertainty", "quantile", "contagion", "systemic risk", "stock markets", "commodity", and "transmission", form the red cluster, which constitutes the methodological and empirical core of the literature. This cluster shows that the QVAR connectedness approach is essentially a framework aimed at examining volatility and risk contagion through quantile-based impulse-response analyses.

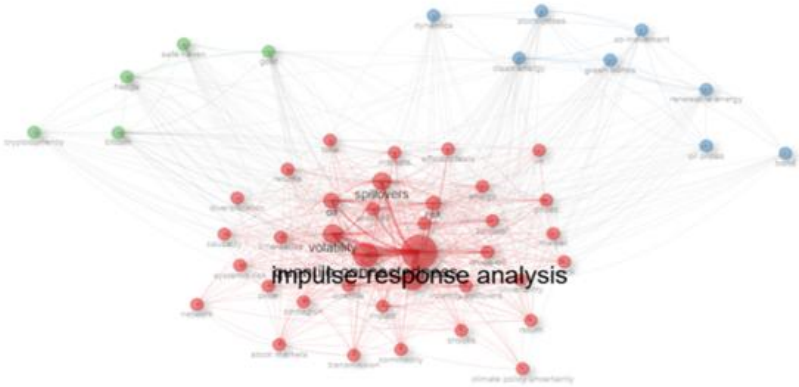

Figure 3. Keyword Co-Op Network

The green cluster in the upper left of the network is grouped around the keywords “cryptocurrency”, “bitcoin”, “hedge”, “safe haven”, and “gold”. This cluster shows that the QVAR connectedness method is heavily used to analyze the relationship between cryptocurrencies and traditional safe haven assets like gold, within the framework of hedge and safe haven roles. The blue cluster in the upper right is represented by concepts such as “clean energy”, “renewable energy”, “green bonds”, “stock prices”, “oil prices”, “co-movement”, and “bond”. This thematic cluster shows that quantile VAR connectedness is used to examine the correlation between green and renewable energy markets, green bonds, and traditional energy prices. Thus, the method is also closely related to energy transition, climate policy, and green finance agendas.

Thematic Map: Motor, Niche, Core, and Emerging Themes

The thematic map given in Figure 4 classifies concept clusters into four main groups based on their relevance and development levels. The engine themes in the upper right section are centered around the concepts of “impulse-response analysis,” “quantile connectedness,” and “connectedness.” High centrality and high density indicate that these themes hold a central place in the overall literature and form highly developed and relatively mature sub-literatures within themselves. Therefore, quantile-based impulse-response

analyses and connectedness measurements form the core of QVAR connectedness studies.

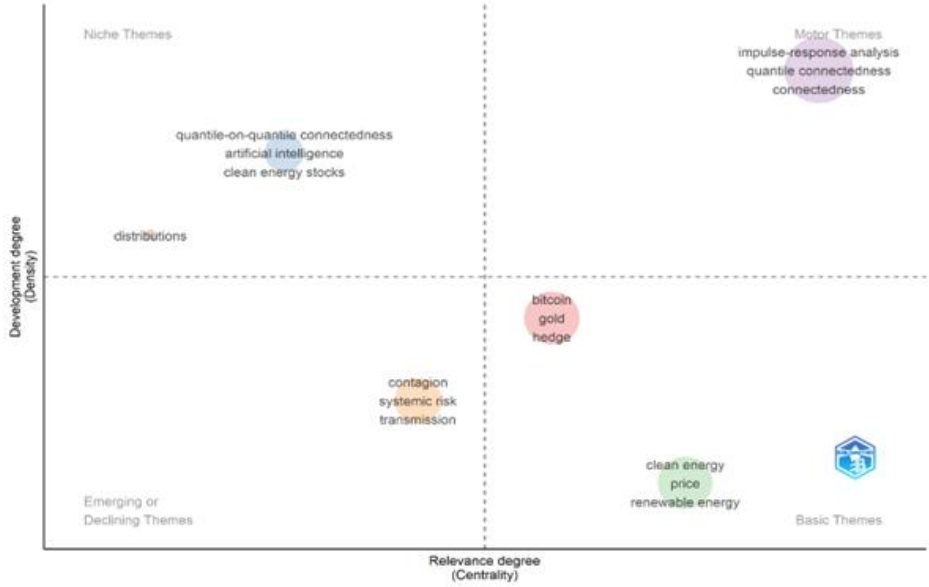

Figure 4. Thematic Map

Among the niche themes in the upper left section, the concepts of "quantile-on-quantile connectedness," "artificial intelligence," "clean energy stocks," and "distributions" stand out. While these themes have relatively limited centrality in the overall literature, their high density makes them specialized and methodologically advanced small sub-fields. In particular, quantile-on-quantile connectedness and artificial intelligence applications can be considered as emerging research lines that expand the QVAR connectedness framework towards more complex models and new data processing techniques.

The main themes in the lower right section consist of the concepts of "clean energy", "renewable energy", and "price". These themes have high centrality and represent broad topics frequently used in literature. However, their relatively low density indicates that these areas have not yet been explored in as much depth as niche themes; however, they are poised to mature with further research in the coming period. This finding reveals that the QVAR connectedness approach still has development potential in the field of renewable energy and price dynamics.

The concepts of “contagion”, “systemic risk”, and “transmission”, located in the lower section and near the center, can be interpreted as emerging themes. Their centrality is moderate, and their density is relatively low. This means that the quantile connectedness approach is newly integrated into the literature on financial contagion and systemic risk, but this integration has not yet formed a mature subfield.

The cluster containing the bitcoin-gold-hedge trio on the thematic map exhibits high centralization and medium density. This cluster demonstrates that cryptocurrencies and gold are a popular research topic in QVAR connectedness studies in the context of their hedge and safe-haven roles; however, it still represents an area open to development in terms of methodological depth.

While the prominence of the keyword "impulse-response analysis" in the bibliometric results may seem surprising at first glance, this is consistent with the computational logic used in the quantile connectedness literature. The explanation is because connectedness measures in most frameworks rely directly on forecasting error variance decompositions (FEVD/GFEVD) derived from impulse-response (MA) coefficients. Therefore, even if impulse-response function graphs are not reported separately in many studies, the impulse-response structure representing the dynamic transmission of shocks is already used methodologically to calculate connectedness indicators. In addition, some studies present quantile-specific impulse-response analyses (e.g., quantile impulse response) as an additional tool to support connectedness findings and more intuitively demonstrate the time profile and quantile asymmetry of shocks. Thus, the term "impulse-response analysis" emerges in this literature as an umbrella concept encompassing both the underlying structure of connectedness calculations and the dynamic shock response analysis reported separately in some studies.

Bradford's Law: Core Journals and the Publication Backbone of the Field

The Core Sources by Bradford's Law graph clearly shows that QVAR/quantile VAR connectedness studies are concentrated in a small number of journals. Among the prominent journals in the shaded "core sources" area, channels such as Energy Economics, Finance Research Letters,

Resources Policy, Research in International Business and Finance, International Review of Financial Analysis, and North American Journal of Economics and Finance stand out.

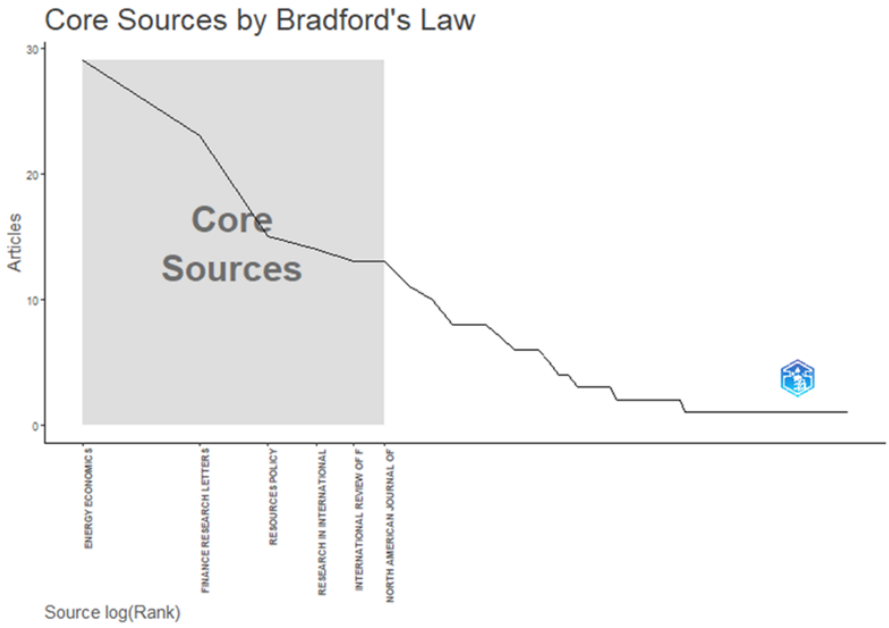

Figure 5. Core Sources by Bradford's Law

The clustering of publications in these journals has two important meanings. First, it shows that the application axis of the literature is clearly located at the intersection of energy-commodities (especially oil) and financial markets; since core journals are platforms that publish high volumes on precisely these themes. Second, the formation of a core journal set indicates that the field has moved from the "trial-and-error" phase to the institutionalization phase because in mature literature, methodological standards and typical research questions tend to accumulate around certain journals. Therefore, the Bradford figure shows that QVAR connectedness research is not a randomly distributed cluster of publications; This shows that the field has a distinct core and is gaining increasing intra-disciplinary recognition.

Lotka's Law: Concentration of Author Productivity and Core Specialization

In Figure 6, the sharp decrease in the author percentage as the number of papers increases shows that author productivity follows a typical "long tail" structure. The majority of authors contribute one or two studies to the field, while a small number of researchers produce a high number of publications. This pattern is consistent with Lotka's Law and implies two structural consequences.

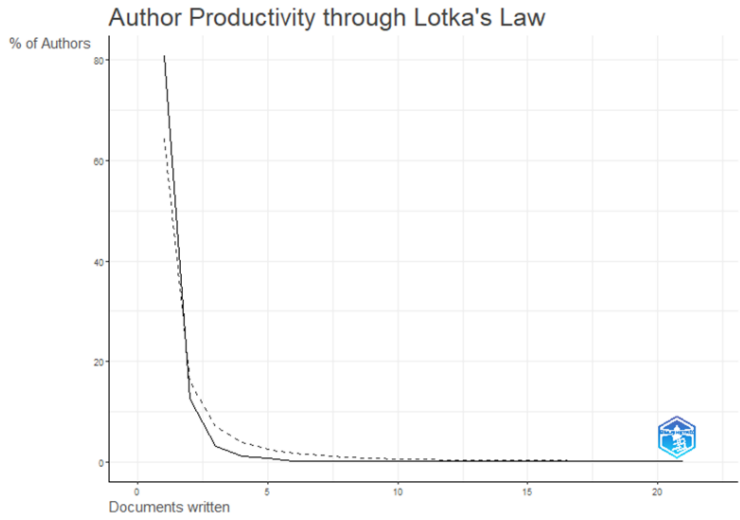

Figure 6. Lotka's Law Plot

First, a narrow core group of authors has formed in literature, carrying the methodological language and application standards. Second, especially with the rapid growth after 2022, a large number of researchers have brought "singular" contributions to the field by applying the QVAR connectedness framework to their dataset. This dual structure (core experts + expanding practitioner environment) is a strong signal of maturity, showing that the field is both rapidly growing and driven by the core. When read together with previous findings (an average of 3.56 authors per document and international co-authorship of 61.25%), it can be concluded that the QVAR connectedness literature has a character that is growing with high collaboration but is also concentrated in production.

The Most Cited Studies: The Field's "Reference Texts" and Knowledge Core

The "Most Global Cited Documents" graph directly reveals which studies the field is consolidating through. Studies that stand out with the highest global citation numbers point to the following cluster: Ando (2022, Management Science) 525 citations, Saeed (2021, Energy Economics) 355 citations, Chatziantoniou (2021, Economics Letters) 297 citations, Bouri (2021, Journal of International Financial Markets, Institutions & Money) 237 citations, and Karim (2022, Finance Research Letters) 215 citations.

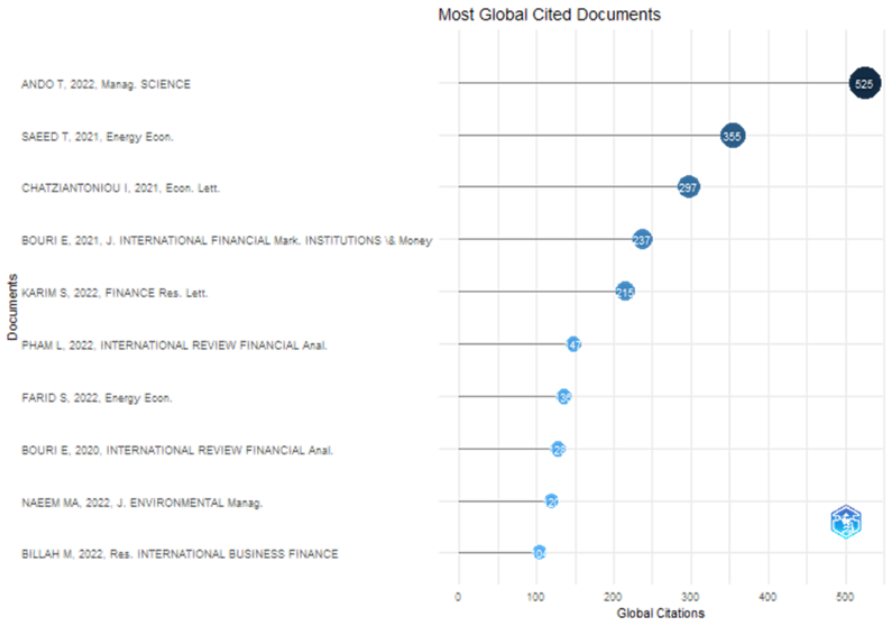

Figure 7. Most Cited Studies

This first group should be read as "core references" that define the methodological framework and application direction of the literature. Two points are particularly important here. First, a significant portion of the most influential studies are concentrated in the 2021–2022 period; such an arrangement suggests that the field was rapidly standardizing methodologically during those years and triggered a very broad wave of application. Second, a more general and high-profile journal like Management Science at the top of the list implies that the literature is not confined to a specific sub-funding community and that methodological contributions

resonate in a wider scientific environment. Therefore, this figure provides a powerful impact map showing “which studies the QVAR connectedness literature speaks through.”

SYSTEMATIC NARRATIVE REVIEW

This section presents a narrative systematic review based on the top 10 most cited studies in the QVAR/quantile connectedness index in your bibliometric analysis. The logic of a narrative systematic review relies on a holistic synthesis of the most influential (most cited) studies that form the conceptual and methodological backbone of the field, rather than the classic “keyword + database search” approach. This approach has the advantage of bringing together the core literature where the methodological evolution of the field is most clearly visible. These 10 studies are clustered around four main lines of application: (i) tail propagation of currency and interest rate shocks; (ii) regime-dependent connectedness in the crypto asset ecosystem (including relationships with cryptocurrencies, NFTs, DeFi, and carbon markets); (iii) contagion during times of crisis in the context of energy-commodities-equities/ETFs/green assets; and (iv) the founding framework of the quantile connectedness approach as a methodological basis. This classification makes it possible to compare findings in the literature and derive common conclusions using a "meta-synthesis" approach.

Methodological Structure of QVAR-Based Connectedness Framework

The preceding sections presented the current state of the literature on the QVAR Connectedness approach. Expressing the method mathematically will be helpful for understanding the conceptual outputs before moving on to the survey analysis of the top ten most cited articles.

The conceptual basis of the QVAR connectedness approach stems from the VAR-based forecast error variance decomposition (FEVD) measurement of spillover/connectedness, developed along the lines of Diebold–Yılmaz. Initially, Diebold and Yılmaz (2009) institutionalized the idea of total in-system spillover/connectivity by measuring shock propagation between returns and volatilities via FEVD. Subsequently, Diebold and Yılmaz (2012)

expanded this framework with directional spillovers (TO/FROM) and net spillover measures, making the question of "who is transmitting risk and who is receiving risk?" directly measurable. Finally, Diebold and Yılmaz (2014) transformed connectedness analysis into a network-based systemic risk approach by considering variance decomposition from a network topology perspective. QVAR connectedness, however, preserves this Diebold–Yılmaz architecture and aims to measure connectivity sensitive to tail regimes by establishing the VAR structure in conditional quantiles instead of conditional means.

Generally, studies analyze systemic risk and transmission dynamics within the QVAR connectedness framework from a regime-dependent perspective. Unlike the conditional mean-focused structure of classical VAR-based connectedness approaches, the QVAR model estimates dynamic relationships separately in different quantiles of the conditional distribution. This allows for a comparative assessment of how the same shock spreads in crisis (τ=0.05), normal/median (τ=0.50), and bull (τ=0.95) regimes. Such decomposition provides a methodological advantage, particularly in capturing asymmetry and nonlinear interactions that become apparent in the end-tails. The QVAR connectedness measurement is based on quantile-based generalized variance decomposition and produces three main outputs. (i) The Total Connectedness Index (TCI) measures the overall level of connectedness in a given regime by summarizing the average cross-spillovers in the system at a specific quantile. (ii) Net Connectedness Index (NET) identifies the sources and targets of systemic risk by determining whether each asset is a net transmitter or net receiver of shocks. (iii) Net Pairwise Directional Connectedness (NPDC) and the number of positive NPDCs and Net Pairwise Transmission (NPT) measures detail the directional structure of contagion channels by revealing the dominant direction in bilateral relationships.

This framework allows for the evaluation of normal and extreme conditions within the same methodological structure. This makes it possible to monitor regime-specific vulnerabilities. Therefore, the QVAR interconnectedness method provides a regime-sensitive information set for hedging and portfolio diversification decisions and macroprudential policy design by more realistically measuring systemic vulnerability during periods of increased tail risk. In this respect, the approach allows for a more refined

mapping of the financial system's responses to extreme events and contagion mechanisms.

Following the quantile connectedness approach developed by Ando et al. (2018, 2022) and applied to financial markets by Chatziantoniou et al. (2021), let

$$\mathrm{r}_t = (r_{1,t}, \dots, r_{k,t})'$$

denote the vector of daily log returns for $k = 10$X10XB stocks. For a given quantile $\tau \in (0,1)$, the QVAR(p) model is:

$$\mathrm{r}_t = \mu(\tau) + \sum_{j=1}^{p} \Phi_j(\tau)\mathrm{r}_{t-j} + \mathrm{u}_t(\tau),$$

where $\mu(\tau)$ is the quantile-specific intercept vector, $\Phi_j(\tau)$are $k \times k$ lag coefficient matrices, and $\mathrm{u}_t(\tau)$ is the error vector with covariance matrix $\Sigma(\tau) = E[\mathrm{u}_t(\tau)\mathrm{u}_t(\tau)']$. Each equation is estimated via quantile regression. The lag order $p$is selected using the Schwarz/Bayesian Information Criterion, with $p = 1$being empirically common and consistent with Chatziantoniou et al. (2021).

QVMA Representation and Generalized FEVD

Using the Wold representation, QVAR (p) can be expressed as an infinite-order Quantile Vector Moving Average (QVMA):

$$\mathrm{r}_t = \mu(\tau) + \sum_{i=0}^{\infty} \Psi_i(\tau)\mathrm{u}_{t-i}(\tau),$$

where $\Psi_i(\tau)$are $k \times k$impulse-response coefficient matrices. Based on Koop, Pesaran, and Potter (1996) and Pesaran and Shin (1998), the generalized H-step-ahead forecast error variance decomposition (GFEVD) measuring the contribution of shocks in variable $j$to the forecast error variance of variable $i$is:

$$\psi_{ij}^{g}(\tau, H) = \frac{\Sigma_{jj}(\tau)^{-1} \sum_{h=0}^{H-1} \left(\mathrm{e}_i'\Psi_h(\tau)\Sigma(\tau)\mathrm{e}_j\right)^2}{\sum_{h=0}^{H-1} \mathrm{e}_i'\Psi_h(\tau)\Sigma(\tau)\Psi_h(\tau)'\mathrm{e}_i},$$

where $\mathrm{e}_i$is a selection vector. Row-normalization yields:

$$\tilde{\psi}_{ij}^{g}(\tau,H)=\frac{\psi_{ij}^{g}(\tau,H)}{\sum_{j=1}^{k}\psi_{ij}^{g}(\tau,H)},\text{so that}\sum_{j=1}^{k}\tilde{\psi}_{ij}^{g}(\tau,H)=1.$$

Quantile Connectedness Measures

Connectedness measures are derived from the normalized GFEVD matrix. The total spillovers transmitted to others (TO) and received from others (FROM) are:

$$C_{i\rightarrow\cdot}(\tau,H)=\sum_{j=1,\,j\neq i}^{k}\tilde{\psi}_{ji}^{g}(\tau,H),C_{i\leftarrow\cdot}(\tau,H)=\sum_{j=1,\,j\neq i}^{k}\tilde{\psi}_{ij}^{g}(\tau,H).$$

The net directional connectedness (NET) is:

$$C_{i}^{NET}(\tau,H)=C_{i\rightarrow\cdot}(\tau,H)-C_{i\leftarrow\cdot}(\tau,H),$$

where positive (negative) values indicate that asset $i$is a net transmitter (receiver) of shocks. System-wide connectedness is summarized by the (corrected) Total Connectedness Index (TCI):

$$TCI(\tau,H)=100\times\frac{\sum_{i=1}^{k}\sum_{j=1,\,j\neq i}^{k}\tilde{\psi}_{ij}^{g}(\tau,H)}{k-1},$$

where higher values imply stronger overall interdependence and systemic risk in the given quantile regime.

Finally, bilateral dominance is assessed using Net Pairwise Directional Connectedness (NPDC) for each pair (i,j):

$$NPDC_{ij}=C_{i\rightarrow j}-C_{j\rightarrow i},$$

and the Net Pairwise Transmissions (NPT) for asset i, defined as the number of counterparties for which $NPDC_{ij}>0$. A higher NPT_iindicates that asset $i$dominates many bilateral linkages as a net transmitter, whereas $NPT_i=0$implies a predominantly receiving role.

Narrative Systematic Review Output

The conceptual turning point of this approach is the claim of "translating tail behavior directly into network topology." The quantile

connectedness framework argues that modeling tail behavior in financial networks radically expands the interpretation of systemic risk. Thus, it is emphasized that connectedness is not only an “average” measure of common-movement, but also a map of systemic risk in extreme loss/extreme gain regimes (Ando et al., 2021).

An important complementary point is the scaling/adjustment of TCI in some studies. For example, it is explicitly stated that in the context of interest rate swaps, TCI is used as a measure of dependency that can be interpreted in the range of [0,1], and that a high TCI means higher intra-network risk/dependency.

We can summarize the conceptual outputs of the ten most cited articles within the scope of a narrowed systematic review in the following sections.

Policy and Shock Spread in Currency and Interest Rate Tails

One of the strongest aspects of the tail connectedness approach is that it makes visible the asymmetric and event-dependent spread of monetary policy and exchange rate market shocks. On the currency market side, Bouri, Çepni, Gabauer, and Gupta (2020) show that in Asia-Pacific exchange rates, quantile connectedness intensifies the spread in extreme conditions (lower/upper tails) and that these structures change over time in a way that is sensitive to significant events. This institutionalizes the distinction between "low/medium connectedness in calm periods" and "intense contagion in tails during stressful periods".

In terms of interest rates, Chatziantoniou, Gabauer, and Stenfors (2021) evaluate the monetary policy transmission mechanism through interest rate swaps using QVAR connectedness. The results show that connectedness is strong in both very negative and very positive interest rate changes (in quantiles approximately below 20% and above 80%). Therefore, we can conclude that the tails of shock propagation can exhibit a distinct and relatively symmetrical structure. Furthermore, dynamic analysis findings indicate that the USD plays a persistent net propagation role in certain periods, generating an "event-dependency" narrative consistent with policy regime changes and crisis periods (Chatziantoniou et al., 2021).

When these two results are read together, the common message of the literature becomes clear. Average-based approaches offer a broad view of the

currency/exchange rate channel, but tail regimes primarily concentrate systemic fragility. Therefore, policy analysis requires a risk monitoring architecture that targets not only the "median regime" but also the "sub-tail regime."

Energy–Commodity–BRIC Line: Contagion in Tails and Leading Markets

The quantile connectedness approach in energy and commodity markets details which asset contagion originates from, and which markets it intensifies in, especially during periods of crisis. Billah et al. (2022), by considering energy commodities and BRIC stock market returns together, report that directional contagion is sensitive to quantile states; spillover is more concentrated on the energy–BRIC axis in the lower tail (bad news regime). The study justifies the concept of “leading market” at the quantile level by emphasizing the role of information carriers/transmitters of energy products other than natural gas (Billah et al., 2022).

In the same study, quantile tables reveal that the total connectedness of the system is significant across the sample in the median regime and that the energy side's position as a net emitter is strongly visible. The study also highlights that periods of high connectedness (spillover approaching upper limits) in both lower and upper tail regimes are associated with global shocks.

Another key contribution at the energy-finance intersection is Saeed, Bouri, and Alsulami's (2021) examination of excessive return connectedness in the "clean energy-dirty energy-green bond-energy ETF" quadrangle. The study numerically reports that total spillover remains relatively limited in the median regime, while TSI significantly increases in the lower-tail regime. This strengthens the argument that diversification benefits erode during times of crisis (Saeed et al., 2021).

This finding implies that connectedness in tails not only increases in magnitude but also that the center of the network (which assets are net transmitters/receivers) can shift. Farid et al. (2022), directly addressing the COVID-19 shock, showed that tail connectedness in energy, metals, and agricultural commodity returns increased sharply with the pandemic. They particularly demonstrate that diffusion intensified in the extreme downward regime and that financial stress was more intensely shared within the

commodity basket. Thus, the pandemic period is positioned in literature as one of the strongest natural experiments on tail connectedness, producing an event-dependent jump.

When these three studies are considered together, the meta-synthesis in the energy-commodity line leads to the following conclusions: (i) connectedness increases in tails; (ii) leading/spreading assets are generally concentrated in the energy complex; and (iii) major global events (GFC, European debt crisis, and COVID-19) transform the connectedness regime in the form of a modal shift.

ESG/Green Assets: The Role of Green Bonds in the Network and Extreme Risk Transmission

The position of green assets within the network is critical in the QVAR connectedness literature for two reasons: Firstly, whether green assets act as safe harbors/stabilizers during periods of crisis. Secondly, whether ESG (Environmental, Social, and Governance) themed instruments behave as net emitters or net receivers in the systemic risk network.

Naeem and Tanveer (2022) address the issue of "extreme risk transmission" between green bonds and other assets using QVAR connectedness and explicitly formulate how connectedness metrics are established at the quantile level. In this context, the calculation of TCI on a quantile basis and the determination of the systemic role of net connectedness (TO−FROM) are used. Thus, it aims to discuss the position of green bonds within the network in crisis regimes. The systematic approach of the study is consistent with the literature line that emphasizes that ESG assets may have a risk diffusion structure dependent on the market regime, instead of the assumption of being low connected in all conditions.

Saeed et al. (2021) also showed that by including green bonds in the energy connectedness system, the net position of green bonds can change as total spillover increases in tail regimes. This reinforced the idea that green assets should be treated as a conditional portfolio component, not a completely safe harbor.

Tail Connectedness in the Crypto Ecosystem

Crypto assets are the fastest expanding theme in the top 10 core literature. This sub-literature converges on two common findings. The first

finding is that connections that appear fragmented in normal times rapidly intensify in tail regimes. The second is that the relationships between the sub-components of the crypto ecosystem—major cryptos, DeFi tokens, NFT indices, stablecoins, and carbon markets—can behave as a single network during times of crisis.

Bouri et al. (2021) emphasize that connectedness in the crypto market increases during periods of stress, such as pandemics, resulting in a weakening of diversification during times of crises. Furthermore, the quantile perspective reveals that risk spread in the crypto market makes sense not only in the mean regime but especially in tails.

At the intersection of crypto with environmental/climate finance, Pham et al. (2022) examine the interconnectedness between carbon prices and green and non-green cryptocurrencies using a tale of two tails approach. The study indicates that net transmitter/net receiver roles can differentiate in tail regimes. Furthermore, it argues that certain crypto classes can assume risk-carrying roles, particularly in extreme regimes. The findings support the argument that the crypto market is not uniform, using connectedness metrics.

In the NFT and DeFi realm, Karim et al. (2022) analyze the quantile interdependence among NFTs, DeFi, and cryptocurrencies, emphasizing the growing systemic integration in tails and the shock-absorbing capacity of sub-segments. This approach demonstrates that crypto finance is no longer a single asset class but a layered network within itself. However, it concludes that these layers become more tightly interconnected in crisis regimes.

The meta-synthesis of the crypto line converges with the energy/commodity literature at the same conceptual point. Connectedness increases in tails, and role reversals (net transmitter → net receiver or vice versa) occur more frequently. Therefore, crypto-ecosystem studies not only bring the connectedness literature into a new market space but also further enhance the method's importance by demonstrating that network topology can rapidly reorganize in tails.

RESULTS AND DISCUSSION

This bibliometric analysis quantitatively reveals the development of the literature, covering 289 studies and 95 sources published between 2020 and 2025 using the keywords "qvar connectedness" and "quantile VAR connectedness." The findings show that the QVAR connectedness literature is a relatively new and rapidly growing research area. Annual productivity increased from only 1 study in 2020 to 109 publications in 2025, showing a significant acceleration after 2022. This trend indicates that the method has been adopted by a wide range of researchers in a short time, and its application areas have diversified rapidly, especially in the last three years.

Citation dynamics offer a meaningful pattern in terms of the maturation process of the literature. The higher "total citations per article" values of studies published in the early years (2020–2021) imply that these studies have become foundational/pioneering references in the literature. In contrast, the decline in average citations during the 2024–2025 period is consistent with the fact that new studies have not yet reached a sufficient "citation age." This indicates that the field is current and expanding; it strengthens the expectation that citation accumulation will accelerate in the coming years, especially for publications after 2023.

The "author and collaboration" structure shows that the literature has a strong network character. The average number of co-authorships in studies produced by 731 authors is 3.56, and the international co-authorship rate is 61.25%. This structure reveals that the QVAR connectedness approach is not confined to specific countries or institutions; it is spreading globally around shared data, shared methods, and a shared research agenda in different geographies. The Lotka Law graph shows that productivity is concentrated around a small number of core authors; however, a large group of researchers contributes to the literature in a more limited way. This situation points to a typical maturation dynamic implying that the methodological core in the field is strong, but application studies are rapidly increasing.

Thematic findings have clearly revealed the conceptual axis of the literature. Keyword analyses and network maps show that the concepts of "connectedness," "quantile connectedness," "spillovers," "volatility," and "risk" are central to the studies. In terms of application, terms related to

markets sensitive to shocks, such as “oil/crude oil,” “energy,” “bitcoin,” “gold,” “covid-19,” and “uncertainty,” stand out. The thematic map positions the “quantile connectedness–connectedness–impulse-response analysis” cluster as a “motor theme” with a high level of centrality and density, while showing concepts like “clean energy–renewable energy–price” as “core themes” connected to the broader literature. This pattern indicates that the method is most strongly used in markets with intense financial shocks and crisis regimes; it also shows an increasing integration with energy transition and sustainable finance discussions.

Finally, it is observed that a significant portion of the most cited studies are concentrated in the 2021–2022 period. This finding indicates that the QVAR/quantile connectedness approach formed a methodological core during this period, and that the “reference studies” that shaped the literature predominantly emerged during these years. Overall, the results show that the QVAR connectedness literature has experienced rapid expansion at both methodological and application levels; it has become a fundamental analytical tool, particularly in the examination of end-tail risk and regime-dependent contagion dynamics.

The most striking aspect of the findings is that the impact of the literature is largely concentrated around the top 10 “citation classics” that generate the highest impact. This concentration in the citation network is significant in two ways. First, it shows that the dominant paradigm of the field has shifted from explaining engagement through a single average network structure to a framework that addresses queue regimes representing periods of crisis and over-optimism separately. Second, the clustering of a significant portion of the most cited studies in the post-2020 period reveals that global shocks such as COVID-19 and new asset classes such as crypto, NFTs, DeFi, and carbon markets have rapidly expanded the research agenda (Bouri et al., 2020; Bouri et al., 2021; Farid et al., 2022; Karim et al., 2022; Pham et al., 2022; Saeed et al., 2021). Therefore, the bibliometric finding indicates that the quantile connectivity approach has become a standard systemic risk measurement tool in different markets.

The conceptual common denominator of the core literature is that connectivity cannot be represented by a single average relational structure. This is because the network topology reorganizes itself in a way that is

sensitive to shock magnitude and market regime. The foundational contribution of this approach is that by associating connectedness measurement with tail behavior, it makes visible how systemic risk is concentrated, especially in tail events (Ando et al., 2022). A recurring finding in most of the core studies is that total connectedness (TCI) increases in tails, directional spillovers (TO/FROM) strengthen during crisis periods, and net roles (NET) redistribute according to regimes (Bouri et al., 2020; Bouri et al., 2021; Farid et al., 2022; Saeed et al., 2021). This pattern consistently supports the conclusion that diversification benefits are relatively stronger in normal times and weaker in stress regimes, both for the energy-commodity and digital asset ecosystems.

In terms of application areas, the synthesis of the literature is grouped along four main lines. First, in studies of monetary policy and the interest rate channel, tail connectedness shows that contagion is stronger when interest rates are volatile and that leading markets can change depending on the regime (Chatziantoniou et al., 2021). Second, in the energy-commodity and emerging markets line, it is reported that tail connectedness increases significantly, especially during pandemics and crises, and that the energy complex often stands out in the role of a net spreader (Billah et al., 2022; Farid et al., 2022; Saeed et al., 2021). Third, the crypto-NFT-DeFi literature shows that while subsegments of the market can be partially decomposed in normal times, they transform into a more integrated network structure in stress regimes. Conversely, it is emphasized that certain segments may remain relatively disconnected during specific periods, offering limited diversification potential (Bouri et al., 2021; Karim et al., 2022). Fourthly, the connections between carbon/green assets and ESG indicate that green financial instruments should be considered not as “absolute safe havens” but as elements that can transition between net receiver/emitter roles within the network depending on the circumstances (Pham et al., 2022; Saeed et al., 2021).

These core studies identified in the bibliometric analysis demonstrate that the rise of the QVAR-connectedness approach is not coincidental; it represents a methodological transformation consistent with the fact that the most critical component of systemic risk emerges in the queues (Ando et al., 2022; Bouri et al., 2020). The research agenda emerging from this compilation is characterized by three key points that are (i) supporting the statistical

significance of tail connectedness with more robust inferential tools, (ii) systematizing sensitivity analyses to design decisions such as window length, prediction horizon, and quantile selection, and (iii) integrating tail connectedness measures with macro determinants, policy regimes, and structural breaks to move towards early warning applications. Within this framework, the fundamental contribution shared by the most influential studies is moving connectedness measurement from the level of "average co-action" to the level of "network reorganization under extreme conditions"; this makes quantile connectedness a central tool in the contemporary financial network analysis literature. In this context, it can be expected that literature will expand in the future towards less studied asset classes, intra-sector micronetworks, macro-financial policy variables, and quantile-based hybrid methods.

REFERENCES

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Ando, T., Greenwood-Nimmo, M., & Shin, Y. (2018). Quantile connectedness: Modelling Tail Behaviour in the Topology of Financial Networks. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3164772

Ando, T., Greenwood-Nimmo, M., & Shin, Y. (2022). Quantile connectedness: Modeling tail behavior in the topology of financial networks. Management Science, 68(4), 2401–2431. https://doi.org/10.1287/mnsc.2021.3984

Billah, M., Karim, S., Naeem, M. A., & Vigne, S. A. (2022). Return and volatility spillovers between energy and BRIC markets: Evidence from quantile connectedness. Research in International Business and Finance, 62, 101680. https://doi.org/10.1016/j.ribaf.2022.101680

Bradford, S. C. (1934). Sources of information on specific subjects. Engineering, 137, 85–86.

Bouri, E., Lucey, B., Saeed, T., & Vo, X. V. (2020). Extreme spillovers across Asian-Pacific currencies: A quantile-based analysis. International Review of Financial Analysis, 72, 101605. https://doi.org/10.1016/j.irfa.2020.101605

Bouri, E., Saeed, T., Vo, X. V., & Roubaud, D. (2021). Quantile connectedness in the cryptocurrency market. Journal of International Financial Markets, Institutions and Money, 71, 101302. https://doi.org/10.1016/j.intfin.2021.101302

Callon, M., Courtial, J.-P., & Turner, W. A. (1979). L'Action concertée Chimie Macromoléculaire: Sociologie d'une agence de traduction. Centre de Sociologie de l'Innovation.

Chatziantoniou, I., Gabauer, D., & Stenfors, A. (2021). Interest rate swaps and the transmission mechanism of monetary policy: A quantile connectedness

approach. Economics Letters, 204, 109891. https://doi.org/10.1016/j.econlet.2021.109891

Diebold, F. X., & Yilmaz, K. (2009). Measuring financial asset return and volatility spillovers, with application to global equity markets. Economic Journal, 119(534), 158–171.

Diebold, F. X., & Yilmaz, K. (2012). Better to give than to receive: Predictive directional measurement of volatility spillovers. International Journal of Forecasting, 28(1), 57–66.

Diebold, F. X., & Yilmaz, K. (2014). On the network topology of variance decompositions: Measuring the connectedness of financial firms. Journal of Econometrics, 182(1), 119–134.

DORA. (2012). San Francisco Declaration on Research Assessment. https://sfdora.org/

Farid, S., Naeem, M. A., Paltrinieri, A., & Nepal, R. (2022). Impact of COVID-19 on the quantile connectedness between energy, metals and agriculture commodities. Energy Economics, 109, 105962. https://doi.org/10.1016/j.eneco.2022.105962

Garfield, E. (1955). Citation indexes for science: A new dimension in documentation through association of ideas. Science, 122(3159), 108–111.

Garfield, E., & Sher, I. H. (1963). New factors in the evaluation of scientific literature through citation indexing. American Documentation, 14(3), 195–201.

Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). The Leiden Manifesto for research metrics. Nature, 520(7548), 429–431.

Karim, S., Lucey, B. M., Naeem, M. A., & Uddin, G. S. (2022). Examining the interrelatedness of NFTs, DeFi tokens and cryptocurrencies. Finance Research Letters, 47, 102696. https://doi.org/10.1016/j.frl.2022.102696

Koop, G., Pesaran, M. H., & Potter, S. M. (1996). Impulse response analysis in nonlinear multivariate models. Journal of Econometrics, 74(1), 119–147.

Lotka, A. J. (1926). The frequency distribution of scientific productivity. Journal of the Washington Academy of Sciences, 16(12), 317–323.

Marshakova, I. V. (1973). System of document connections based on references. Nauchno-Tekhnicheskaya Informatsiya, Series 2(6), 3–8.

Naeem, M. A., Conlon, T., & Cotter, J. (2022). Green bonds and other assets: Evidence from extreme risk transmission. Journal of Environmental Management, 305, 114358. https://doi.org/10.1016/j.jenvman.2021.114358

Pesaran, H. H., & Shin, Y. (1998). Generalized impulse response analysis in linear multivariate models. Economics Letters, 58(1), 17–29.

Pham, L., Karim, S., Naeem, M. A., & Long, C. (2022). A tale of two tails among carbon prices, green and non-green cryptocurrencies. International Review of Financial Analysis, 82, 102139. https://doi.org/10.1016/j.irfa.2022.102139

Price, D. J. de Solla. (1963). Little science, big science. Columbia University Press.

Priem, J., Taraborelli, D., Groth, P., & Neylon, C. (2010). Alt-metrics: A manifesto. http://altmetrics.org/manifesto/

Pritchard, A. (1969). Statistical bibliography or bibliometrics? Journal of Documentation, 25(4), 348–349.

Rousseau, R., Egghe, L., & Guns, R. (2018). Becoming metric-wise: A bibliometric guide for researchers. Chandos Publishing.

Rousseau, S., & Rousseau, R. (2015). Metric-wiseness. Journal of the Association for Information Science and Technology, 66(11), 2389.
Saeed, T., Bouri, E., & Alsulami, H. (2021). Extreme return connectedness and its determinants between clean/green and dirty energy investments. Energy Economics, 96, 105017. https://doi.org/10.1016/j.eneco.2020.105017
Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. Journal of the American Society for Information Science, 24(4), 265–269.
Zipf, G. K. (1935). The psycho-biology of language: An introduction to dynamic philology. Houghton Mifflin.

A Content-Based Analysis Of Alfred Hitchcock's Cinema

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ABSTRACT

One of the most influential figures in cinema history, Alfred Hitchcock is a storyteller who goes beyond the title of ‘Master of Suspense’ to provide the most concrete examples of auteur theory. This study examines Hitchcock's cinema using content analysis methods, exploring fundamental themes such as guilt, voyeurism, authority figures, uncanniness, and psychoanalytic tensions. The study analyses selected films through brief anecdotes, within the framework of Freudian, Lacanian, and feminist film theories, examining the impact of the director's ‘pure cinema’ approach on content and how it involves the audience as an ‘accomplice’ in the narrative.

Keywords: Alfred Hitchcock, horror cinema, auteur, psychoanalytic, suspense

INTRODUCTION

Alfred Hitchcock's cinema is not merely the product of technical mastery, but also a systematic journey into the dark corners of the human psyche. Hitchcock viewed cinema not as a tool for ‘storytelling’ but rather as a space for ‘creating experiences.’ In his films, content and formal choices are so intertwined that it is impossible to consider one independently of the other.
In academic literature, Hitchcock was defined as an ‘auteur’ (creative director) by French Cahiers du Cinéma critics in the 1950s. Truffaut argues that despite using a commercial cinematic language, the director incorporated his personal obsessions, fears, and philosophy into each of his films. This study aims to identify thematic continuity in the director's filmography and analyse the psychological responses these themes evoke in the viewer.
To understand Hitchcock's cinema, it is essential to draw on psychoanalytic and social theories. Slavoj Žižek (1991) explains Hitchcock's scenes through the Lacanian concept of ‘Desire’. According to him, objects in the film represent a void that the characters cannot reach. On the other hand, Laura Mulvey (1975) criticises Hitchcock through the lens of ‘The Male Gaze,’ theorising how female characters are turned into fetish objects on screen and how the audience derives pleasure from this voyeurism.

When one thinks of Hitchcock cinema, the first things that come to mind are ‘fear’ and ‘suspense.’ Although fear and suspense are similar concepts in Alfred Hitchcock's films, they are two distinct things. Suspense arouses curiosity in people, while fear is more about the act of surprising them. Alfred Hitchcock, who frequently employed these elements of horror and suspense in his films, rose to prominence as a result and became one of

the finest directors of his era. The concepts he utilised in his films served as a lesson for future generations of filmmakers. When new directors aspiring to create suspense and horror films began their work, Alfred Hitchcock was invariably the first director who came to mind.

In the process of human life, fairy tales, horror stories and novels, as well as horror films, play an active role in symbolising and concretising people's primary fears. In none of these areas of fear do people randomly or unnecessarily select symbols that create fear. These elements are seen as changing and taking on new forms and colours according to the thoughts, imaginations and designs of subsequent generations, based on the symbols created by early and primitive humans. In other words, the basis of today's human ability to create symbols draws on the symbols used by early and primitive humans to create the heroes, themes, and events of horror stories, novels, and films (Köknel, 1997: 47).

Hitchcock brought new innovations to the world of cinema in terms of horror and suspense. Foremost among these innovations was his sense of humour, which was not found in horror and suspense films. He made this sense of humour his own and, with it, made a name for himself in a positive way for many years.

Suspense is the main ingredient of Alfred Hitchcock's films. The unease that pervades his films gradually fills the theatre, clearly conveying this feeling to the audience. For Hitchcock, maintaining suspense for a short time, in high doses and at a frightening level, is not valuable. In Hitchcock's films, the audience must wait in unease for a long time (Dorsay, 1992: 117).

THEMES AND BRIEF ANALYSES IN HITCHCOCK FILMS

The Loss of Innocence and the 'Wrong Man'

One of the most characteristic elements of Hitchcock's cinema is the sudden confrontation of an innocent individual with a major accusation. This is not merely a plot device, but an existential threat. Good character types are portrayed as either victims of chance or as being drawn into evil by others. They get into trouble willingly or unwillingly, and their salvation comes through their own efforts. Good characters can also be people who are accused even though they are innocent. They pursue the culprit to prove their innocence (Bolat, 2018: 52).

As can be understood from the characters with good character, no one helps them from the outside, and it is seen that not helping them leads them down an even worse path. People with good character have to cut their own throats to escape this difficult situation. At the same time, they are also subjected to slander.

To give examples from his films; in North by Northwest (1959), the character Roger Thornhill becomes the target of a spy ring simply because he was in the wrong place at the wrong time. This situation symbolises the individual's vulnerability in modern society and the fear of being ‘misunderstood’. Hitchcock's own childhood experience of his father having him briefly locked up in a cell by a police commissioner is the biographical origin of this fear of ‘unjust imprisonment’.

In Strangers on a Train (1951), the transmission of crime is taken to a psychological dimension. The ‘murder swap’ proposal between two strangers is based on one character acting out the other's repressed desires. Here, the content is built on the idea that crime taints not only the perpetrator but also the one who contemplates the act.

The Transformation of the ‘Gaze’ into Violence: Voyeurism

For Hitchcock, voyeurism is not merely one character secretly watching another, but a parody of the ‘act of watching’ inherent in the nature of cinema. In Alfred Hitchcock's cinema, voyeurism functions not only as a narrative theme but as a central cinematic strategy that defines the viewer's position. Hitchcock frequently identifies the camera with the character's gaze, removing the viewer from being a passive recipient of the narrative and confronting them directly with the ethical responsibility of the act of looking. In this context, the gaze is constructed as a problematic act involving power, desire, and transgression rather than innocent observation (Mulvey, 1975; Wood, 2002).

In Rear Window (Hitchcock, 1954), where voyeurism is most prominently explored, the main character Jeffries's observation of his neighbours from his window is a metaphorical counterpart to the cinema audience's practice of witnessing the lives of others in a darkened space. The film relates the desire to see to the loneliness and spatial constraints of the modern individual, while also shifting the act of watching into an area of moral questioning. In this way, Hitchcock exposes the gaze that gives the audience pleasure and invites them to rethink it in terms of guilt, curiosity and responsibility (Spoto, 1999).

In Hitchcock's cinema, gaze and identification are fundamental narrative mechanisms that deepen voyeurism. The director often aligns the camera with the character's visual perception, removing the viewer from an external, neutral position and involving them in the moral tension of the narrative. This identification allows the viewer to see through the character's eyes, while also causing them to participate in the act of looking; thus, the viewer cannot remain entirely exempt from the ethical consequences of the narrative (Mulvey, 1975).

In Vertigo (Hitchcock, 1958) in particular, gaze, desire and identity construction are intertwined. Scottie's obsessive gaze on Madeleine/Judy reveals the reduction of the female body to a visual object and the regulatory power of the male gaze. By consciously problematising identification, Hitchcock makes the audience complicit in the character's desires while also making their destructive consequences visible; thus, the gaze is associated more with control and loss than with pleasure (Wood, 2002).

In Vertigo, Scottie's secret surveillance of Madeleine as she moves through the city constitutes the act of ‘stalking,’ another form of voyeurism. Scottie watches the woman not as a person, but as an ‘image’. This situation can be explained by Jean-Paul Sartre's concept of ‘The Look’: to watch someone is to objectify them. By watching Madeleine, Scottie casts her into his own idealised mould. His comparison of Judy to Madeleine after Madeleine's death shows that voyeurism has turned into a desire to ‘revive a dead image’ (necrophilic tendencies).

In Hitchcock's cinema, the gaze is usually filtered through an obstacle (window pane, binoculars, glasses). These barriers represent the ‘distance between reality and fantasy’ in terms of content. In the film Notorious (1946), the characters watching each other through doorways or mirrors emphasises that information is always fragmented and suspect. This situation coincides with the post-structuralist theory that ‘the truth can never be seen in its entirety.’

Spatial Framing and the Window Metaphor

In Hitchcock's cinema, spatial framing is a fundamental cinematographic tool that defines the boundaries of the gaze and visually structures voyeurism. Architectural elements, particularly windows, doors, mirrors, and staircases, function both as a visual frame and a narrative threshold. Through these frames, the viewer is confined to a spatially limited gaze along with the characters; the distinction between what is seen and what remains hidden sharpens, and the act of watching becomes a conscious transgression (Bordwell & Thompson, 2019). In Rear Window (Hitchcock, 1954), the window is not merely an architectural element but a metaphor for cinema itself. Jeffries' fixed position and the separate framing of the windows in the opposite apartment make the viewer a passive observer of multiple narratives, while simultaneously making visible the ethical consequences of this gaze. Each window functions as a "screen" offering a slice of intimate life; Thus, Hitchcock invites us to rethink the cinema screen as a public space of surveillance and confronts the viewer with the responsibility of the gaze (Wood, 2002).

In Hitchcock's cinema, space is not merely a physical backdrop for events, but an active narrative element that determines the character's physical and mental state. Especially limited, enclosed, or immobile spaces directly shape the direction and quality of the gaze. The character's physical limitations make the act of seeing a necessity, while space functions as a structure that regulates and controls the gaze. This situation causes the viewer to share the same spatial limitations, inevitably intensifying the viewing experience (Bruno, 2002).

In Rear Window (Hitchcock, 1954), Jeffries' broken leg provides a fundamental narrative justification for transforming spatial immobility into a gaze. The limitation of the character's capacity for action reduces looking to almost a single activity, while also transforming space into a necessary tool of the practice of surveillance. In this way, Hitchcock constructs space as a relational area established between bodily deficiency and visual compensation; the viewer, by sharing the gaze within this spatial confinement, is more deeply involved in the ethical tension of the narrative (Spoto, 1999; Wood, 2002).

In Hitchcock's cinema, buildings and interior designs represent the mental maps of the characters. The "staircase" motif, in particular, is the most frequently used and most meaningful architectural element in the director's filmography. In Hitchcock, staircases are never merely tools connecting two floors; they symbolize a moral ascent or an inevitable downfall.

Vertigo and Spiral Stairs: The spiral staircase of the church tower in San Francisco is a physical manifestation of Scottie's vertigo (and uncontrollable obsession). The fact that the stairs appear as an endless void when viewed downwards symbolizes the character's drowning in guilt. Psycho and Forbidden Zone: The stairs in Norman Bates' house form the boundary between the "known world" (the house) and the "hidden reality" (the mother figure upstairs). The attack Detective Arbogast suffers while climbing the stairs is a violent reaction to the violation of a moral boundary. In spatial analysis, windows are identified with the "eye." In Rear Window, the framed windows function as cinema screens, while in Shadow of a Doubt, the light seeping through the windows represents how fragile the peace of the small town is and how evil from outside can seep in at any moment.

The Centrepiece of Hitchcock's Narrative: The MacGuffin

In Hitchcock's cinema, the MacGuffin is used as a functional element that sets the narrative in motion but does not carry a thematic meaning in itself. As the director defines it, the MacGuffin is a narrative tool that the characters pursue, but its main importance for the viewer lies in triggering the development of events and relationships. In this context, while the

MacGuffin directs the viewer's attention to a concrete object or piece of information, it allows the psychological, ethical, and visual processes that constitute the narrative's core tension to develop in the background (Truffaut, 1985).

The MacGuffin is the stolen money in Psycho, the microfilm in North by Northwest. From a thematic perspective, the MacGuffin is a pretext that initiates the plot. Through this, Hitchcock conveys to the viewer that the real focus should not be on the "event" itself, but on the characters' "psychological reactions" to that event. One of the most unique concepts in Hitchcock's cinema, the MacGuffin is not just a script trick, but also an ontological part of the narrative structure.

In films such as The 39 Steps (Hitchcock, 1935), Notorious (Hitchcock, 1946), and North by Northwest (Hitchcock, 1959), the MacGuffin appears in the form of spy documents, secret formulas, or mistaken identities. The content of these elements is often vague or insignificant; their main function is to set the characters in motion and draw the viewer into the narrative. While Hitchcock directs the viewer's curiosity with this method, he emphasizes that the MacGuffin is more about function than meaning; thus, the gaze, tension, and the viewer's emotional participation are placed at the center of the narrative rather than objects (Wood, 2002).

In Hitchcock's cinema, the MacGuffin can be read not only as a functional element that initiates the narrative, but also as a metaphorical device that directs the viewer's attention. Through MacGuffin, the viewer is encouraged to focus on a concrete objective on the surface of the narrative, while the film's true thematic network—crime, desire, identity, and gaze—is silently constructed in the background. In this respect, MacGuffin is more concerned with the postponement of meaning than with meaning itself; as the viewer is drawn along in pursuit of an object they deem important, the real tension of the narrative intensifies at a psychological level (Truffaut, 1985; Wood, 2002).

The conscious decontextualization of MacGuffin makes visible Hitchcock's playful yet critical relationship with the audience. The movement and misdirection that revolve around the object or information are more important than what it actually is. The secret state secrets in North by Northwest (Hitchcock, 1959) or the uranium bottles in Notorious (Hitchcock, 1946) lose their dramatic significance as the narrative progresses; however, the relationships between characters, and the themes of trust and betrayal, deepen. Thus, MacGuffin functions as a narrative "empty center," indirectly carrying the emotional and ethical weight of the film. This metaphorical structure also questions the viewer's cinematic perception. The curiosity directed towards the MacGuffin offers an implicit critique of why and how the viewer looks in cinema. By consciously fixing the viewer's attention on a false focus, Hitchcock reveals the manipulability of the act of watching. In this respect, the MacGuffin becomes a metaphor not only for

the narrative but also for cinema itself: what is assumed to be important is often merely a tool used to maintain the gaze (Mulvey, 1975; Bruno, 2002).

The most paradoxical element of content analysis in Hitchcock's cinema is the MacGuffin. Hitchcock defines this concept as "an object or secret that the characters value highly, pursue, die for, or kill for, but which holds no significance for the viewer" (Hitchcock & Truffaut, 1967). While academically the MacGuffin functions as the "engine" that sets the narrative in motion, the content itself is built upon a void.

In Hitchcock's cinema, the relationship between MacGuffin and ideology demonstrates that elements that appear ideologically neutral on the surface of the narrative invisibly reproduce specific value systems and power relations. Although MacGuffin is often presented as an insignificant, even ambiguous, object or piece of information in terms of content, the narrative movement organized around it renders ideological frameworks such as the state, security, national interest, and individual responsibility natural and unquestionable. Thus, MacGuffin creates a narrative ground where ideology operates silently, rather than being a direct representation of it (Wood, 2002).

In films like Notorious (Hitchcock, 1946) and North by Northwest (Hitchcock, 1959), produced within the context of the Cold War, the MacGuffin appears as a state secret, classified information, or object of espionage. The content of these elements is not detailed; the viewer is guided to accept the necessity of protecting or capturing the MacGuffin, rather than understanding what it is. This parallels the way ideology operates: what matters is not the information itself, but the discourse of legitimacy and threat built around it. In this way, Hitchcock avoids explicitly defending ideological assumptions, instead embedding them within the natural flow of the narrative (Truffaut, 1985).

The ideological function of the MacGuffin is further highlighted by the conscious diversion of the viewer's attention. While the viewer focuses on the object they perceive as central to the narrative, ideological structures such as gender roles, state authority, and individual freedom are reproduced in the background without question. In this context, the MacGuffin can be read as a cinematic equivalent of the "invisibility" of ideology; Through an object stripped of its meaning, ideological meanings are silently circulated (Mulvey, 1975; Bruno, 2002).

In structuralist film analysis, the MacGuffin is treated as an "empty signifier." Gilles Deleuze (1986), in his work Cinema 1: The Movement-Image, describes Hitchcock's use of the MacGuffin as a "pure function" that initiates the action but has no meaning in itself.

North by Northwest (1959): In this film, the MacGuffin consists of microfilms containing government secrets hidden inside a figurine. Although the protagonists obtain the microfilms at the end of the film, the viewer never learns the contents of these secrets. Here, the content is not based on "what the secret is," but on "the chaos created by the desire to possess the secret." The 39 Steps (1935): The aircraft engine design that the characters are chasing is completely insignificant compared to the thematic depth of the film (trust, betrayal, escape). Žižek (1991) identifies the MacGuffin with the Lacanian psychoanalytic concept of "petit objet a" (the unattainable object of desire). According to Žižek, the MacGuffin is a "nothingness"; however, this nothingness is the only thing that allows desire to continue. While the characters chase after the MacGuffin, they are actually chasing after their own desires and fears.

Psycho (1960): The $40,000 stolen at the beginning of the film is a classic example of the MacGuffin. The viewer expects the chase to continue in the first half of the film. However, when Marion Crane is murdered in the shower, the money completely loses its meaning, and the narrative evolves from a "crime/escape" story to a "pathological horror" story. This thematic shift demonstrates the MacGuffin's power to manipulate the viewer.

In academic literature, the MacGuffin is seen as Hitchcock's ability to "confine content within form." Spoto (1983) argues that Hitchcock, using the MacGuffin, reminds the audience that "it's not what you're after, but who that pursuit makes you." In this context, the MacGuffin is an "absence" that deepens the content. According to Hitchcock, if the MacGuffin were a very important object (for example, a well-known historical artifact), the viewer would focus on the object and miss the suspense experienced by the character. The object's "lack of content" allows the viewer's attention to be entirely focused on "form and emotion." This is the narrative equivalent of Hitchcock's ideal of "pure cinema" (Wood, 2002).

The Relationship Between Silence, Sound and Suspense

For Hitchcock, sound is not merely a complement to the image, but a fundamental element that determines the psychological depth of the story. In Hitchcock's cinema, silence and sound function as essential elements that guide, rather than complement, the visual narrative in building tension. The director considers the absence or limited use of sound as a dramatic void; this void focuses the viewer's attention on the image while simultaneously deepening the feeling of anticipation and unease. In this context, silence is not merely an auditory deficiency, but an active narrative tool that heralds the impending threat (Chion, 1994).

Collaborations with composer Bernard Herrmann have shaped the auditory identity of Hitchcock's cinema. The high-pitched violin sounds in the shower scene of Psycho imprint the act of the knife entering the body on the viewer's mind more effectively than the visuals. Brown (1994) describes the Hitchcock-Herrmann collaboration as "the pinnacle of emotional manipulation." Here, the music is not merely background; it is an expression of the characters' repressed fears.

In The Birds (Hitchcock, 1963), in particular, the almost complete exclusion of traditional film music allows for the creation of visual tension through sound effects and abrupt silences. The mechanical and rhythmic nature of bird sounds, detached from the natural flow of nature, transforms into a menacing atmosphere. Here, Hitchcock removes sound from being an emotional guide directing the narrative and transforms it directly into the tension itself; the viewer is deprived of musical guidance and left alone with the visual events. The relationship between visual tension and sound is further sharpened by Hitchcock's editing and framing choices. In the shower scene in Psycho (Hitchcock, 1960), Bernard Herrmann's sharp strings complement the violence not directly shown in the image, at an auditory level. In contrast, the prolonged silence after the murder, instead of reducing tension, reinforces the weight of the crime. This contrast shows that Hitchcock uses sound not only to create intensity but also to guide the viewer's emotional response and fill visual gaps with meaning (Chion, 1994; Wood, 2002).

In Hitchcock's cinema, music, by establishing a direct relationship with the visual representation of violence, becomes a fundamental narrative tool that complements the violence that is not shown or is shown only to a limited extent on screen. The director uses music not only to create an emotional atmosphere but also as a structure that increases the perceptual intensity of violence. In this context, music fills the gaps left by the visual narrative, stimulating the viewer's imagination and deepening the violence at a psychological level (Chion, 1994).

One of the most striking examples of this relationship is the shower scene in Psycho (Hitchcock, 1960). Bernard Herrmann's sharp, high-pitched string music makes the knife blows, which are not directly displayed in the image, audibly visible. Here, the music replaces the violence; the viewer experiences not the physical act, but its effect. Hitchcock's placement of music in such a decisive position creates an ethical distance from the visual representation of violence, while inevitably guiding the viewer's emotional response (Wood, 2002).

The music-violence relationship in Hitchcock's cinema is not limited only to sudden outbursts; The moments when the music is deliberately withdrawn also reinforce the impact of the violence. The silence that follows the act of

violence makes the weight and traumatic effect of the crime visible, forcing the viewer to confront the emotional void. This contrast shows that the absence of music is just as meaningful as its presence. Thus, while Hitchcock avoids aestheticizing violence through music, he transforms it into a more lasting and disturbing experience in the viewer's mind (Chion, 1994).

In Psycho (Hitchcock, 1960), the music composed by Bernard Herrmann goes beyond being a classical accompaniment and functions as a leitmotif. The recurring musical motifs throughout the film, rather than directly representing specific characters or emotional states, create an abstract field of meaning that evokes the threat, repressed desire, and sense of impending violence. In this respect, the music of Psycho functions as an auditory structure that makes the unconscious layers of the narrative visible (Chion, 1994).

The sharp string motif heard in the shower scene is the most intense expression of the tension language that permeates the entire film. This motif functions not merely as a sign specific to the moment of the murder, but as a threat indicator that constantly keeps the possibility of violence alive. Hitchcock's positioning of this music in place of the invisible violence on stage expands the narrative meaning of the leitmotif; the music represents not the event itself, but its emotional and psychological impact (Wood, 2002).

The string-heavy music, composed in harmony with the film's black-and-white visual aesthetic, creates a lasting sense of tension in the viewer's subconscious through repetition. Each return of the leitmotif evokes a previous experience of violence, creating an echo in the viewer's memory. This repetition, in addition to ensuring narrative continuity, functions as a mechanism to control the viewer's level of expectation and anxiety. Thus, Psycho's music becomes one of the most prominent examples in Hitchcock's cinema where sound is placed at the center of the narrative (Chion, 1994; Spoto, 1999).

In The Birds (1963), traditional music is not used; instead, the sounds of birds' wings and cries are electronically manipulated. This thematic choice symbolizes nature's "alienated" and "mechanical" attack on humanity. Silence, in Hitchcock's work, is not an emptiness but an unsettling presence, "a harbinger of impending disaster."

RESULTS AND DISCUSSION

A content-based analysis of Alfred Hitchcock's cinema shows that the director, using the conventions of genre cinema, dealt with universal human fears, moral dilemmas, and psychological deviations. Guilt, voyeuristic

curiosity, maternal obsession, and unease make Hitchcock not just a director, but one of the artists who best captured the unease of modernity. Hitchcock, while trapping the viewer in the screen, doesn't just tell a story; he transforms them into an accomplice, forcing them to confront their own moral weaknesses. A content-based analysis of Alfred Hitchcock's cinema proves how the director combined theological guilt, psychoanalytic deviations, voyeuristic desires, and social unease with the grammar of cinema. When evaluated within the framework of auteur theory, Hitchcock is a revolutionary storyteller who confronts the masses with their own shadows within mass culture. Hitchcock's content-based revolution profoundly influenced subsequent generations of filmmakers. Directors such as Brian De Palma, David Fincher, and Christopher Nolan have continued Hitchcock's themes of voyeurism and uncanny elements, modernizing them further. This brief analysis demonstrates that Alfred Hitchcock's cinema is far more than simple "thriller stories"; it is a complex work that dissects the anatomy of the human soul and modern society. When examined through content analysis, concepts such as voyeurism, uncanny elements, the MacGuffin, space, and sound are seen to transform from mere visual elements in Hitchcock's camera into narrative pillars possessing philosophical and psychological depth. Hitchcock doesn't simply tell a story while trapping the viewer in the screen; he transforms them into an accomplice, forcing them to confront their own moral weaknesses. His legacy to cinematic art is not only technical perfection but also the genius to transform the darkest desires of the individual within mass culture into an aesthetic form.

REFERENCES

Bruno, G. (2002). Atlas of emotion: Journeys in art, architecture, and film. Verso.

Brown, R. B. (1994). Overtones and Undertones: Reading Film Music. University of California Press.

Bolat, N. (2018) Gerilim ve Mizahın Mükemmel Uyumu: Alfred Hitchcock. Middle Black Sea Journal of Communication Studies, 3(2), 43-53

Bordwell, D., & Thompson, K. (2019). Film art: An introduction (12th ed.). McGraw-Hill Education.

Chion, M. (1994). Audio-vision: Sound on screen (C. Gorbman, Trans.). Columbia University Press.

Dorsay, A. (1992). 100 Yılın 100 Yönetmeni. 2. Basım. İstanbul: Remzi Kitapevi

Köknel, Ö. (1998). Korkular Takıntılar Saplantılar. İstanbul: Altın Kitaplar Yayınevi

Mulvey, L. (1975). Visual pleasure and narrative cinema. Screen, 16(3), 6–18. https://doi.org/10.1093/screen/16.3.6

Spoto, D. (1999). The dark side of genius: The life of Alfred Hitchcock. Da Capo Press.

Truffaut, F. (1985). Hitchcock (Rev. ed.). Simon & Schuster.

Wood, R. (2002). Hitchcock's films revisited. Columbia University Press.

Žižek, S. (1991). Everything You Always Wanted to Know About Lacan (But Were Afraid to Ask Hitchcock). Verso.

The Relationship Between Music and Theatre in the Context of Performance, Cultural Transmission, and Education: A Study on Turkish Folk Culture

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ABSTRACT

Evaluations conducted through traditional Turkish folk theatre, the âşıklık tradition, and musical narrative practices indicate that the music–theatre conjunction is an important instrument in the transmission of cultural memory and the construction of collective identity. In this context, music emerges beyond being merely an aesthetic element that supports dramatic narration; it stands out as a field of expression that directs the process of meaning production on stage and strengthens the interaction between the performer and the audience. The inclusion of traditional musical-dramatic structures in educational processes through a holistic approach has contributed to the orientation of acting pedagogy away from a structure focused solely on technical skills toward an understanding that prioritizes cultural and artistic depth. The aim of this study is to reveal the conceptual, historical, and pedagogical significance of the relationship between music and theatre within the context of Turkish folk culture, particularly through the Abdal musical tradition; and to demonstrate the value of this relationship in terms of cultural memory, collective identity, and contemporary theatre/acting education. In this framework, the historical development of musical narrative forms based on oral culture, the function of music within dramatic structure, and its role in the formation of scenic narration have been evaluated within the scope of folk theatre and narrative traditions. In particular, it has been determined that in the Abdal tradition, music is not merely an auditory element; rather, it is a fundamental component that carries the narrative, determines the rhythm, and directs performative action, and it has been emphasized that the improvisation-based structure of this tradition, the performer's simultaneous embodiment of narrator and actor identities, and the unity of music–body–narrative exhibit a theatrical quality. In line with the data obtained, the potential of the Abdal musical tradition in terms of contemporary staging approaches and theatre/acting education has been discussed; and it has been concluded that traditional musical narrative practices offer an original reference framework for contemporary performing arts and pedagogical approaches.

Keywords: Turkish folk culture, music–theatre relationship, Abdal tradition, musical narration, theatre music

INTRODUCTION

Music and theatre have occupied a central place in cultural life as two fundamental forms of expression that have been intertwined since the earliest periods of human history (And, 2003; Boratav, 2012). From primitive rituals to modern performing arts, these two art forms have assumed significant functions in the transmission of social memory, the construction of collective identity, and the sharing of aesthetic experience (Özdemir, 2010). Especially in societies where the oral cultural tradition is strong, music and dramatic narration are observed to constitute an inseparable whole (Boratav, 2012). This historical and cultural coexistence has manifested itself in different forms across different geographies; each society has reproduced the music–drama relationship through distinctive forms in accordance with its own cultural codes.

There are several fundamental concepts through which these two ancient arts come into contact with one another. The concept of rhythm is one of the notions that establishes this proximity. In performing arts, rhythm is not merely a musical element but one of the constitutive components of dramatic structure and scenic perception. The performer's bodily actions, the organization of movement on stage, and the relationship established with the audience acquire meaning within a temporal organization. This organization operates through a rhythmic structure that is directly or indirectly related to music. Therefore, in text-centered performing arts, rhythm should be considered a dramaturgical tool that determines the internal tempo of the text, connects actions on stage, and directs the audience's perceptual attention. This shared ground between music and performing arts reveals that the meaning produced on stage is nourished not only by verbal narration but also by bodily and auditory flow.

There are other channels of contact between music and theatre; these channels also emerge in discussions of theatricality that have been conducted as intrinsic to the disciplines of theatre and performance. Theoretical debates on theatricality foreground the dynamism of the performer–audience relationship, rhythmic movement, and the spatial separation between stage and audience (Eşigül, 2020a: 235–251). Meyerhold's approach of "re-theatricalization" necessitates the transmission of the performer's energy to the audience through rhythmic movement; for this reason, rhythm produces not only physical but also perceptual musicality. Féral likewise argues that theatrical action emerges through a spatial division established via "the gaze"; this division determines the rhythm and perceptual tempo of the performance, enabling the stage to possess a musical flow.

In this context, the relationship between music and performing arts is grounded not only in the rhythmic foundations of the ancient choral tradition but also in the body–rhythm–perception relationship emphasized by modern conceptions of theatricality. Accordingly, music should be considered both a

historical determinant of dramatic structure and a constitutive aesthetic element of contemporary staging.

When all channels of contact are considered together, the function of music in playwriting and staging processes must be reconsidered. Music is not merely an auxiliary element used to create an emotional atmosphere or to soften transitions between scenes; rather, it can be regarded as a constitutive dramaturgical element that directs the performer's bodily action, determines the tempo of the stage, and shapes the audience's perceptual engagement. Such an approach allows for the development of a holistic performance aesthetic in which music, body, and space simultaneously produce meaning on stage, moving beyond the boundaries of text-centered theatre. In this respect, the union of music and performing arts assumes a central role in redefining dramaturgy and theatrical experience in contemporary performing arts.

For the development of theatre, educators, actors, directors, writers, and all those involved in theatre work must strive to improve and keep pace with the times. The experience of theatre as a living art form must be continuous. As times change, human relationships, from the past to the present, will reflect a different kind of permanence in theatre (Pazvantoğlu and Can Budak 2025: 49).

Turkish folk culture contains rich examples of music–theatre interaction thanks to its deep-rooted oral narrative tradition, ritual-based practices, and the intense relationship music establishes with everyday life (And, 2003). From shamanistic rituals of Central Asian origin to village theatrical performances in Anatolia, and from the âşıklık tradition to meddah performances, music emerges as both the carrier and the determinant element of dramatic narration within an interdisciplinary perspective (Özdemir, 2010; Artun, 2014). In this context, music is not merely an aesthetic element; it is a structural component that reinforces the meaning of narration, organizes dramatic time, and establishes direct interaction with the audience (Yıldız, 2016). However, social and cultural transformations experienced throughout the historical process have also affected the manner in which this holistic structure is perceived.

With the institutionalization of Western theatre practices during the Republican period, aspects of the music–theatre relationship rooted in folk culture have at times receded into the background (And, 2003). Nevertheless, the increasing interest in traditional forms, particularly since the second half of the twentieth century, has made it necessary to re-evaluate musical dramatic structures within Turkish folk culture (Nutku, 2001). This situation necessitates addressing the music–theatre relationship not only as a historical phenomenon but also in terms of contemporary performing arts and educational fields (Yıldız, 2016). From this point of view, examining traditional music–theatre unity in a multifaceted manner gains importance

both for understanding cultural continuity and for nourishing contemporary artistic practices.

The relationship between music and theatre in the performing arts should be considered not merely as the coexistence of two disciplines used simultaneously, but as a shared structure that determines the temporal and bodily organization of performance. The performer's presence on stage, the continuity of bodily action, and the live relationship established with the audience acquire meaning within a rhythmic order. This order becomes visible at times through the explicit rhythms of a musical composition, and at other times through the internal tempo of dramatic action. Therefore, examining the theatre–music relationship on a theoretical level necessitates reading performance through the principles of rhythm, repetition, and transformation.

Schechner's performance theory constitutes an important theoretical foundation for explaining the theatre–music relationship due to its emphasis on the rhythmic structure of theatrical behavior. According to Schechner, theatrical performance is a rhythmic field of interaction that transforms with each enactment as a form of "twice-behaved behavior"; this rhythmic structure, reshaped in every performance through the performer's live presence, is directly connected to the musical temporality of performance. His conception of performance based on layers of movement, repetition, transformation, and behavior demonstrates that the rhythmic order of stage action possesses a musical organization. Therefore, Schechner's approach, which views theatre as a "series of perceptual transformations," provides a functional framework for explaining the reciprocal interaction between musical rhythm and the rhythm of behavior on stage (Eşigül, 2020b: 266–267).

From this perspective, music on stage should be evaluated not merely as an external accompanying element but as a constitutive component that reveals the internal rhythm of performative behavior. The reciprocal interaction between the performer's actions and the temporal flow of music transforms performance into a live experience that is reconstructed anew each time rather than a fixed representation. The principles of rhythmic repetition and transformation emphasized by Schechner enable the use of music as a dramaturgical tool in playwriting and staging processes. Thus, music becomes a fundamental performance element that deepens perceptual transformations through which meaning is produced on stage and determines the dynamics of the performer–audience relationship.

Throughout the historical development of the performing arts, the relationship between music and theatre has existed not merely as an aesthetic coexistence but as a fundamental method of meaning production. When the ritual, narrative, and collective experience-producing practices of human communities are examined, it becomes evident that performative structures in which sound, rhythm, and bodily movement operate together constitute

the precursor forms of theatre. In this context, music should be evaluated not as a secondary element supporting dramatic narration on stage, but as a constitutive component that organizes time, conveys emotional intensity, and directs collective perception. An examination of the historical origins of theatre clearly reveals that this organic relationship with music has been determinative in shaping staging practices.

At the inception of theatre, music and theatre developed together. "In Ancient Greek theatre, music and dance are inseparable parts of the dramatic structure." In Ancient Greek theatre, the chorus formed both the emotional and rhythmic foundation of dramatic action through an integrated structure of rhythmic walking, music, and dance; in staging, music and dance functioned as complementary elements that strengthened the dramatic impact of speech, determining rhythmic tension in both tragedy and comedy. The music used in choral sections, particularly in tragedies, became the rhythmic carrier of the stasimion structure, functioning not merely as an accompaniment to dramatic action but as a constitutive element of it (Eşigül et al., 2023: 29–32).

This constitutive role assumed by music in Ancient Greek theatre provides an important historical reference for rethinking the relationship between music and theatre in modern performing arts. The rhythmic organization observed in the choral structure can be directly associated today with bodily action on stage, dramaturgical tempo, and perceptual flow. For this reason, music should be considered in contemporary theatre and stage performances not only as an element that creates atmosphere but as a carrier of meaning that determines the temporal and bodily coordinates of dramatic structure. This continuity extending from antiquity to the present demonstrates that music and theatre create a shared perceptual space on stage, producing a holistic performance experience that envelops the audience on both auditory and bodily levels.

The relationship between music and performing arts has existed throughout history not merely at the level of aesthetic accompaniment, but as a fundamental organizational principle that determines how meaning is produced on stage. From ritual-based collective performances onward, examples in which sound, rhythm, and bodily movement operate together have constituted the precursor forms of the performing arts; this unity has provided a constitutive framework that shapes the temporal flow and perceptual intensity of dramatic narration. In this context, music should be evaluated not as a secondary element supporting narration in stage performances, but as a means of meaning production that organizes the time of dramatic action, directs bodily movement, and enables collective experience.

In Ancient Greek theatre, the chorus formed both the emotional and rhythmic foundation of dramatic action through an integrated structure of rhythmic walking, music, and dance. In staging, music and dance determined

rhythmic tension in tragedy and comedy as complementary elements that strengthened the dramatic effect of speech; the music used in choral sections, particularly in tragedies, became the rhythmic carrier of the stasimion structure, functioning not merely as an accompaniment to dramatic action but also as its constitutive element (Eşigül et al., 2023: 29–32).

This constitutive role undertaken by music in Ancient Greek theatre offers an important historical reference for re-evaluating the unity of music and performing arts in contemporary performance practices. The rhythmic structure observed in the choral element demonstrates that bodily action, dramaturgical interpretation, and perceptual flow in contemporary performing arts can be constructed together with musical principles. Therefore, music should be addressed in modern theatre and stage performances not merely as an atmosphere-creating element, but as an active carrier of meaning that determines the temporal, bodily, and perceptual coordinates of dramatic structure.

This historical continuity demonstrates that music and performing arts produce a holistic performance experience by creating a shared perceptual space on stage that envelops the audience on both auditory and bodily levels. Thus, the unity of music and theatre can be evaluated as a multilayered aesthetic structure in which meaning in the performing arts is produced not only through narration but also through rhythm, movement, and temporal organization.

In music and performing arts, the stimulation of creativity is often made possible not so much through theoretical structures as through the activation of bodily and sensory processes. The performer's ability to display a live, fluid, and transformative presence on stage depends on their capacity to relate their internal rhythm to external stimuli. At this point, music—especially rhythm—stands out as a tool that establishes direct contact with the stage artist's body and awakens movement prior to thought. The repetition, variation, and unexpected ruptures offered by rhythm function as a threshold that suspends the performer's habits and initiates the creative process.

The value of rhythm for the stage artist stems from its transformation from a mere measure of time into a trigger of the creative process. Rhythmic styles in music—ranging from regular beats to unexpected disruptions, from asymmetrical patterns to micro-tensions created by chord transitions—possess the quality of provocative stimuli that directly translate into movement in the performer's body. Rhythmic diversity activates the emotional responses of the stage artist and triggers creative reflexes; thus, the performer can develop a more spontaneous, more organic, and more original performance through the bodily momentum guided by rhythm. As in Dalcroze pedagogy, transforming rhythm into bodily experience enriches the creative process by establishing a direct connection between the artist's nervous system and expressive capacity. For this reason, rhythmic styles

function for the stage artist not merely as technical tools but as positive creative motors that stimulate imagination, nourish emotional flow, and deepen improvisation (Eşigül and Özkeleş, 2019b: 117–118).

In this context, rhythm can be evaluated not so much as a formal regulator that structures the stage artist's performance, but as a catalyst that reveals creative internal potential. The diversity offered by rhythmic styles increases the performer's bodily awareness while also enabling a rethinking of the temporal organization of action on stage. Thus, this dynamic relationship established with music strengthens an improvisation-based, experience-centered, and body-oriented understanding of creation in the performing arts; it transforms rhythm into not merely an accompaniment to performance, but a dramaturgical and aesthetic constitutive element.

Music has a meaning-bearing function in stage performances. This characteristic is clearly observed in examples of cultural performance rooted in the shared origins of music and theatre. In the context of Turkey, a strong example of this unity is found in the Semah practices of Anatolian Alevism. Studies conducted specifically in the Reşadiye district of Tokat reveal that music in Semah performances constructs a structure that cannot be considered separately from theatrical action. Melody, rhythm, and musical patterns combine with bodily movement, spatial organization, and community interaction to produce a holistic performance language on stage. In this context, music functions not as a secondary element supporting dramatic action, but as a constitutive component that determines the time, rhythm, and perceptual orientation of theatrical structure (Eşigül and Eşigül, 2021: 35–60). This approach demonstrates that the unity of music and theatre can be addressed at the level of dramaturgical construction in playwriting; it shows that music can be used as a fundamental dramaturgical tool that regulates the flow of action on stage and jointly produces meaning on bodily and auditory levels.

The aim of this study is to examine the historical, functional, and aesthetic dimensions of the relationship between music and theatre within the context of Turkish folk culture; to reveal the roles assumed by music in traditional folk theatre forms; and to offer evaluations from the perspective of contemporary theatre and arts education in line with the findings obtained.

Method

This study is descriptive in nature and aims to reveal the conceptual, historical, and pedagogical significance of the relationship between music and theatre within the context of Turkish folk culture through the Abdal musical tradition, as well as the value this relationship holds in terms of cultural memory, collective identity, and contemporary theatre/acting education. Data were collected through the document analysis technique, and the historical development of music-based narrative forms rooted in oral

culture, the function of music within dramatic structure, and its role in the formation of scenic narration were analyzed and interpreted within the framework of folk theatre and narrative traditions.

Music and Narrative Tradition in Turkish Folk Culture

Since the beginning of their existence, human beings have sought to understand, interpret, and distinguish the sounds of nature; in this sense, they have employed imitation as a means of gaining certain experiences. In order to imitate sounds, humans not only used their own voices but also produced and utilized various tools and implements, developed them over time, and through these processes discovered musical instruments and music. It is assumed that whistling sounds emerged when the blowing wind struck broken reeds in marshlands, that these sounds were imitated by humans and used during both sorrowful and joyful occasions, and that in this way the first musical phenomenon came into being (Eşigül, 2021: 632).

These initial attempts at imitation and sound production gradually ceased to be merely individual forms of expression and began to be reproduced within the cultural lives of human communities through certain patterns and tools. These early musical experiences, based on the imitation of natural sounds, combined with the human search to expand their sound-producing capacity and gave rise to the idea of obtaining sound through the transformation of objects found in nature. Thus, an awareness developed that sound could be produced not only through bodily action but also through specific tools; this awareness marked the beginning of a cultural and technical process that laid the groundwork for the emergence of musical instruments.

Although there is no definitive information regarding when and how musical instruments first emerged in the historical process, sources on the subject clearly indicate that they have undergone numerous transformations before reaching the forms in which they are used today. When examining the global distribution of musical instruments, it is possible to observe many instruments that are both similar to and different from one another. Societies may have shaped their own instruments—both physically and in terms of performance—by making use of the possibilities offered by their geographical environments and by drawing upon interactions with different cultures (Eşigül, 2021: 632).

Within the performance practices of the music and narrative tradition in Turkish folk culture, having a structure that is easily comprehensible, transmissible, and applicable is of particular importance. In this oral culture–based tradition, music is not merely an accompanying element of narration; it is a fundamental structural component that constructs meaning, directs dramatic flow, and strengthens the narrator's expression. However, it is observed that written sources and academic studies that directly address

musical narrative forms in Turkish folk culture through performance practices, establish pedagogical processes in this context, and transform them into applications are quite limited (Peker and Algı, 2024).

This situation reveals that the music and narrative tradition has largely been addressed only at historical and theoretical levels, and that performance-based, experiential, and practice-oriented approaches have not been sufficiently developed. For this reason, there is a need for instructional practices that center the performative dimension of musical narration in Turkish folk culture and aim to holistically develop the musical and dramatic skills of the narrator–performer. From this point of view, it is anticipated that exemplary practices in which verbal expression, melody, rhythm, and bodily expression elements within the music and narrative tradition are addressed together will contribute to the clearer, more applicable, and more sustainable transmission of the music and narrative tradition in Turkish folk culture; at the same time, such practices are expected to provide a foundation for interdisciplinary studies in the fields of theatre, acting, and music education.

In Turkish folk culture, music has functioned not only as a field of aesthetic expression but also as one of the fundamental tools of narration, communication, and cultural transmission. During periods in which the oral culture tradition was dominant, music served as an important structural element that enabled narrative genres such as epics, fairy tales, legends, and folk stories to be preserved in memory and transmitted from generation to generation (Boratav, 2009). In this context, music should be regarded not merely as an accompaniment to narration, but as an element that deepens meaning and strengthens dramatic effect.

The relationship between word and music in the Turkish folk narrative tradition is particularly evident in the âşıklık tradition. Âşıks expressed social events they experienced, individual emotional states, and historical memory through an improvisation-based narrative language accompanied by the bağlama. In this tradition, music stands out as one of the fundamental elements that determine the rhythm, emotional tone, and dramatic structure of the narration (Artun, 2014). Thus, the narrator presents a holistic performance on stage with an identity that is simultaneously that of a musician and a dramatic performer.

This functional role of music within the narrative tradition can also be clearly observed in folk theatre and village theatrical performances. In these genres, music serves as a narrative tool that supports the plot, clarifies stage transitions, and strengthens interaction with the audience. Especially within improvisation-based staging practices, music becomes an inseparable part of dramatic narration by integrating with the performer's bodily movements and verbal expression (And, 2012).

Within this framework, the music and narrative tradition in Turkish folk culture should be evaluated not merely as a folkloric element, but as a rich cultural heritage in terms of dramatic narration, improvisation, and

performative expression. This structure, in which word, music, and movement are intertwined, enables both the understanding of traditional staging practices and the development of locally grounded approaches in contemporary arts and education (Güvenç, 2008).

Since the beginning of their existence in the world, human beings have attempted to understand, interpret, and distinguish the sounds of nature; in this sense, they have used imitation in order to gain certain experiences. In order to imitate sounds, humans not only used their own voices but also produced various tools and implements, used them, developed them over time, and through these processes discovered musical instruments and music. It is assumed that whistling sounds emerged when the blowing wind struck broken reeds in marshlands, that these sounds were imitated by humans and used during both sorrowful and joyful occasions, and that in this way the first musical phenomenon came into being (Eşigül, 2021: 632).

On the other hand, the Abdal tradition has taken shape within Turkish folk culture not merely as a musical performance practice, but as a way of life and expression intertwined with Sufi thought. In this context, Abdallık, with its distanced stance toward the world, understanding of humility, and orientation toward truth, positions music not as an aesthetic goal but as a means of spiritual transmission. In Abdal music, word, melody, and performance practice constitute a cultural space in which Sufi thought and folk wisdom circulate, beyond individual artistic production. In this respect, the Abdal musical tradition functions as an important transmission mechanism that ensures cultural continuity through melodic patterns, narrative themes, and performance practices passed down from generation to generation. The master–apprentice–based learning process enables the transmission not only of technical musical skills but also of Sufi values, a philosophy of life, and social memory. Thus, Abdal music functions both as a field of spiritual expression and as a living and transformable carrier of folk culture.

Because Central Anatolian Abdals exist within a deeply rooted and rich musical culture, they are encoded with musical elements even before birth. From an early age, their musical learning begins by being in the same environment as individuals who previously served as representatives of musical traditions (such as grandfathers, fathers, older brothers, uncles, etc.). Among the Abdals, the transmission of music to the next generation occurs within a master–apprentice relationship (Eşigül and Çınar, 2018: 97). When their mastery in vocal performance is examined from a technical perspective, it is unquestionable that Central Anatolian Abdals operate at very high levels. These characteristics can be observed in the vocal embellishments they perform in both kırık hava and uzun hava renditions. Moreover, Abdals, who have developed a distinctive style in instrumental performance as well, have occupied a unique position within Turkish music culture (Eşigül and Çınar, 2018: 598).

The musical competence of Central Anatolian Abdals is fundamentally shaped by a transmission model based on oral culture practices. Musical knowledge is transmitted from generation to generation not through written notation, but through master–apprentice relationships, imitation, repetition, and performance grounded in bodily memory. This mode of transmission parallels Walter Ong's definition of knowledge in oral culture as "knowledge reconstructed in memory and kept alive through performance." The musical tradition of the Abdals is sustained precisely through this living, performance-based memory mechanism.

The creative process described above can be strongly associated with Richard Schechner's concept of "restored behaviour." According to Schechner, restored behaviour is a performative structure that emerges when individuals or communities repeatedly reproduce certain cultural action patterns by reorganizing fragments of what has previously occurred (Schechner, 2024: 123–139). The practices of repetition, modeling, and reconstructing the performance patterns of previous generations in new performances observed in the musical learning of the Abdals correspond exactly to this definition. For the performance of an Abdal musician is not merely a musical production belonging to a single moment; it is a cultural re-performance in which behavioral fragments of past performances are reorganized within social memory and carried onto the stage.

Therefore, the musical transmission practices of the Abdals embody both the oral culture characteristic of learning through repetition based on live performance and, as indicated by Schechner, a concrete example of the concept of "restored behaviour" in the sense of cultural behavior being sustained across generations through repeated re-performance. In this respect, the continuity of Abdal musicianship can be evaluated as a dynamic performance practice in which sequences of behavior stored in a shared communal memory are reconstructed anew in each generation (Eşigül and Özkeleş, 2019a: 35–37).

Within this framework, Abdal musicianship can be understood not merely as a tradition of musical performance, but as a performance system that enables the continuous reproduction of cultural memory on stage. The transmission of musical knowledge through body, memory, and repetition rather than written codes necessitates that the performer establishes a bridge between past and present in every performance. This situation transforms the musician from a passive transmitter into an active interpreter who reorganizes cultural behavior patterns each time. Thus, music becomes not only a field of aesthetic expression, but also an enactment-based narrative form that keeps the historical experience of the community alive.

This perspective also offers an important opening for studies in music, theatre, and performance. The repetition, variation, and bodily memory–based learning observed in the performances of Abdal musicians concretely demonstrate how the concepts of "live experience" and "re-performance"

function in contemporary performance practices. Therefore, this musical tradition constitutes a strong point of reference in both music and theatre for the development of non-text-centered, bodily, and experience-based compositional approaches. Considering performance as an experience that carries traces of the past in every instance yet is entirely constructed in the "now" can be regarded as one of the most significant contributions of Abdal musicianship to performance theory in the performing arts.

The Reflection of Musical Thought on the Performing Arts

In the history of theatre, music has not existed as a secondary element accompanying the formation of the performing arts; rather, it has functioned as a constitutive component that determines the temporality, rhythm, and perceptual orientation of scenic action. From antiquity to modern staging approaches, music has worked in conjunction with bodily movement and spatial organization to structure the dramatic form, enabling meaning on stage to be produced not solely through verbal narration but also through rhythm, sound, and silence. In this context, the performing arts have been shaped as a multilayered field of performance in which musical time and rhythmic organization are decisive.

This structural unity between music and the performing arts becomes particularly evident in the experimental and avant-garde approaches developed in twentieth-century theatre. Absurd theatre, in this respect, stands out as one of the aesthetic domains in which musical thought most radically permeates dramatic construction. As demonstrated by Eşigül (2022), absurd theatre is based on an aesthetic understanding in which logical causality is disrupted, language becomes dysfunctional, and incongruity is consciously produced within staging patterns. Ionesco's position within absurd theatre is evaluated within this framework, emphasizing that the absurd is not merely a thematic content but an aesthetic stance that transforms the structural components of the performing arts.

The fact that the origin of the concept of the absurd derives from music, meaning "lack of harmony" (Esslin, cited in Eşigül, 2022: 4), further renders visible this profound structural relationship between music and theatre. On the theatrical stage, the conscious suspension of expectations of harmony, order, and meaning is concretized through the transfer of non-harmonic structures from music to scenic action. Rhythmic disruptions, repetitions, silences, and unresolved tensions become the fundamental carriers of dramatic structure in absurd theatre. Actions on stage progress through non-teleological cycles and a fragmented perception of time, much like an incongruous musical composition.

In this direction, absurd theatre offers a domain in which the unity of music and the performing arts produces not merely a simultaneous use but a shared mode of thinking and construction. This stage language, shaped by

musical principles, invites the spectator to reproduce meaning not by receiving it from a ready-made narrative but through auditory, bodily, and rhythmic irregularities on stage. Thus, absurd theatre presents a distinctive performance aesthetic that demonstrates how music can function as a dramaturgical tool in the performing arts, placing rhythm and incongruity at the center of meaning production.

Experience-oriented approaches in the performing arts necessitate addressing interdisciplinary interaction not merely as a technical combination but as a structural requirement of meaning production. In this context, the relationship between music and the performing arts should be evaluated not at the level of auxiliary elements that support narration, but at the level of a shared performative language constructed through bodily action, rhythm, and temporality. Particularly in ritual-based stage practices, music creates a field of experience that shapes dramatic action, determines the perceptual framework of scenic activity, and intensifies the relationship established with the audience. This approach makes it possible to conceive music and the performing arts not as two components that complement one another spatially, but as two equal components that produce meaning together.

Music and the performing arts, as two disciplines whose origins lie in the learned and repetition-based performative structure of human behavior, possess the potential to produce a shared experience on stage. Just as bodily action in theatre functions as the carrier of meaning, music operates as a fundamental structural element that organizes and deepens this action through rhythm, sound, and repetition. The performance that emerges from the unity of music and theatre is based on a live encounter established "here and now" between performer and spectator; in this encounter, music goes beyond being an accompanying element that supports the dramatic structure and determines the direction, tempo, and perceptual intensity of interaction on stage. Thus, the spectator transforms from a position of merely observing the narrative into a subject who takes part in the musical and bodily flow and becomes a co-producer of meaning (Eşigül, 2019: 167–170).

Within this framework, the music–theatre partnership is directly related to contemporary performance approaches that place experience at the center of stage construction. When the rhythmic and repetition-based structure of music merges with the performer's bodily action, it generates on stage not a linear narrative but an intensified field of perception. This enables the spectator to experience events on stage not only at a cognitive level but also bodily and emotionally. Therefore, music can be considered a fundamental compositional component in theatrical performance that invisibly guides dramatic structure, transforms perceptions of time and space, and deepens the encounter on stage. This approach points to a holistic performance aesthetic that requires music and theatre to be conceived together at all stages, from playwriting to staging.

Contemporary performance debates increasingly reinforce the tendency to address musical performance not merely as an auditory activity but as a holistic stage act encompassing bodily, visual, and spatial dimensions. Within this approach, the musician ceases to be solely a subject who produces sound on stage and transforms into a performer who generates meaning through the body, posture, appearance, and relationship established with the stage. Particularly in experience-oriented and interdisciplinary stage practices, the strengthening of music's semantic effect becomes possible through the support of auditory elements by visual and bodily signifiers. At this point, theatre's long-standing accumulation of knowledge in stage design, makeup, and costume offers an important theoretical and practical reference field for musical performances.

The utilization of theatrical makeup and costume practices in the musician's process of producing meaning through music on stage can be considered an important strategy that enhances the performative power of music. In their academic study addressing makeup and costume in theatre, Arsoy Baltacıoğlu and Eşigül (2019: 195–197) state that these elements, as the design components closest to the actor's body, are fundamental tools that render visible the character's psychological, social, and aesthetic dimensions and determine the perceptual framework of the relationship established with the audience. From this perspective, the musician may likewise be positioned not merely as an auditory producer on stage, but as a performer who constructs meaning through the body, appearance, and scenic presence. The fact that makeup and costume in contemporary theatre move beyond a representational function to become formal signifiers emphasizing the theatrical nature of performance allows sound in musical performances to be strengthened as an imagistic and bodily narrative language. Thus, the musician's appearance on stage forms a layer of meaning that operates simultaneously with the musical structure, producing a holistic performance aesthetic that directs the audience's perception and deepens music's narrative capacity on stage.

CONCLUSION

This study has examined the historical, theoretical, and cultural dimensions of the relationship between music and theatre within the axis of Turkish folk culture, revealing that this relationship is not merely an aesthetic simultaneity but a constitutive performative structure that determines meaning production on stage. From antiquity to contemporary stage practices, music has been shown to function as a fundamental element that shapes the temporality, rhythm, and perceptual orientation of dramatic action; it has been observed that bodily movement, space, and the relationship established with the audience acquire meaning through musical organization.

The examples of Turkish folk culture examined within the scope of the research demonstrate that the relationship between music, narrative, and performance exhibits a holistic structure within the oral culture tradition. The minstrel tradition, village theatrical performances, forms of folk theatre, and particularly the Abdal musical tradition reveal that music is not a secondary element that supports narration, but rather a fundamental expressive domain that constructs and conveys dramatic meaning. In these traditions, music operates together with speech, rhythm, and bodily expression, producing a multilayered stage practice in which the narrator is positioned simultaneously as both musician and performer.

The modes of transmission examined through the example of Abdal musicianship have shown that musical knowledge is transmitted from generation to generation not through written codes but through the body, memory, and repetition. When this situation is evaluated within the framework of Schechner's concept of "restored behavior," together with the live, performance-based structure of oral culture, it reveals that music is not merely an aesthetic production but a performance system in which cultural memory is continuously reconstructed on stage. Thus, music assumes the function of a dynamic bridge established between the past and the present, enabling both continuity and transformation in each performance.

Within the study, the reflections of musical thought on contemporary performing arts were also evaluated, particularly through the example of absurd theatre. The stage language of absurd theatre, constructed through incongruity, repetition, silence, and rhythmic disruptions, has been directly associated with non-harmonic structures in music; it has been demonstrated that this aesthetic understanding places music at the center of the stage as a dramaturgical tool. In this context, music has been considered a fundamental component of a mode of thinking and construction in which meaning on stage is produced not solely through text, but through auditory and bodily irregularities.

The findings obtained indicate that the relationship between music and theatre also holds significant potential in terms of contemporary performing arts and arts education. Considering rhythm as an element that enhances bodily awareness and triggers the creative process provides a strong pedagogical foundation for acting, improvisation, and performance-based educational models. In this respect, music should be reconsidered in the performing arts not merely as an accompanying element, but as a fundamental dramaturgical tool that reveals the performer's creative potential, transforms stage construction, and deepens the relationship established with the audience.

In conclusion, this study addresses the historical and cultural unity of music and theatre within the context of Turkish folk culture and demonstrates that this relationship occupies a central position in meaning production in the performing arts. Evaluating the music–theatre relationship

together with its dimensions of performance, expression, and transmission enables both a deeper understanding of traditional cultural practices and the reconsideration of contemporary performing arts and educational approaches through local sources. In this context, music should be regarded not merely as an element that is heard on stage, but as a multilayered narrative and performative language operating through the body, time, and perception.

The study presents the relationship between music and theatre not only as a historical and aesthetic unity, but as a multilayered structure that must be addressed together with its dimensions of cultural transmission, performance, and education. The examination of musical narrative traditions in Turkish folk culture necessitates the reconsideration of the function of music in the performing arts and the development of new perspectives on how this function can be reflected in contemporary arts education practices. At this point, it is important that the theoretical and practical data obtained from traditional performance forms are not confined to a merely descriptive framework, but are transformed into a guiding perspective for performing arts education and practices.

Historical, theoretical, and pedagogical readings indicate that, particularly in the process of training performing artists, the more effective integration of musical thought into dramaturgical processes can provide significant gains both pedagogically and artistically. Addressing musical narrative and performance practices specific to Turkish folk culture together with contemporary staging approaches enables local cultural resources to be rendered functional within current educational and artistic environments. This situation also brings to the fore the necessity of structuring educational programs and practice models to be developed in the field of performing arts not only on the basis of universal theories but also on local cultural heritage.

In this context, the study points to the need to develop approaches that address the music–theatre relationship through its cultural, pedagogical, and performative dimensions, both in academic research and in arts education practices. Accordingly, presenting a number of recommendations for performing arts education, curriculum structures, and future research based on the results obtained is considered a complementary step that completes the integrity of the study.

Recommendations

In line with the findings addressed in the study, the re-evaluation of the relationship between music and theatre, particularly within the context of Turkish folk culture, offers various opportunities for both academic research and performing arts education. Within this framework, it is primarily recommended that higher education institutions that train performing artists develop course contents in their curricula that address music not merely as a supportive element, but as a dramaturgical, rhythmic, and performative

component. Supporting traditional Turkish folk theatre, musical narrative traditions, and improvisation-based performance practices with applied studies rather than limiting them to theoretical knowledge will strengthen students' holistic expressive skills on stage.

At the level of practice, workshops to be prepared based on the minstrel tradition, village theatrical performances, and musical narrative practices may contribute to the development of improvisation, sense of rhythm, and bodily awareness in acting education. Such studies are expected to render students' relationship with music on stage more conscious and to support their ability to use music as a creative tool in performance processes. In addition, addressing projects aimed at the restaging of musical dramatic forms within the framework of interdisciplinary collaborations will enhance interaction between theatre and music departments.

From an academic perspective, increasing the number of studies that place the music–theatre relationship in Turkish folk culture at the center will contribute to the deepening of the theoretical framework of this field. In particular, qualitative research on performance analysis, the relationship between musical structure and dramaturgy, and cultural transmission processes is considered to provide original data for the performing arts literature. Moreover, comparative studies examining the relationship between traditional musical narrative forms and contemporary theatre aesthetics will render visible the interaction between local and universal staging approaches.

Finally, addressing the music–theatre relationship within the contexts of education, performance, and cultural sustainability will enable the preservation and transformation of musical dramatic forms belonging to Turkish folk culture as living artistic practices. The pedagogical and artistic approaches to be developed in this direction will contribute to the formation of an original model of education and production in the field of performing arts that is both culturally grounded and responsive to contemporary requirements.

REFERENCE

And, M. (2003). Geleneksel Türk tiyatrosu. Yapı Kredi Yayınları.

Arsoy Baltacıoğlu, Y., ve Eşigül, Z. (2019). Bufon estetiğini kostüm ve makyaj uygulamalarında yakalamak. In S. Özkeleş ve Z. Eşigül (Eds.), Müzik, tiyatro ve sinema alanında akademik çalışmalar (pp. 195–224). Gece Kitaplığı.

Artun, E. (2014). Âşıklık geleneği ve halk hikâyeleri. Akçağ Yayınları.

Boratav, P. N. (2012). Halk edebiyatı dersleri. Tarih Vakfı Yurt Yayınları.

Eşigül, T. (2021). Yaylı halk çalgıları yapımı. Geleneksel meslekler ansiklopedisi. Ajans Düş Pınarı.

Eşigül, T., ve Çınar, S. (2018). Abdallığın tasavvufi yönü ve kültürel aktarım aracı olarak Abdal müzik geleneği. Akademik Sosyal Araştırmalar Dergisi, 66, 598.

Eşigül, T., ve Eşigül, Z. (2021). Alevi kültürel performanslarında “arınma ritüeli” teması ve inanç bağlamında icra edilen semah pratikleri: Reşadiye örneği. H. Arapgirlioğlu (Ed.), Güzel sanatlarda akademik araştırma ve değerlendirmeler (pp. 35–60). Serüven Yayınevi.

Eşigül, T., ve Özkeleş, S. (2019a). Orta Anadolu Abdallarındaki müzikal unsurların kabak kemane eğitimindeki yeri ve önemi. S. Özkeleş ve Z. Eşigül (Eds.), Müzik, tiyatro ve sinema alanında akademik çalışmalar (pp. 35–60). Gece Kitaplığı.

Eşigül, Z. (2019). Deneyim ortak paydasında buluşan disiplinler: Ritüel, tiyatro, performans. S. Özkeleş ve Z. Eşigül (Eds.), Müzik, tiyatro ve sinema alanında akademik çalışmalar (pp. 153–170). Gece Akademik Yayıncılık.

Eşigül, Z. (2020a). Antik Yunan tragedyasında koronun teatralliği. V. Hatipoğlu (Ed.), Güzel sanatlar alanında teori ve araştırmalar II (pp. 235–251). Gece Kitaplığı.

Eşigül, Z. (2020b). Richard Schechner’in performans kuramı ve çevresel tiyatro anlayışı. V. Hatipoğlu (Ed.), Güzel sanatlar alanında teori ve araştırmalar II (pp. 253–274). Gece Kitaplığı.

Eşigül, Z. (2022). Melih Cevdet Anday yazınında absürd örüntüler. Serüven Yayınevi.

Eşigül, Z., ve Özkeleş, S. (2019b). Oyuncunun oynama isteğinin uyarılmasında müzikteki ritmik stillerin kullanımı üzerine doğaçlama etütler. S. Özkeleş ve Z. Eşigül (Eds.), Müzik, tiyatro ve sinema alanında akademik çalışmalar (pp. 115–152). Gece Kitaplığı.

Eşigül, Z., Yalçın, M., ve Ayaydın, Y. (2023). Tiyatro tarihi: 9. sınıf ders kitabı (pp. 166–167). MEB Yayınları.

Nutku, Ö. (2001). Meddahlık ve halk tiyatrosu. Mitos Boyut Yayınları.

Özdemir, U. (2010). Türk halk kültüründe müzik ve ritüel ilişkisi. Millî Folklor, 22(88), 45–58.

Pazvantoğlu ve Can-Budak, S. (2025). TAL (Tiyatro Araştırma Laboratuvarı) modeli üzerine bir inceleme. Yaratıcı Drama Dergisi, 20(2), 40–54. https://doi.org/10.21612/yader.2025.007

Peker, O., ve Algı, S. (2024). Bağlama eğitiminde boş tel kullanmadan icra yönteminin transpozisyon becerilerinin gelişimine katkısının incelenmesi. Eurasian Journal of Music and Dance, (25), 136–152. https://doi.org/10.31722/ejmd.1526720

Schechner, R. (2024). Restoration of behavior. Journal of Theatre Anthropology, 3–4, 123–139. Mimesis Edizioni.

Yıldız, N. (2016). Geleneksel Türk tiyatrosunda müziğin işlevi. Tiyatro Araştırmaları Dergisi, 41, 23–39.

Design-Based Occupational Safety in the Project Life Cycle: Integrating the Risk Hierarchy

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ABSTRACT

In numerous nations, including Türkiye, the building-construction sector stands out as a primary contributor to workplace, occupational incidents leading to deaths and severe harm. Relying solely on Personal Protective Equipment (PPE) which ranks as the least effective measure in the hierarchy of risk mitigation strategies for preventing such mishaps remains a persistent misconception and common practice within the field. However, the emerging concept of Prevention through Design (PtD), also known as Design for Safety (DfS), has been increasingly highlighted in global literature on occupational health and safety, offering a transformative solution. This strategy involves conducting systematic evaluations of risks and identifying potential dangers during the initial concept and detailed planning stages of building- construction initiatives, then implementing targeted adjustments to designs that eliminate threats at their origin or reduce them to acceptable thresholds. It is also predicated on carrying out methodical risk assessment and hazard identification studies during the conceptual design and detailed project phases, Project lifecycle of a construction project, followed by guided design modifications to remove hazards at their source or lower risk levels to manageable levels. This research aims to empirically illustrate, from an innovative angle, how design procedures and choices influence safety outcomes in building- construction endeavors, while also exploring the feasibility of the Safety by Design methodology in the sector, its overall benefits, and possible challenges through a structured scientific lens, incorporating PESTLE (Political, Economic, Sociological, Technological, Legal and Environmental) Analysis-framework

Keywords – Design modifications; Occupational accidents; Occupational health and safety; PESTLE analysis; Project Lifecycle, Risk assessment

INTRODUCTION

Instead of designing temporary collective protection measures (scaffolding, guardrails, etc.) in construction projects, Design-Based Occupational Safety (DBOS) aims to eliminate or significantly reduce hazards at their source through permanent modifications to the structure itself (Behm, 2005; Gambatese et al., 2005). Designing parapet walls that are high enough, incorporating permanent anchorage points into floors and curtain walls, erecting guardrail systems around roof skylights, or producing them with an outward curve are typical instances of this strategy (Health and Safety Executive [HSE], 2015).

According to international studies, design choices made before to the start of construction account for about 60% of fatal incidents in the construction sector (Behm, 2005; Gibb et al., 2005). The World Health Organization first brought up the need for designers to take occupational safety into account in 1985 (World Health Organization, 1985). Since the 1990s, this obligation has been upheld by laws and guidelines, especially in the UK and Australia (HSE, 1997; Safe Work Australia, 2012).

The actions at the top of the risk control hierarchy, eliminating the hazard and reducing the risk through various approaches are mostly relevant during the design phase (Manuele, 2007). In this context, design has two fundamental dimensions: (i) the direct elimination or minimizing of hazards through the structure itself and the chosen construction methods, and (ii) the inclusion of permanent infrastructure in the project to facilitate the effective and safe establishment of collective and individual security measures (Gambatese et al., 2005).

According to Gürcanlı and Möllen (2013), the fatal accident rate in Turkey's construction industry is almost three times that of its employment share. In addition to employees, project designers, site managers, and contracting firm management are also impacted by a lack of understanding of occupational safety. According to a UK research, indirect costs from accidents and occupational illnesses account for 8.5% of project costs on average (HSE, 1997). It is estimated that 75 billion euros of the 900 billion euros in the construction industry are lost each year as a result of these losses when this rate is applied to 15 EU nations (HSE, 1997).

Between 2010 and 2020, an average of 400 people died in Turkey's construction industry, according to statistics from the Social Security Institution (SGK, 2021). However, there aren't many comprehensive cause-and-effect evaluations of accidents in the official database. According to a research based on data collected from court expert reports and archival records between 1968 and 1999, falls from heights, collapses and falling materials, electric shocks, mechanical accidents, and excavation collapses are the most frequent construction accidents in Turkey (Gürcanlı and Möllen, 2013).

Design-Based Safety (DBS) is a method that aims to eliminate or significantly reduce hazards in construction projects by making permanent structural changes to the building rather than relying solely on temporary safety equipment (for instance, scaffolding or guardrails) (Karakhan, 2016; Samsudin et al., 2022; National Institute for Occupational Safety and Health, 2024; Toole and Goldenholz, 2025). Concrete expressions of this technique include building parapet walls to the appropriate height, establishing fixed anchor points in floors and curtain walls, hanging permanent guardrails around roof skylights, and sloping these areas outward (CPWR, 2023). According to recent publications, risk evaluations may be finished 25% faster and DBS has been applied more effectively in the post-pandemic

period utilizing digital technology (e.g., using BIM systems) (Zhang et al., 2015; Lu et al., 2021). DBOS can avoid between 40% and 60% of construction accidents, according to research conducted over the last five years; early interventions in the design phase are responsible for this success (Karakhan, 2016; Samsudin et al., 2022; National Institute for Occupational Safety and Health, 2024; Zoller, 2025). According to research conducted worldwide, project decisions made before to the start of site work account for around 60% of construction-related fatal accidents (Toole and Goldenholz, 2025). The World Health Organization first brought up designers' duty for safety in 1985. Since the 1990s, laws and regulations have strengthened this obligation, especially in the UK and Australia (HSE, 1997; Safe Work Australia, 2012). According to recent publications, risk evaluations may be finished 25% faster and DBS has been applied more effectively in the post-pandemic period utilizing digital technology (for instance, using BIM systems) (Zhang et al., 2015; Lu et al., 2021).

RISK CONTROL HIERARCHY IN OCCUPATIONAL SAFETY

The most successful phases in the risk management hierarchy, eliminating hazards and reducing risk through alternative means may be done primarily during the project design phase (Manuele, 2014). In this context from risk control, two key design aspects stand out: (i) the direct elimination or minimization of risks through the structure and preferred construction techniques, and (ii) the inclusion of fixed infrastructure in the project to support the safe installation of collective and personal protective equipment (Gambatese et al., 2005). Research from 2020 to 2025 shows that DBS provides a 15-20% cost benefit while also examining the difficulties faced in emerging nations (like Türkiye), such as insufficient training and a lack of legal norms (Trout, 2024; Zoller, 2025). The probability of fatal accidents in the Turkish construction industry is almost three times higher than its employment share (Gürcanlı and Möllen, 2013). In addition to field workers, architects, site supervisors, and senior contractor management are all impacted by the absence of a safety culture. According to UK research, the indirect costs of accidents and occupational diseases account for an average of 8.5% of project expenditures. This figure corresponds to an annual loss of about €75 billion when applied to the roughly €900 billion construction sector in 15 EU nations (HSE, 1997).

In Türkiye, DBS has the potential to reduce accidents by up to 30%. However, Law No. 6331 on Occupational Health and Safety does not adequately clarify designers' obligations (Gürcanlı and Müngen, 2013; He et al., 2020). Between 2010 and 2020, 400 workers died in construction on average each year, according to Social Security Institution figures (SGK, 2021). However, there is very little official data infrastructure available for thorough cause and effect analysis of incidents. The most frequent construction accidents in Türkiye are falls from heights, collapses and falling

materials, electrical contact, machine-related incidents and excavation collapse according to an analysis of a dataset from 1968 to 1999 that was assembled from court expert reports and archival documents (Gürcanlı, 2006). According to recent research conducted between 2022 and 2025, DBS might avoid 50% of these accidents, emphasizing the significance of guardrails and fixed anchors in fall situations (CPWR, 2023; Trout, 2024).

Table 1: The Main Accident Types in the Construction Sector (Adapted from Gürcanlı & Müngen, 2013; Adapted from Social Security Institution (SGK) and Ministry of Labor and Social Security (2025) joint statistics; Social Security Institution. (2025). 2024 Work Accident and Occupational Disease Statistics Report; Republic of Turkey Ministry of Labor and Social Security. (2025))

Incident Category	**Fatalities**	**Percentage (%)**	**Injuries**	**Percentage (%)**
Fall or Slip from High Areas	225	40.8	28,000	32.5
Electrical Contact and Shock Effects	70	12.7	2,500	2.9
Impact or Crushing by Heavy Objects	60	10.9	8,000	9.3
On-Site Vehicle Movements	50	9.1	3,000	3.5
Structural Collapse and Soil Slides	45	8.2	2,500	2.9
Entrapment or Severance by Machine Parts	40	7.2	18,000	20.9
Explosion, Burn, or Chemical Exposure	30	5.4	6,500	7.5
Inhalation of Toxic Substances or Asphyxia	20	3.6	5,500	6.4
Other Unspecified or Rare Events	12	2.1	12,184	14.1
Grand Total	**552**	**100**	**86,184**	**100**

After reviewing the Table 1, it is clear that human-caused falls, such as sliding from high locations or walking into voids, are the major cause of both deadly and non-fatal events at construction sites. Electric current exposure is the second leading cause of death, whereas limb entrapment in rotating machinery is the second leading cause of non-fatal injuries. An independent examination is required to determine how the structure's load-bearing system or architectural elements contribute to the level of safety. To begin resolving the relationship between project designs and safety, the basic principles of preventive and protection in occupational health should be used (Gürcanlı and Müngen, 2013; Social Security Institution (SGK) and Ministry of Labor and Social Security (2025) joint statistics; Social Security Institution. (2025). 2024 Work Accident and Occupational Disease Statistics Report; Republic of Turkey Ministry of Labor and Social Security (2025); definition from author).

According to Behm (2005), research undertaken by the European Foundation for the Improvement of Living and Working Conditions in 1991 found that about fifty-nine out of sixty fatal accidents were caused by planning decisions made before building operations began. Similarly, a 1994 UK evaluation found a link between project selections and safe execution (Gambatese et al., 2005). The construction business had 86,184 injuries and 552 fatalities, according to the table. 33% of injuries and 41% of fatalities are caused by falls from heights. 13% of deaths are caused by electric shock, while 21% of injuries are caused by limb entrapment. Other major dangers include explosions, heavy object hits, on-site vehicle accidents, and structure collapses. In conclusion, equipment entrapments are the predominant source of injury, while falls and electrical contact continue to be the top causes of mortality (Behm, 2005; Gambatese et al., 2005).

Even among specialists, the idea of occupational safety is sometimes construed narrowly, with an emphasis primarily on individual protective equipment. However, this sector needs protection policies that follow a systematic order of priority (EFCA & ACE, 2006):

- Modify work schedules to accommodate each person's ergonomic and physiological traits.
- Replace dangerous materials, techniques, or substances with safer alternatives.

- Use geographical separation to isolate dangers and guarantee technical compatibility.
- Create a preventative plan that takes organization, technology, social dynamics, and environmental factors into account.
- Give collective protection measures top priority before distributing individual devices.
-Avoid risk development in the first place.
- Identify unavoidable hazards and replace unsafe work procedures with safer alternatives.
- Eliminate dangers where they originate.

The second stage of this rating makes the design element clear. The most efficient and empirically supported method of eliminating risks is through design-driven intervention at the highest levels of the hierarchy and in the early phases of the project. Despite being relatively new, this strategy is becoming more and more popular. A particular handbook for designers has been created by the Architects' Council of Europe (ACE) and the European Federation of Engineering Consultancy Associations (EFCA). These efforts were expedited by the statement adopted by the parties at the 2004 European Construction Safety Summit in Bilbao, which established core principles based on the duties delegated to designers in Council Directive 92/57/EEC.

STUDIES ON THE RELATIONSHIP BETWEEN DESIGN AND OCCUPATIONAL SAFETY

Design-Focused Proactive Occupational Safety Approach

Protection and prevention techniques have a complicated structure that includes health, safety, and ergonomic considerations; they connect economic dynamics, social perception, and legal frameworks. System safety is typically not a main priority for designers, and this responsibility is frequently delegated to safety specialists. In contrast to post-event reactive measures, a proactive safety strategy requires predicting future dangerous circumstances, particularly in industrial production processes. This requires multidisciplinary collaboration, comprehensive studies, and future scenario evaluations. In conclusion, proactive safety should address three essential dimensions during the design Process (Fadier and de la Garza, 2006):
• Variable risk categories include operator safety, socio-technical system integrity, personnel-based risks, and environmental repercussions.

• Various levels within the organizational structure (high management, decision-making bodies, field inspections, implementation units).
• Several design processes and levels (customer needs, engineering studies, requirements definitions, technical specifications and so on).
While these ideas are largely relevant to continuous-flow production models, they are also useful in laying the theoretical groundwork for the notion of Safety by Design in the construction sector, which is distinguished by project-based execution. Every construction project needs new ways backed up by concurrent engineering processes, taking into account multiple design approaches, management layers and risk profiles.
While Safety by Design is a relatively new idea in many countries, including Türkiye, it is left to individual initiatives in the United States, but in the United Kingdom, it is a legislative obligation under the Construction (Design and Management) Regulations (2007). This Regulation provides a precise definition of the designer's health and safety responsibilities.
The most common issue mentioned by designers is that they don't have enough experience with safety. Only by working closely with construction teams on design-build projects can these people create safety-focused methods (Gambatese et al., 2005).

In 1995, the United Kingdom imposed this obligation on designers for the first time; other European nations and Australia followed suit by enacting laws or putting in place robust incentive systems. This strategy has been incorporated into projects by international design-build firms including Washington Group, Jacobs & Parsons, Mustang Engineering, Bovis Lend Lease and Bechtel. Major investors like Southern Company and Intel have also used it in at least one project. Several studies show that designers fall short of this obligation in a variety of industries, including construction (Bluff, 2003; Trethewy and Atkinson, 2003; Health and Safety Executive, 2004; Behm, 2005; Gibb et al., 2005; Fadier and de la Garza, 2006).

Ensuring Occupational Safety Through Design

When it comes to the essence of the idea, Occupational Safety by Design (OSD) refers to protecting the safety of construction professionals through the structure's permanent architectural and structural components. This definition should include and widen not just the building period, but also worker safety throughout maintenance, repair and restoration activities across the structure's lifetime. OSD is not to be confused with construction site management, interim safety measures or post-accident interventions. Its immediate impact is to avoid field injuries, reduce accident frequency, and

improve worker health overall. Indirect contributions result from reducing accident compensation, delay fines, and time extensions within the project budget. This technique also has the added benefit of improving the safety infrastructure during operating and maintenance times.

OSD differs from site-based emergency interventions or interim protective measures in that it addresses hazards early on, lowering accident rates and improving worker health. This technique has the following side effects: decreased legal obligations, wasted time, and financial overruns due to accidents. Furthermore, implementing a permanent safety infrastructure during a facility's operational period promotes long-term sustainability.

Szymberski's (1997) time-cost-impact curve is cited by most scholars in the literature. This graph highlights that safety precautions may be used most successfully at the conceptual planning and detailed design stages. The degree of safety intervention steadily declines as the project moves along. Although this graphic illustrates how crucial the pre-design stage is, safety concerns are often neglected until after building has started in many nations, particularly Turkey.

The present research demonstrates trends that stress the usefulness of OSDs. For example, Jin et al. (2023), who synthesized OSD research from the construction literature, discovered that limiting risks at the start of a project can lower overall accident incidence by 30-50%. Similarly, Al-Bayati et al. (2024) examined the hurdles to OSD (insufficient training and regulatory inconsistencies) in the US construction sector and offered integrated training approaches to solve them. Machfudiyanto et al. (2023) investigated OSD awareness in Indonesia and discovered that boosting designer competency might reduce sector accidents by up to 25%. While Coleman and Thomas (2023) stress that engineering companies may reduce hazard sources through early design interventions despite regional regulatory variances, NIOSH's (2023) nationwide campaign presents OSD as a lifecycle-oriented preventative tool.

According to the time-impact curve of OSD, these investigations demonstrate that the conceptual planning and detailed drawing phases are the most crucial intervention windows. While the safety impact reduces as the project develops, digital technologies (for instance, BIM integration) extend it. In Turkey and other comparable contexts, establishing legislative frameworks and changing design education are critical for wider adoption of OSD, as present approaches focus on the post-construction phase and lose out on early chances.

If Occupational Safety by Design is characterized as a process, it should be

understood as including hazard analysis into the design process from the beginning. The procedure begins with the identification of dangers. Then, using engineering principles, efforts are taken to remove or lessen the dangers. Even during the design process, necessary steps are conducted based on the risk hierarchy mentioned above. Sometimes a design modification immediately implies structural changes (for instance, parapet walls can be raised, bolts can be pre-installed on flat roofs etc.), while other times, hazards are decreased or removed by altering the building approach (for example, using alternative external materials). The objective is to make some workplace safety precautions superfluous and reduce the need for personal or collective protective measures. To do this, the designer (architect or engineer), the owner (the authority in charge of design revisions), the contractor and the occupational safety specialist should work together. It would be useful to offer some instances to support this idea. The following table shows how occupational safety precautions are introduced throughout the design process.

Table 2: Occupational Safety Precautions are Introduced throughout the Design Process (adapted from Gambatese et al., 2005; Toole and Gambatese, 2008; Health and Safety Executive, 2015; CPWR, 2023; National Institute for Occupational Safety and Health, 2024; opinions from author)

Design Element	**Hazard Source**	**Prevention through Design (PtD) Intervention**	**Outcome Impact**
Roof Edges	Fall from height	Parapet wall ≥ 1.1 m in height	Eliminates need for temporary guardrails
Floor Openings	Fall and material protrusion	Integrate permanent anchorage points	Safety harness attachment infrastructure ready
Exterior Façade Works	Scaffolding erection risk	Prefabricated modular façade system	Minimizes scaffolding installation
Roof Skylights	Breakage and fall	High-impact resistant polycarbonate + fixed grating	Ensures safe maintenance access
Stairwells and Gallery Voids	Fall	Integrate permanent guardrails and toe-boards	Provides permanent collective protection

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Designing Processes for Occupational Safety

When seen as a process, OSD is the incorporation of hazard assessment from the early phases of project design. This approach starts with systematically identifying possible hazards; next, using engineering principles, these risks are either fully removed or lowered to acceptable levels. Interventions that follow the risk control hierarchy are prioritized throughout the design phase. In rare circumstances, design updates may need direct structural changes. In other cases, hazard sources are eliminated by changing the building approach (for example, using safer materials for outside cladding). The major objective is to eliminate traditional safety measures (personal or collective protective equipment) and reduce dependency on such equipment. This aim needs coordinated coordination among the architect/engineer, project owner, contractor and safety specialist (Szymberski, 1997; Toole and Gambatese, 2008; Jin et al., 2023).

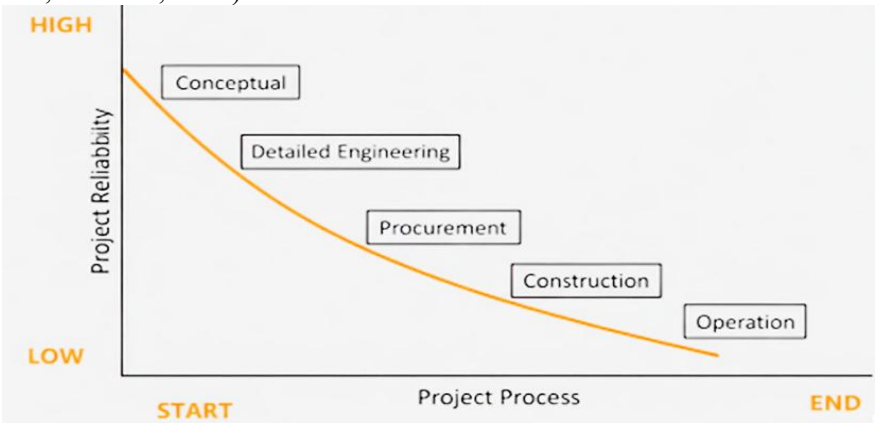

Figure 1: Decreasing Effectiveness of Occupational Safety Interventions Over Time in the Project Life Cycle- Time/Work Safety Impact Curve (source: Szymberski, 1997; adapted from author)

The graph above (Figure 1) visualizes the applicability and effectiveness of occupational safety measures across the life cycle of construction projects. The axes represent the vertical progression of intervention effectiveness (high to low) and the horizontal progression of project phases (inception to

completion). The curve documents that safety-focused decisions have the highest potential impact in the pre-design and early design phases, with a systematic decline in effectiveness in later phases (Szymberski, 1997, explanation from author). The graph is an updated and expanded version of Szymberski's (1997) original time-impact model. The impact of digital design tools (BIM, parametric modelling) may moderate the gradient in the Detailed Engineering phase, but the overall decreasing trend remains (Toole and Gambatese, 2008; Jin et al., 2023).

DESIGN-BASED ELIMINATION OF FALL RISKS FROM HEIGHT

Falls from height, a prominent cause of death in the construction sector, are commonly linked to the fracture of transparent eternity surfaces on rooflights. While practices such as installing stairs, creating wooden walkways, or erecting temporary platforms on the construction site can help to prevent such incidents, a comprehensive approach that includes not only the building's construction phase but also maintenance and renovation periods is required. A low-cost design redesign can eliminate the need for these interim remedies and effectively avoid accidents. For example, incorporating permanent guardrails or protective gratings around skylights and constructing surfaces with curved rather than flat surfaces can reduce the danger of falls during the building's existence (Frijters and Swuste, 2008; Gambatese and Tymvios, 2021; CPWR, 2023)

Table 3: Risk scores by floor type and shows how optimization linked with cost, time, and customer expectations promotes safety improvements (Adapted from Frijters & Swuste (2008) and CPWR (2023).

Slab Type	**Primary Hazard Sources**	**Risk Score (0–10)**	**Recommended Prevention through Design (PtD) Intervention**	**Optimization Impact**
Wide-Span Flat Slab	Flat surface, edge voids	8.2	Integrate edge toe-boards and anchor points	Cost +3%, fall risk -45%
Voided-Bubble or Ribbed Slab	Internal voids, access difficulty	4.1	Factory pre-installed void covers	Duration -12%, safety score +2.8 points

Source: Adapted from Frijters & Swuste (2008) and CPWR (2023).

Note: Risk scores are relative values adapted from the case study; optimization represents the optimal balance within the project constraints.

In a similar context, Frijiters and Swuste (2008) investigated the safety performance of several floor types, focusing on falls and trips. The study focuses solely on floor manufacturing and sub-processes, documenting the influence of design choices on the risk profile at an early stage on an individual basis. The findings show that the hollow-beam technology greatly decreases the risk of falls, emphasizing the need of alternative evaluation throughout the project phase. Table 3 summarizes risk scores by floor type and shows how optimization linked with cost, time, and customer expectations promotes safety improvements.

THE IMPACT OF DESIGN PROPOSALS ON FATAL ACCIDENTS IN TÜRKİYE

Design modifications such as prefabricated manufacture or ground-level assembly essentially negate these three main risks. Although material falls rank third in terms of fatalities, their subcategories splash, entrapment, and hand tool accidents remain uncommon, which puts them at danger of being disregarded in the OSD priority process. This calls for adding sub-components to design-focused risk matrices. The same risk group includes material falls, splashes, entrapments, and mishaps using hand tools. Splashing and hand tool mishaps have seldom resulted in fatalities.

Table 4: Distribution of Design-Based Occupational Safety proposals developed against hazard elements in the Turkish construction sector

Hazard Type (Fatality Rank)*	**PtD Recommendation Count**	**Recommendation Distribution (%)****	**Estimated Fatalities (2025)**	**Fatality Share (%)**	**Estimated Injuries (2025)**	**Injury Share (%)**	**Expected Prevention Gain (%)*****
Fall from Height (1)	148	25.1	238	42.3	29,500	33.8	81(permanent barrier, anchorage)
Electrical Contact (2)	71	12.0	74	13.2	2,700	3.1	85 (cable insulation)
Material Fall/Crushi	78	13.2	63	11.2	8,500	9.7	74 (edge protection,

ng (3)							prefab)
Structural Collapse/Landslide (4)	52	8.8	48	8.5	2,800	3.2	77(geotechnical reinforcement)
On-Site Traffic Incident (5)	41	7.0	53	9.4	3,200	3.7	70(separated pathways)
Machine/Limb Entrapment (6)	36	6.1	42	7.5	19,300	22.1	67 (sensor-equipped covers)
Explosion/Burn (7)	34	5.8	32	5.7	6,800	7.8	64(compartment walls)
Toxic Gas Inhalation (8)	27	4.6	13	2.3	12,800	14.7	61(ventilation ducts)
Fire/Burn (9)	24	4.1	0	0.0	1,000	1.1	59 (fire compartments)
Environmental Condition Impact (10)	20	3.4	–	–	1,500	1.7	56 (climate insulation)
Hand Tool Incident (11)	12	2.0	1	0.2	650	0.7	62(ergonomic handles)
Other/Secondary Factors	46	7.8	0	0.0	2,050	2.3	52 (general monitoring)
Grand Total	**589**	**100+**	**562**	**100**	**87,300**	**100**	**73 average**

Source: Compiled from SGK (2025), CPWR (2025), and updated risk Modeling.
Notes: *Ranking based on Gürcanlı (2006) and SGK (2025) fatality frequency; 2025 estimates assume 1.8% growth (Mortality frequency based on Gürcanlı & Müngen (2013); SGK (2025) data; 2025 estimates are calculated assuming a 1.8% increase). **Exceeds 100% due to multi-hazard coverage (Rates exceeded due to multiple coverage).

***Gain derived from case-based simulations (CPWR, 2025; Jin et al., 2024); BIM integration adds ~12% efficiency (Benefit-Design impact predicted by case-based simulations (CPWR, 2025; Jin et al., 2024); BIM integration provides an additional 12% contribution).

Table 4 summarizes the distribution of OSD recommendations produced for dangers in Turkey's construction sector, as well as their forecasts until 2025. While falls from heights continue to be the leading cause of death (42.3%), limb entrapment (22.1%) accounts for the majority of injuries. The average 73% preventive potential reveals that design-focused treatments may reduce mortality by approximately 40%; due to multiple coverage, the distribution rates are greater than 100%. This synthesis indicates that early implementation of DBOS could reduce sector mortality however, layered risk matrices are recommended to ensure that sub-risks (such as hand tools) are not neglected.

PESTLE ANALYSIS

To understand the various factors affecting the construction industry, a PESTLE analysis has been attempted within the scope of occupational health and safety. Construction is not solely linked to modern machinery and equipment such as cranes and excavators. The construction industry existed long before the manufacture of these machines. The PESTLE analysis framework highlights numerous political, social, economic, environmental, technological, and legal factors affecting activities within the construction sector and occupational safety.

Political Aspects: The construction sector is critically important to the economy of every country. Therefore, governments develop strategies to guide the construction industry. They create policies regarding safety regulations, building regulations, and construction-related rules. In a country experiencing political instability, the construction sector stagnates because it is uncertain how long the current administration will last. This situation brings with it the fear of a change in government, as this signals a change in government policies. The construction sector is structured in a way that can be positively influenced by government policies and support (such as KOSGEB R&D/Innovation programs) aimed at integrating occupational safety technologies (for instance, digital transformation incentives under Law No. 6331 on Occupational Health and Safety). However, airspace regulations related to drone use (registration, pilot license, and flight permits as per established rules) and restrictions specific to construction sites

(prohibited zones, distance rules in crowded areas) are significant factors that will directly affect the feasibility of the project. Furthermore, restrictions and customs duties in international trade policies regarding the procurement of drones and software components from abroad may increase the project's costs. Therefore, ensuring regulatory compliance (fulfilling insurance obligations) and taking advantage of incentives (technology-focused R&D support) will be a critical strategy to ensure the project's success.

Economic Aspects: Economic development is one of the most significant economic factors directly linked to the construction sector. If a country experiences strong economic growth, its construction sector will also progress. High economic growth means higher per capita income, which in turn means people have more purchasing power. As people's readily available cash increases, they invest in the construction sector, leading to increased demand for housing, buildings, and other infrastructure. Furthermore, a country exhibiting high economic growth also invests in infrastructure improvement projects such as educational institutions and roads. This increases the desire for construction. Therefore, the construction sector progresses. In addition, interest rates significantly impact the construction sector. Interest rates represent the cost of borrowing. The ability of construction companies and site managers, the target group of the project, to adopt this technology is related to their economic situation (project budgets, profit margins), and this can affect the project's widespread adoption in the sector. In addition, the importance of the construction sector to the economy (employment and growth contributions) and its adaptation to innovations (digital transformation trends) have a critical impact on determining the success rate of the project. The aim is to make this technology more accessible to construction companies by achieving economic gains (reduced insurance costs due to decreased accident rates, increased productivity) and cost-effectiveness (through subscription systems or rental alternatives).

Social Aspects: The social success of the project depends on the adaptation of construction workers and site managers to technology and their attitudes towards these innovative solutions (drone-based monitoring and AI image processing). The increasing global population, rapid urbanization, and increased infrastructure investments are increasing the need for safer working methods in the construction sector, making such projects even more essential. Furthermore, ensuring that workers and managers receive adequate training on image processing software and drone technology facilitates the

adoption of the technology and increases the social impact of the project (reduction in workplace accidents, protection of worker health). Training and awareness activities (e.g., occupational safety seminars) help the construction sector to adopt these technologies more widely. In a country with a growing population, construction activity will increase; as the population rises, individuals need more housing, schools, buildings, and other infrastructure to sustain their lives. Consequently, population growth leads to increased demand for construction.

Technological Aspects: Thanks to rapid advancements in image processing techniques and drone technology, it is becoming possible to ensure workplace safety more effectively on construction sites. Drones can remotely monitor hazardous areas, automatically identify the use of personal protective equipment (PPE) and prevent accidents by detecting potential risks (for instance, not wearing a helmet or the risk of falling) early. However, the technical expertise required to ensure compatibility between hardware (drones and cameras) and software (AI-based image processing systems) can present challenges in the integration process. Furthermore, the security and privacy of visual and video data collected on construction sites (including worker images) are of paramount importance for the technological sustainability of the project. Regularly updating the technological infrastructure, implementing data protection measures, and complying with legal regulations will support the long-term success of the project. Machines can be used for bricklaying, concrete application, and other operations. The use of machinery in these activities will enable automation in the construction sector and support efficient construction processes. Additionally, the use of drones for aerial surveillance can significantly support the construction industry in site inspections. Furthermore, implementing such methods will prevent unnecessary waste of resources. In addition, the use of software has had a positive impact on the construction field. For example, design software is used by civil engineers and designers in the creation of buildings, houses, roads, etc. It allows them to design on the software and then bring these designs to life in practice.

Legal Aspects: Many laws affect the construction sector. One of these is labour law legislation. The construction industry is subject to regulations such as minimum wage regulations, occupational safety regulations, and anti-discrimination laws. It is obligated to comply with all labour law regulations. Workers have strong unions, and any violation of such laws can negatively impact the reputation of the construction sector. Construction

companies acting contrary to these laws may face hefty fines. Data protection laws significantly impact the construction sector, as construction companies possess their clients' data. Consequently, any breach or leakage of a client's data can result in fines. Strict compliance with data protection laws (anonymization, obtaining consent, secure storage) is necessary to ensure that data obtained through image processing software (worker images, site records) does not violate personal or commercial privacy. These legal elements are crucial for the future sustainability and reliability of the project.

Environmental Aspects: The increasing impact of climate change on construction sites (extreme weather conditions, material durability issues) highlights the importance of safer and more sustainable construction technologies; this project (drone-assisted monitoring and image processing for early hazard detection) offers an effective response to this need. Furthermore, the energy consumption of the drones contributes to environmental sustainability by encouraging greater use of renewable energy sources (for instance, solar-powered charging stations) on construction sites. This aspect of the project is significant in terms of reducing environmental risks (increased waste, energy waste, environmental damage due to accidents) and adopting a more environmentally friendly construction model. Construction work negatively impacts the environment in various ways. Materials such as stone and limestone, necessary for construction, are obtained through mining. This can damage natural resources such as mountains. Additionally, many machines are used during the construction phase. All of these machines require fossil fuels to operate. As a result, carbon emissions occur and air quality deteriorates. Given all the environmental damage caused by construction, pressure groups could become active and demand sanctions against construction companies.

CONCLUSION and DISCUSSION

By studying the precautions that should be taken during the design phase regarding occupational health and safety, and how the pre-project relationship between the designer, contractor, and owner can affect occupational safety in a very simple way, according to a scientifically proven and fact-backed risk hierarchy, sometimes with a design change, sometimes with design additions, and by making some changes at relatively low cost during the preliminary design phase of the project, the risk of occupational accidents can be largely eliminated during the project phase. If

the development of the occupational safety culture created by design is achieved, the catastrophic incidence of occupational accidents will be reduced and healthier and safer work environments will be created.

Unfortunately, there is no study on this topic in Turkey, and although occupational health and safety appear to be limited solely to legal regulations, efforts should be made to develop and develop it.

In the construction sector, safety-focused regulations in the early stages of project drawings are essential to radically eliminate potential threats. This approach centers on measures integrated with architectural decisions; For example, through standardizing height barriers or ergonomically planning access points, the level of hazard in construction site operations can be significantly reduced. According to the fundamental principles of risk management, steps to eliminate hazards or limit them with alternative methods are the primary responsibility of designers; this produces more permanent and efficient results compared to temporary solutions in field applications.

Pre-project interactions determine the coordination between the designer, builder, and investor; this tripartite structure can reinforce safety standards through early negotiations. This model, based on a risk hierarchy, enables large-scale prevention with minimal cost revisions (for instance, pre-installation of anchor systems). Such approaches transform the industry's understanding of safety, creating more conscious and sustainable environments. Accident statistics show that a mature culture can halve catastrophic events; healthy workplaces increase productivity and minimize occupational illnesses.

In the Turkish context, although the topic appears to be limited to legal frameworks, academic and applied studies have increased in recent years. For example, studies measuring design-focused safety awareness highlight the need for training for industry stakeholders. This offers the potential to move beyond legislation with practical guidance and training programs

REFERENCE

Al-Bayati, A. J., Bazzi, K., Karakhan, A. A., & Jensen, E. (2024). Clearing the Path: Overcoming Barriers to Prevention through Design (PtD) Utilization in the US Construction Industry. Safety, 10(3), 74.

Behm, M. (2005). Linking construction fatalities to the design for construction safety concept. Safety Science, 43(8), 589–611.

Bluff, E. (2003). The role of designers in occupational health and safety: A discussion paper. National Occupational Health and Safety Commission.

CPWR. (2023). Design for safety: Examples of permanent fall protection in construction. The Center for Construction Research and Training.

CPWR. (2023). Roofing and skylight safety: Permanent design solutions. The Center for Construction Research and Training. https://www.cpwr.com/research/roof-safety

CPWR. (2025). Permanent safeguards in construction: Updated risk mitigation models. The Center for Construction Research and Training.

European Federation of Engineering Consultancy Associations & Architects' Council of Europe. (2006). Guide to health and safety in design: Responsibilities of designers under EU Directive 92/57/EEC. EFCA-ACE Joint Publication.

Fadier, E. & de la Garza, C. (2006). Safety design: Towards a new philosophy. Safety Science, 44, 55–73.

Frijiters, A. C. P., & Swuste, P. H. J. J. (2008). Safety assessment in design: The case of floor slabs in the Netherlands. Safety Science, 46(5), 796–805.

Gambatese, J. A., & Tymvios, N. (2021). Designing for construction safety: Process and examples. Practice Periodical on Structural Design and Construction, 26(1), 04020054.

Gambatese, J.A., Behm, M. and Hinze, J.W. (2005) Viability of Designing for Construction Worker Safety. Journal of Construction Engineering and Management, 131, 1029-1036. https://doi.org/10.1061/(ASCE)0733-9364(2005)131:9(1029)

Gibb, A., Haslam, R., Hide, S., & Gyi, D. (2005). The role of design in accident causality. In S. Rowlinson (Ed.), Designing for safety and health in construction (1–15). CIB W99.

Gibb, A.G., Haslam, R.A., Hide, S.A., Gyi, D.E., Pavitt, T., Atkinson, S. and Duff, A.R. (2005) Contributing Factors in Construction Accidents. Applied Ergonomics, 36, 401-415.

Gürcanlı, G. E., & Müngen, U. (2013). Analysis of construction accidents in Turkey and responsible parties. Industrial Health, 51(6), 581–595.

He, C., McCabe, B., & Wang, G. (2020). Design for safety in developing countries: A review of barriers and enablers. Journal of Construction Engineering and Management, 146(12), 04020135.

Health and Safety Executive (HSE). (1997). Costs of accidents and ill-health at work. HSE Books.

Health and Safety Executive (HSE). (2015). Designing for health and safety in construction: A guide for designers (CDM 2015). HSE Books.

Health and Safety Executive. (2004). Improving health and safety in construction: Phase 2 – Depth and breadth: Volume 7 – Analysis of HSE mechanisms

(HSE Research Report 236). HSE Books. https://www.hse.gov.uk/research/rrhtm/201-300.htm#RR236.
Health and Safety Executive. (2015). Managing health and safety in construction: Construction (Design and Management) Regulations 2015 – Guidance on Regulations (L153). HSE Books.
HSE. (1997). Successful health and safety management (HSG65). Health and Safety Executive.
Ibrahim, M., Li, H., & Zhang, J. (2025). BIM-enabled design for safety: Post-pandemic acceleration in risk assessment. Automation in Construction, 158, Article 105234.
Jin, R., Zou, P. X. W., & Piroozfar, P. (2023). Design for construction safety: A systematic review of prevention through design (PtD) effectiveness. Safety Science, 159, Article 106012.
Jin, Z., Gambatese, J., & Liu, D. (2024). Evolving prevention through design: BIM impacts on construction hazards. Journal of Safety Research, 88, 112–128.
Jin, Z., Gambatese, J., Liu, D., & Dharmapalan, V. (2023). Analysis of prevention through design studies in construction: A subject review. Journal of Safety Research, 84, 138–154.
Karakhan, A.A. (2016) Designer's Liability: Why Applying PTD Principles Is Necessary. Professional Safety, 61, 53.
Lu, Y., Gong, P., Tang, Y., Sun, S., & Li, Q. (2021). BIM-integrated construction safety risk assessment at the design stage of building projects. Automation in Construction, 124, 103554
Manuele, F. A. (2007). Prevention through design: Addressing occupational risks in the design & redesign processes. Professional Safety. Asse.org
Manuele, F. A. (2014). Advanced safety management: Focusing on Z10 and serious injury prevention (2nd ed.).. John Wiley & Sons.
National Institute for Occupational Safety and Health. (2024). Prevention through design (PtD) resources. Centers for Disease Control and Prevention. https://www.cdc.gov/niosh/ptd/about/index.html
Republic of Turkey Ministry of Labor and Social Security. (2025). Occupational Health and Safety in Construction 2024 Annual Bulletin. General Directorate of Occupational Health and Safety. https://www.csgb.gov.tr/isggm/2024-bulten
Safe Work Australia. (2012). Guide to safe design of buildings and structures. Safe Work Australia.
Samsudin, N. S., Mohammad, M. Z., Khalil, N., Nadzri, N. D., & Izam Che Ibrahim, C. K. (2022). A thematic review on Prevention through Design (PtD) concept application in the construction industry of developing countries. Safety Science, 148, Article 105640. https://doi.org/10.1016/j.ssci.2021.105640
SGK. (2021). İstatistik yıllıkları 2010-2020. Sosyal Güvenlik Kurumu.
SGK. (2021). İş kazaları ve meslek hastalıkları istatistikleri 2010-2020. Sosyal Güvenlik Kurumu.
Social Security Institution (SGK) and Ministry of Labor and Social Security (2025) joint statistics.
Social Security Institution. (2025). 2024 Work Accident and Occupational Disease Statistics Report: Special Assessment of the Construction Sector. SGK Publications. https://www.sgk.gov.tr/istatistik/2024-insaat-sektor-raporu

Sosyal Güvenlik Kurumu. (2025). 2024 iş kazası ve meslek hastalığı istatistikleri: İnşaat sektörü analizi. SGK Yayınları.
Szymberski, R. (1997). Construction project safety planning. TAPPI Journal, 80(11), 69–74.
The Construction (Design and Management) Regulations 2007, SI 2007/320 (UK).
Toole, T. M., & Gambatese, J. (2008). The trajectories of prevention through design in construction. Journal of Safety Research, 39(2), 225–230.
Toole, T. M., & Goldenholz, B. (2025). Quantifying the impact of design decisions on fatal construction incidents: A 10-year global analysis. Journal of Safety Research, 92, 145–158.
Trethewy, R. W., Atkinson, M. ve Falls, B. (2003). Improved Hazard Identification for Contractors in the Construction Industry. Journal of Construction Research, 4(1), 71–85
Trout, D. (2024, September). Prevention through design in the construction industry [Conference presentation]. Building Innovation Conference 2024, Washington, DC, United States.
World Health Organization. (1985). Identification and control of work-related diseases (Technical Report Series No. 714). WHO.
Zhang, S., Sulankivi, K., Kiviniemi, M., Romo, I., Eastman, C. M., & Teizer, J. (2015). BIM-based fall hazard identification and prevention in construction safety planning. Safety Science, 72, 31–45.
Zoller, A. (2025). Prevention through design: Global trends and economic impacts 2020-2025. International Journal of Occupational Safety and Ergonomics, 31(1), 89–102.

The Politics of Legitimizing the War with Disinformation: The Example of Ukraine and Gaza

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ABSTRACT

This chapter examines how states use disinformation to legitimise war, focusing on the Russia–Ukraine war and Israel's operations in Gaza. It first traces how digital diplomacy and the rise of social media have transformed political communication, making distant actors more influential and blurring the line between news and manipulation. Building on definitions of disinformation as the deliberate distortion of information, the chapter highlights its tools (manipulated images, selective framing, fabricated documents) and its effects on democratic will, peace and human rights. It then discusses the role of mainstream and alternative media, with special reference to Türkiye, emphasising ownership concentration, commercialisation and the erosion of journalism's public-interest function. In this environment, fact-checking platforms and institutions such as Türkiye's Combating Disinformation Center, together with sites like teyit.org, emerge as partial correctives and data sources for the study.

The empirical sections analyse disinformation cases from the Russia–Ukraine war and the Gaza war, showing how parties and their sympathisers circulated recycled war footage, miscaptioned images, game videos and staged scenes to present themselves as victims and their opponents as aggressors. Drawing on examples verified by fact-checking organisations, the chapter demonstrates that contemporary armed conflicts open a second front in digital spaces, where struggles over narrative and legitimacy rival kinetic operations on the ground. It concludes that disinformation is not an incidental by-product of war but a systematic instrument of legitimation and delegitimation, and that strengthening media literacy, independent verification and plural media structures is essential to limiting its impact on democratic societies.

Keywords – Disinformation, Fact-checking Platforms, Ukraine War, Gaza, Mainstream Media

INTRODUCTION

Today, developments in information technologies have made it a necessity for states to be informed about each other's news, and states have even begun to see this as a power. Developments in technology and the exponential growth of manipulated and distorted videos tell us that seeing no longer means believing (Turness 2023).

The increase in communication opportunities provided by mass media and especially social media causes people to be influenced by those who are far away from those who are physically close.

Not only bilateral relations but also international relations have kept pace with the digital transformation. The transition from the classical diplomacy approach to digital diplomacy is also a result of this transformation. Digital diplomacy, which facilitates access to the target audience, has allowed states to be selective about which information or news to share and to use them in line with their purposes.

Communication

As a social being, humans want to communicate to feel like they are a part of the society they live in. While doing this, communication can be established between those who are ready or not ready. By those who are ready, we mean those who can physically be in the same environment and can react to each other's statements of will, gestures and facial expressions.

The phenomenon of people conveying their feelings and thoughts to others in every conceivable way is called communication (Talas 2019:57). The expression “in every possible way”, which is a definition suitable for today, has now come to include the virtual world as well as the material world. The dizzying development in communication tools has carried communication to different channels. This has started a period in the system of relationships where those who are far away are more effective than those who are close (Talas, 2019:51). People are now more influenced by people they do not know in unknown geographies than by those who are close to them.

Communication is one of the most important instruments of socialization, which is a learning process from birth to death. The use of communication, which is used as a tool for social consensus, in a political dimension should also be accepted as a natural process of the flow. "Political communication", which can also be defined as the use of communication channels in politics, is based on the methods and principles that can be used to attract the attention of voters. Politicians with strong political communication skills are more likely to be successful. In this sense, the increase in the use of the internet and especially social media in our country, where the young population is dense, has led politicians to turn their attention to this area. In fact, the presence of politicians has begun to be measured by their presence in the internet media (Talas 2019:69). In other words, your presence in online media has become one of the criteria by which your success is measured.

Internet communication, where text-sound and image are used in the same environment, is a more effective means of communication than traditional media (Çakır and Topçu 2005:76). The evolution of classical communication channels, which are a part of the cultural processes of societies, and their spread to the digital atmosphere in this way has caused political institutions to change its methods. The development of information and communication technologies has brought the concept of digital diplomacy instead of classical public diplomacy. Digital diplomacy, which is considered

as a method of discussing, evaluating and proposing solutions to developments in foreign policy on the internet, is also defined as sharing international communication activities in digital environments (Özdemir, 2023:167-68). It is now considered natural for states to carry out activities, make propaganda and communicate in digital environments, as well as individual sharing.

Disinformation

Disinformation, which comes from the French word "désinformation", has its Turkish equivalent in the Turkish Language Association Dictionary as "information distortion". People's tendency to believe in the worst and violence is the main source, or starting point, of disinformation. This causes the spread of distorted information to exceed the spread of real information.

It is bending, distorting and giving false information in social areas (material and digital) by both real persons and legal entities and especially states to direct society in line with their own interests. Producing direct false information, blending true information with other lies, presenting a part of the truth as if it were the whole, and adding additional distorting information are types of disinformation. Today, there are professional organizations that carry out disinformation activities, both openly and covertly, both state and private (Ertem 2019:32). Expressions such as "information warfare" are used for such work. The tools used in disinformation are photomontage, fake documents, images produced or manipulated in a studio environment, and false intelligence information. The most important example of disinformation for perception management and information sharing purposes in recent history emerged during World War I. The claims of "Hun atrocities" put forward by the Ministry of Information to get the United States into World War I were disinformation. This information, which targeted American intellectuals on the reasonable assumption that they were the most gullible and likely to believe the propaganda, was successful and the United States entered the war (Chomsky 1997). The most obvious example in more recent history of disinformation being used to sway public opinion is the Americans' use of all means of mass communication before entering Iraq to share information that Saddam Hussein had weapons of mass destruction (Ertem 2019:32).

With the new methods emerging every day, and the developments in artificial intelligence technology added to them, disinformation has gained a new dimension. Thanks to this technology, creating disinformation will not only be the responsibility of individuals, organizations and states with a strong infrastructure behind closed doors, but it will also spread to the base and everyone with an internet connection will have this potential. Disinformation has destructive consequences, such as targeting people's

fundamental rights and freedoms, especially corrupting their will, threatening national and international peace, and damaging democracies. Throughout history, states have taken on various names for the dissemination of information in line with their own interests. Whether it is espionage, black propaganda or intelligence, it reflects the desire of states to use information as they wish. Having information and deciding how to use it is the exclusive authority of states. States determine which way to use information in line with their own interests. Digital diplomacy practitioners and creators need to play an active role in every stage of the news production and distribution process and manage this process (Özdemir, 2023:175). States will be fighting against disinformation that is against them to the extent that they diversify their ways of using and spreading it. The Republic of Türkiye has also realized this and established the "Combating Disinformation Center" within the Presidency's Directorate of Communications. The aim of the center is to detect disinformation, which is an important part of perception operations, conspiracy theories and manipulation attempts spreading domestically and internationally, at an early stage and to ensure that the necessary measures are taken (https://www.dmm.gov.tr/ 2023). At the same time, it aims to ensure that news containing disinformation is exposed and real news is reached by publishing bulletins at certain intervals. The points to be considered in order to combat information pollution are as follows: One should be suspicious, emotions should not be abused, the entire news should be read or watched, the authenticity of the sources should be questioned, news that is not based on a valid source should not be shared, the content producer should be checked, the date of the content should be checked, the possibility of humorous content should be emphasized, the person should protect his/her reasoning skills, an expert should be consulted, the spread of information pollution should be prevented, click traps should not be fallen for, attention should be paid to imitations, and social media usage should be limited (https://www.dmm.gov.tr/dezenformasyon-101/ 2023). The Center's efforts, especially in the field of media literacy, will contribute to preventing the spread of disinformation.

Mainstream Media

Disinformation is frequently encountered not only on social media but also through what we might call classical media, such as newspapers, television and radio. For this reason, it is necessary to mention the mainstream media, which receives the most criticism on this issue and has no difficulty in reaching large audiences.

The struggle for dominance that both political actors are trying to establish over the media, and the media is trying to establish over politics has caused a wide debate (Bostancı 2014:85). Although the rapprochement or divergence of one from the other is sometimes referred to as "partisan

media", it should not be confused with the "mainstream media". First, the ownership and capital structure of the mainstream media must have the ability to act independently of the political organizations and the state of the society in which it is located. At the same time, the administration of the mainstream media must have an organic independence (Gürsel 2018). However, today, the commercial interests of the mainstream media have overtaken the purpose of broadcasting for the public benefit (Taylan and Ünal 2017:28). As the media began to become commercialized, it chose to present its news in a more entertaining way, moving away from public interest (Özdemir 2022:940). Mainstream media has an obligation to be independent, but it does not have to be impartial (Gürsel 2018).

Alternative media, which is seen as the opposite of the mainstream media, is seen as tools and institutions that produce and publish content against the mainstream media. In terms of its purpose and development, alternative media has generally been used as a means of self-promotion and communication for those who are in the minority and who cannot find a place for themselves in the mainstream media (Akveran 2018:14). The most distinctive feature of alternative media is that it stays away from commercialism. It is useful to look at the mainstream media in our country and around the world.

Mainstream Media in Türkiye

The monopolization experienced in the world media is also seen in the Turkish media. Many mass media have become monopolized and gathered around a very small number of media companies (Özdemir 2022:946). From the 1990s, when private radio and television started broadcasting, to the present day, it is seen that the media has begun to gather under the monopoly of certain companies. These are: Turkuvaz, Doğuş, Demirören, İhlas, Türk Medya and Ciner media groups. However, it is possible to say that the main fields of activity of these companies are gathered in a wide range from construction to energy, from automotive to finance. Therefore, the mainstream media, which acts with the concern of receiving more advertisements, reaching more readers, viewers and listeners and making profits, encounters obstacles in realizing the social role attributed to it under the influence of economic power centers (Özdemir. M. 2016:247-48). There are also criticisms that there is no mainstream media left in today's Türkiye (Gürsel 2018). The shift of focus from journalism principles such as accurate sources, accurate news and presenting the news appropriately to getting a share from advertising and making a profit has led to the questioning of the media's contributions to social culture.

Alternative journalism approaches have emerged due to the standardization of news and mass media in terms of discourse and content, their becoming the spokesperson of governments and dominant views, and the aim of making profit overtaking many of the dominant elements of mass communication (Akveran 2018:18). The basic indicators of alternative media, which have a common emphasis on interaction with the reader, participation and opposition to commercialism, can be listed as follows; the main motivation for publishing is not profit, having a horizontal, egalitarian and participatory structure within the media that is far from hierarchy, pursuing a sense of social responsibility and providing opportunities for the groups that are excluded from the public sphere and/or remain in the minority to express themselves (Taylan 2012:14). When we look at the features mentioned above and compare them with the mainstream media today, it becomes clear how much the mainstream media lacks these qualities.

Since the monopolization seen in mainstream media organizations is not seen in local media organizations, it is easier to cover different news (Akveran 2018:18). However, this does not mean that local media does not face problems. Reasons such as lack of resources and employees, not being able to receive advertising, the local nature of the news, and the difficulty of reaching large audiences make it difficult for local media to survive.

Mainstream Media in The World

Today, the media, which is under the control of global capital under the control of America and the West and the businesses they have local connections with, has entered into a commercial monopolization that started in the USA in the 1880s, and this commercial monopolization trend, which spread to countries such as France, England, Italy and Germany over time, affected not only the national media but also the local media (Özdemir 2022). After the Second World War, it is observed that liberal economic approaches, as an extension of capitalism, began to dominate the media organs of powerful capital groups and tried to direct the mass media with a single voice (Özdemir.M. 2016:248). In 1983, the most influential media organizations in the USA were in the hands of 50 media companies, but by 2003, these 50 media companies were in the hands of only 5 major media companies (Time Warner, Disney, Viacom, The News Corporation and Bertelsmann) (Bagdikian 2004:27-28). As can be seen, the tendency towards monopolization in the media experienced in Türkiye is no different from the process in the world. The attempt to gain media support behind the capital that is gaining strength in other sectors also aims to legitimize its activities and create defense channels.

Democratic societies are also societies where there is freedom of the press, and the media has more opportunities to fulfill the functions expected of it. However, the monopolization tendencies mentioned above also cripple the function of the media in democratic societies. A healthy vertical and horizontal organization of the media means that its public duties can be fulfilled in a healthy manner.

Example of Ukraine and Gaza

In relations between states, whether political, military or economic competition, all have in common the desire to have information about the other side. The fact that information makes the side stronger is often sought to be abused. This sometimes manifests itself as the contamination of information, changing the truth that can be accepted, and providing false or misleading information in line with one's interests. Today, states changing real information or sharing information that is not true in line with their own interests has become more common with the development of mass communication technologies. In this sense, it is seen that states resort to disinformation. They attempt to legitimize their actions by ignoring who the news affects other than themselves and how much it affects them and the consequences it may cause. When we look at recent world history, the periods when disinformation and information pollution increase are the times when the possibility of conflict increases the most or during war periods. Especially the live broadcasting of the war that started with the Gulf War in the 1990s, while providing viewers with the opportunity to see the war through the eyes of the broadcaster, it should also be considered an effort to legitimize the war. Legitimization through disinformation continues to be more developed, complex and intense today, and examples of this can be found in the Ukraine and Gaza War, which is the subject of this study.

It is not always possible to investigate the truth of the information that states disseminate to prove the legitimacy of their claims. Access to real information becomes even more important in times of conflict, war and natural disaster, and thus the need to distinguish real information from disinformation arises. This is sometimes attempted to be distinguished by units established by states themselves (such as the Center for Combating Disinformation) and sometimes by independently acting verification platforms.

Fact-checking platforms also try to ensure users' participation in news fact-checking processes by evaluating the news that individuals find suspicious about false information and send them (Ulaş and Baloğlu 2021:181). Most permanent fact-checking organizations operate outside of traditional newsrooms. Although examples can be found in England and

Italy, as a rule, sites in Eastern Europe operate with support from independent and non-governmental organizations (Graves and Cherubini 2016:10). In this regard, there are verification platforms established and operating in Türkiye, as in the world. Yalansavar.org, malumatfurus.org, evrimagaci.org, dogrulukpayi.com and teyit.org are a few of them. According to Çömlekçi, the interaction-based structure of social media is utilized to the maximum extent, and instead of one-sided communication, a multi-faceted communication style is adopted in which readers can also participate in the production process (Çömlekçi, 2019, p. 1560). In this study, we will use data from both the "Combating Disinformation Center" and verification platforms. In line with the subject of the study, some examples of disinformation used by the parties to legitimize the war during the Ukraine-Russia War and the Israel-Gaza War will be discussed.

Ukraine

The Russia-Ukraine War, which began with Russia's invasion of Ukraine on February 24, 2022, is seen to be waged not only on the ground by the parties, but also through economic, political, diplomatic and even digital means. People are now routinely confronted with various forms of untrue and misleading content, including disinformation (false or distorted claims) that are strategically used to mislead people (Aaron Erlich, Calvin Garner, 2023). While waging war, they also benefit from the boundless power of disinformation.

Legitimization of this situation is important for Russia, which first launched the attack, and like many authoritarian regimes, the Russian government effectively controls mass information within the country, and pro-Kremlin actors continue to spread disinformation on social media platforms (Aaron Erlich, Calvin Garner, 2023).

Since social media channels are still not sufficiently controlled and do not contain a verification mechanism, social media channels have also been turned into a 'front' with Russia's invasion of Ukraine, which began on February 24, 2022, and Moscow's efforts to legitimize the military operation have often been supported by manipulative content 'produced in troll factories' (Sığırcı 2023:4481). It is also necessary to say here that disinformation is not only Russia, but also Ukraine. It would not be wrong to say that disinformation, where all kinds of communication tools are used, is carried out especially through Facebook and Twitter (X) because of the lack of control and the lack of need for confirmation, as mentioned earlier. The fact that information spreads quickly and is a medium based on interaction is also among the reasons why these areas were chosen.

We would like to state that we will comment on the disinformation news published during the Ukraine-Russia war with the support of teyit.org.

According to the video shared on February 24, 2022, Russia is bombing an air base belonging to Ukraine. In the video, the plane, which was fired upon from the ground, left after dropping bombs on the ground facilities. The findings on the subject are that the images are from the game Arma 3 and the videos consist of game images recorded at different times (Arabacı 2022).

A photo said to show the Russian flag being raised in the Ukrainian city of Kharkov began to spread on social media with a post made on February 24, 2022. The shared photo shows a Russian flag hanging on a government building. During the protests in Ukraine in 2014, pro-Russian demonstrators hung the Russian flag on the Kharkov government building and other buildings. The findings are as follows: the photo was taken during the protests in Ukraine in 2014 and the original photo can be accessed on the Reuters website (Yılmaz 2022).

It was claimed that a video shared on February 25, 2022, showed soldiers who died in the Russia-Ukraine conflict. In the video, wounded and dead soldiers, as well as burning vehicles are seen. The findings obtained in the examinations; The video is not from the current Russia-Ukraine conflict, the images show soldiers who died in the conflicts in the Donbass region in 2014, and when we examine the video in detail, it is seen that they are military units affiliated with Ukraine from the colors of the soldiers' uniforms (Korkmaz 2022).

A video shared on social media on February 27, 2022, allegedly showed Ukrainian soldiers being made up to create fake blood and wounds, and the posts feed off a conspiracy theory that suggests that the ongoing conflict in Ukraine is “fake.” As a result of the investigations, when we searched for the keywords “soldier makeup Ukrainian” to find the video used in the claim, it was seen that the images belonged to the 2020 series “Contamin” and were shot long before the conflict began (Öztürk 2022).

On July 8, 2022, Ukrainian Ambassador to Ankara Vasyl Bodnar shared on Twitter that Ukrainian fields in flames were burned by Russian invaders with missiles and that farmers were trying to save what they could. It is possible to find the source of the video when a reverse search is done on search engines. The footage was uploaded to the video sharing site YouTube on July 1, 2014, years before the current conflicts (Tütüncüoğlu 2022). As a result of the analysis, it was proven that the video was uploaded in 2014 at the earliest, and it was concluded that this information was false.

Gaza

In the war between Israel and Hamas in Gaza on October 7, 2023, the death toll exceeded 40,000 and the number of injured exceeded 90,000. As in today's wars, the war was not only on land but also on news channels and social media. Israel, especially supported by the Western media, has gone beyond its right to self-defense and violated the principle of proportionality. It is seen that while reporting news about Israel, information is omitted, the person who carries out the action, that is, the subject ("UN shelter in Gaza was hit, 16 dead) is hidden, the negative aspects of the person who carries out the action are not emphasized and responsibility is not attributed by using active and passive sentences (Küngerü 2015:84-85). Here, disinformation posts made during the ongoing war will be included.

Israeli Prime Minister Benjamin Netanyahu shared some digitally prepared animated images on October 27, claiming that these images showed the Hamas headquarters under Shifa Hospital. The Israeli army has also made this claim many times and launched an operation on Shifa Hospital on November 14. However, Norwegian Doctor Mads Gilbert, who has been working at the hospital for 16 years, stated that the claim that there is a headquarters in the hospital is unfounded. Not a single piece of evidence has been produced regarding the headquarters claimed by Israel. Some of the images shared with the claim of "tunnel located in the Shifa Hospital" were determined to be elevator shafts, while others were determined to be septic tanks (https://www.dmm.gov.tr/dezenformasyon-101/2023:5-7). This is disinformation spread by Israel to damage Gaza's health system. It has been accepted by many international media organizations such as CNN and BBC that Israel has not been able to prove its claims of "headquarters under Shifa Hospital" (disinformation-101/ 2023:11).

A claim has also been made on social media regarding CNN International reporter Clarissa Ward, who is working on the Gaza border, and it has been claimed that the footage of Ward running away from rocket fire is "fake." The findings of the investigation are as follows: The voiceover was added to the video in the post later, the original video is available on CNN International's website, The description of the video states that CNN reporter Clarissa Ward and her team had to take shelter from rockets near the Gaza border. The video with the voice-over was shared on October 10 by an account called The Quartering (Toprak 2023).

The news report, which was presented by the United States-based Fox News channel with the claim that "Our reporter caught the ambush attempt while visiting the scene of the music festival massacre," was determined to be fake. When the footage related to the news was examined, it was seen that the alleged Hamas members were blindfolded and taken into custody under the sound of gunfire, however, when the rest of the footage was examined, it was

determined that the incident was staged by Israeli soldiers for the reporters. In the continuation of the footage, it was determined that the person alleged to be "a Hamas member who came to the festival area and set up an ambush" was dressing among the trees. This alleged ambush moment was reported and served by many international broadcasting organizations (disinformation-101/ 2023:12-13).

In one of the images that appeared on social media immediately after Israel launched ground operations against Gaza, a wounded Israeli soldier is seen speaking with Turkish subtitles as follows:

> *"They had filled us in and said that the Palestinians were cowards. Our commanders said, 'Each of you are Rambo, Thor, our heroic soldiers' and they said, 'The enemy you are facing is a few people who do not know how to fight and do not have powerful weapons.' We tried to enter Gaza with this gas. But everything was going as our commanders had told us. Until we encountered a fighter. Before I knew it, the man destroyed three of our teams as if he was an army, not a single person. He killed a lot of our soldiers. I was also injured and managed to survive by playing dead. Someone please stops Netanyahu. This is not a war, and the people we are facing are not people, they are an army of ghosts.*

As a result of the investigation, the following findings were reached (Ekeöz 2023):

- The original video was released on October 12, 2023, before the ground operations began.

- Common words such as "Palestine, Netanyahu, Rambo, Thor" are not heard in the video.

- It has been determined that the Turkish subtitles in the video are not correct.

- It has been determined that the speaker is Yair Wisner from the Israeli police.

- Wisner gives a morale speech to his unit mates.

Israel's official Arabic X account shared a photo with the note that Israeli soldiers were helping a civilian and that the elderly should be respected. The old man in the photo was identified as a 74-year-old Gazan named Bashir Haji, who lives in the Al-Zaytun neighborhood of Gaza. It has been determined that Bashir Haji, one of the thousands of Gazans forcibly displaced by Israel and driven south, was brutally executed by Israeli soldiers. His son, who spoke to Al Arabiya television channel, stated that he lost his family while

going south and that he later found his father shot in the head and back (disinformation-101/ 2023:35).

One of the images shared on social media regarding the situation in Gaza has gone viral, showing a burning city. It has been understood that the same images claimed to be Israeli were uploaded to a YouTube channel on July 16, 2023. This date corresponds to 3 months before the operation against Hamas. It has been determined that the original video contained images of celebrations in the city after an Algerian football team became champions for the 4th time in a row (Ekeöz 2023).

RESULTS AND DISCUSSION

States may occasionally have disagreements with each other. These disagreements can sometimes be resolved through diplomacy and sometimes through peaceful means. If these means are ineffective, resorting to war is also a possibility. In such periods of uncertainty and chaos, states seek national and international actors who will support them while carrying out their activities related to the dispute. These can be traditional allies or actors who will support them later. This process, which we can call a kind of supporter gathering activity, is sometimes done through disinformation.

The diversification of mass communication tools and the support of technological developments in this situation mean that disinformation has also diversified and even, in terms of our subject, the battlefields have been moved not only to the ground but also to digital media. The activities of states that need legitimization rather than their legitimate activities are more the subject of disinformation.

Especially in times of conflict and war, states resort to disinformation when sharing their attacks and defenses with third parties. The best examples of this are the Ukraine and Gaza examples mentioned above. It is expected that the activities carried out by the parties against each other will have an impact on the outside world through disinformation.

As a result of this study, it is seen that disinformation is sometimes used to legitimize one's own actions and sometimes to denigrate the other side. Another finding is that disinformation is not only made by the parties to the war, but also by third parties who sympathize with them.

REFERENCES

Akveran, S. (2018). Alternative Media Need Against the Mainstream Media And Ethics (in Turkish). *Fourth Power International Refereed Journal*, 1(1), 10–31.

Arabacı, A. O. (2022). The claim that some recently shared images are from the Russia-Ukraine conflict - Teyit. Retrieved December 4, 2023, from https://teyit.org/analiz/yakin-zamanda-paylasilan-bazi-goruntulerin-rusya-ukrayna-catismalarindan-oldugu-iddiasi

Bagdikian, B. H. (2004). The new media monopoly. Boston, MA: Beacon Press.

Bostancı, M. (2014). Political communication 2.0 (in Turkish). *Erciyes Communication Journal*, 3(3). https://doi.org/10.17680/akademia.v3i3.5000006569

Çakır, H., & Topçu, H. (2005). Internet as a communication language (in Turkish). *Journal of Erciyes University Social Sciences Institut*e, (19), 71–96.

Chomsky, N. (1997). What makes mainstream media mainstream? Retrieved November 30, 2023, from https://web.archive.org/web/20100908200000/http://www.chomsky.info/articles/199710--.htm

Çömlekçi, M. F. (2019). Disinformation on social media and practices of fact-checking platforms (in Turkish). *Gümüşhane University e-Journal of Faculty of Communication*, 7(3), 1549–1563. https://doi.org/10.19145/e-gifder.583825

DMM. (2023a). Disinformation Combat Center – DMM. Retrieved November 30, 2023, from https://www.dmm.gov.tr/

DMM. (2023b). Disinformation 101 (in Turkish) – Disinformation Combat Center. Retrieved November 30, 2023, from https://www.dmm.gov.tr/dezenformasyon-101/

Ekeöz, İ. (2023a). Is the video showing an Israeli soldier injured in the ground operation in Gaza? - Teyit. Retrieved December 4, 2023, from https://teyit.org/analiz/video-gazzedeki-kara-operasyonunda-yaralanan-israil-askerine-mi-ait

Ekeöz, İ. (2023b). Does the video show Gaza after an Israeli attack? - Teyit. Retrieved December 4, 2023, from https://teyit.org/analiz/video-israilin-gazze-saldirisini-mi-gosteriyor

Erlich, A., & Garner, C. (2023). Is pro-Kremlin disinformation effective? Evidence from Ukraine. Retrieved November 11, 2023, from https://journals.sagepub.com/doi/full/10.1177/19401612211045221

Ertem, Y. E. (2019). Disinformation on social media (in Turkish) (Master's thesis, Marmara University, Istanbul, Türkiye).

Graves, L., & Cherubini, F. (2016). The rise of fact-checking sites in Europe. Oxford.

Gürsel, K. (2018). How do you want your mainstream media? (in Turkish) Retrieved November 30, 2023, from https://birikimdergisi.com/haftalik/9226/ana-akim-medyaniz-nasil-olsun

Korkmaz, B. (2022). The claim that the video shows soldiers killed in the current Russia-Ukraine conflict (in Turkish) - Teyit. Retrieved December 4, 2023, from https://teyit.org/analiz/videonun-guncel-rusya-ukrayna-catismasinda-olen-askerleri-gosterdigi-iddiasi

Küngerü, A. (2015). Representation of Israel's 2014 Gaza attack in international media: CNN and Al-Jazeera channels as examples (in Turkish) (Master's thesis, Akdeniz University, Antalya, Türkiye).

Özdemir, M. (2016). In The Information Age The Role Of Alternative Media That Arose Againts Mainstream Media And Rising Citizen Journalism. *İnönü University Faculty of Communication E-Journal*, 1(2), 247–259.

Özdemir, M. (2022). Structural and Functional Similarity Between Local- National and International Media (in Turkish). *Ahi Evran University Social Sciences Institute Journal,* 8(3), 940–957. https://doi.org/10.31592/aeusbed.1125382

Özdemir, M., Tabanyeli, S. (2023). Understanding Of Journalism In Digital Diplomacy (in Turkish). Retrieved November 14, 2023, from https://asosjournal.com/index.jsp?mod=tammetin&makaleadi=&makaleurl=e86c71ac-5ccd-4bd5-b28b-212caa3b6408.pdf&key=67013

Öztürk, A. D. (2022). The claim that the video shows Ukrainian soldiers with makeup to appear wounded - Teyit. Retrieved December 3, 2023, from https://teyit.org/analiz/videonun-ukraynali-askerlere-makyajla-yaralanmis-goruntusu-verildigini-gosterdigi-iddiasi

Sığırcı, T. (2023). Disinformation in news about the Russia and Ukraine war on social media: Twitter example. Social Mentality and Researcher Thinkers Journal, 75(75), 4481–4492. https://doi.org/10.29228/smryj.71417

Talas, M. (2019). Globalization, political groups, political culture, political communication and Türkiye (in Turkish). Gaziantep, Türkiye: İKSAD Publishing House

Taylan, A. (2012). Bianet as a Model of Alternative Media: An Ethnographic Study on Alternative Media in Turkey (Doctorate's thesis, Ankara University, Ankara, Türkiye).

Taylan, A., & Ünal, R. (2017). Sensational Journalism in Mainstream Media: Example Of Health Communication. Journal of Atatürk Communication, (14), 27–44.

Toprak, E. (2023). The claim that CNN International's footage on the Gaza border is fake - Teyit. Retrieved December 4, 2023, from https://teyit.org/analiz/cnn-international-ekibinin-gazze-sinirindaki-goruntulerinin-sahte-oldugu-iddiasi

Turness, D. (2023). Explaining the 'how' - the launch of BBC Verify. BBC News, May 21.Retrieved May 28, 2025, from https://www.bbc.com/news/uk-65650822

Tütüncüoğlu, M. (2022). The claim that the video shows Russian burning of fields in Ukraine - Teyit. Retrieved December 3, 2023, from https://teyit.org/analiz/videonun-ukraynadaki-tarlalarin-ruslar-tarafindan-yakildigini-gosterdigi-iddiasi

Ulaş, T., & Baloğlu, E. (2021). News verification and reliability in the digital age. In Journalism and News: Continuity, Change and Digitalization (pp. 169–192). Konya: Palet Publishing.

Yılmaz, H. Z. B. (2022). The claim that the photo shows a Russian flag raised in Kharkiv, Ukraine on February 24, 2022 - Teyit. Retrieved December 4, 2023, from https://teyit.org/analiz/fotografin-ukraynanin-harkov-sehrinde-rus-bayragi-cekildigini-gosterdigi-iddiasi