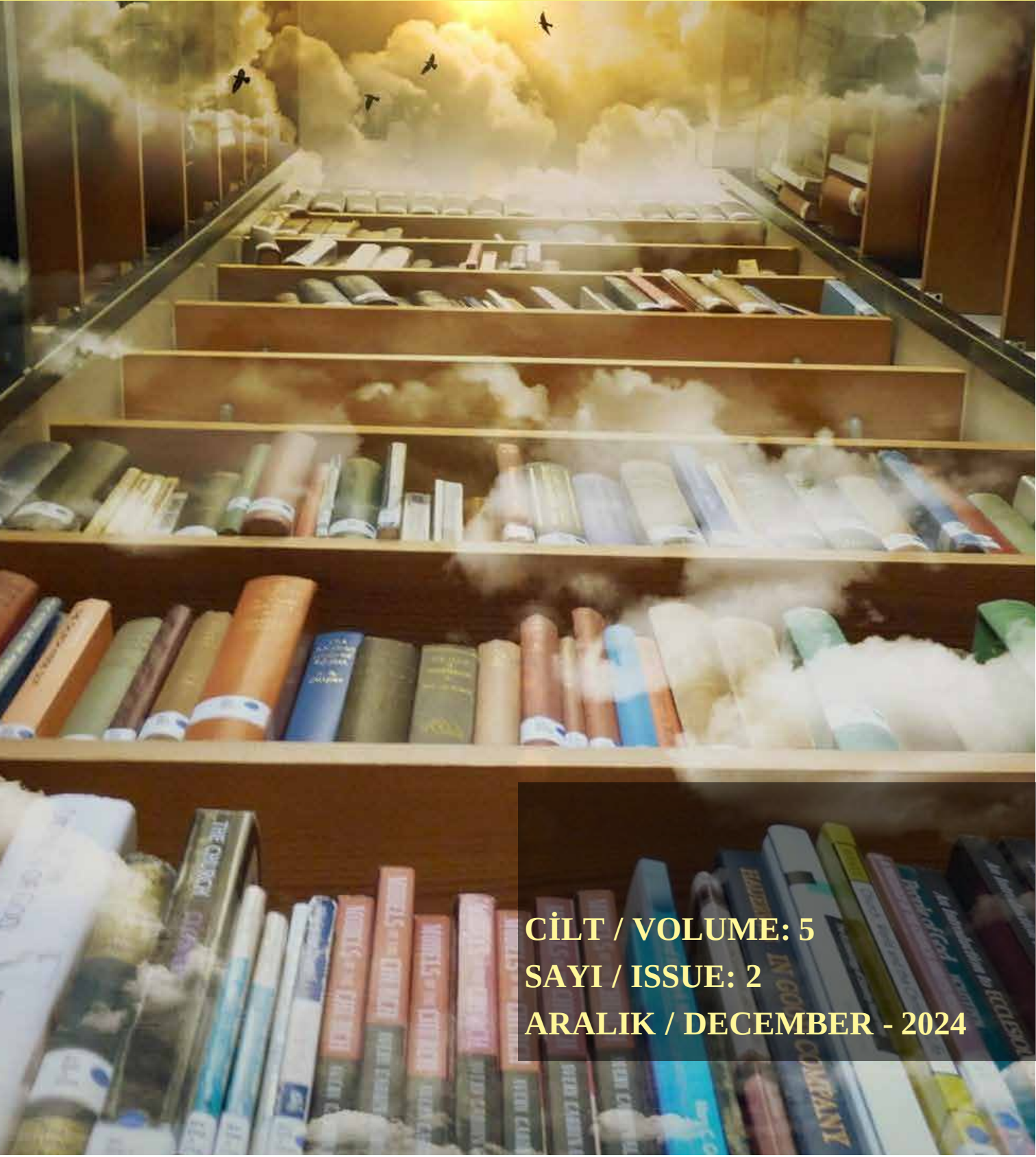


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The Evaluation of Global Environment Facility Projects in Türkiye

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ABSTRACT

This study conducted a comprehensive analysis and evaluation of the Global Environment Facility (GEF) projects implemented in Turkey. The main tool used was the World Bank Map tool. By entering the GEF option in the Toolkit sub-tool of the World Bank Map tool, various interpretations were attempted by obtaining data on GEF projects implemented in Turkey. At the same time, the land cover type in the provinces where GEF projects are implemented was examined according to the land cover analysis type in the World Bank Map tool using Modis Combined. All reviews and analyses were based on data obtained from the relevant website between 1 and 10 June 2024. It defines which types of GEF projects are supported and financed according to the provinces in Turkey, and also attempts to determine the differentiation of land cover in the provinces where these projects are implemented. In Turkey, 17 GEF projects are actively implemented in 27 locations with a total funding of \$46 million. The focal areas of these projects are climate change (7), land degradation (7), biodiversity (6), multifocal area (3), and chemicals and waste (7). Of course, it could be argued that it is not correct to base the differentiation by province only on GEF projects, but it is still considered that it can create a significant level of awareness among policymakers and all relevant stakeholders, especially farmers. Although it is expected that it will be difficult to detect the effects of these projects in the short term, it is predicted that the results will have important implications, especially for farmers and agricultural organizations, which are important stakeholders that are considered to be effective in land use. Future studies, using the new generation of impact evaluation methods, will be able to show the effects of the project in question more clearly.

Keywords: New generation impact evaluation, sustainability, land cover type, World Bank, data lab.

Türkiye’de Küresel Çevre Fonu Projelerinin Değerlendirilmesi

ÖZ

Bu çalışma, Türkiye’de uygulanan Küresel Çevre Fonu (GEF) projelerinin kapsamlı bir analizini ve değerlendirmesini yapmıştır. Kullanılan ana araç Dünya Bankası Harita aracıdır. Dünya Bankası Harita aracının Toolkit alt aracında GEF seçeneği girilerek Türkiye’de uygulanan GEF projelerine ilişkin veriler elde edilerek çeşitli yorumlar yapılmaya çalışılmıştır. Aynı zamanda Modis Combined kullanılarak Dünya Bankası Harita aracındaki arazi örtüsü analiz tipine göre GEF projelerinin uygulandığı illerdeki arazi örtüsü tipi incelenmiştir. Tüm inceleme ve analizler 1-10 Haziran 2024 tarihleri arasında ilgili web sitesinden elde edilen verilere dayanmaktadır. Türkiye’de illere göre hangi tür GEF projelerinin desteklendiği ve finanse edildiği tanımlanmakta, ayrıca bu projelerin uygulandığı illerdeki arazi örtüsü farklılaşması belirlenmeye çalışılmaktadır. Türkiye’de 27 lokasyonda toplam 46 milyon dolar fon ile 17 GEF projesi aktif olarak uygulanmaktadır. Bu projelerin odak alanları iklim değişikliği (7), arazi bozunumu (7), biyoçeşitlilik (6), çok odaklı alan (3) ve kimyasallar ve atıklardır (7). Elbette illere göre ayırmanın sadece GEF projelerine dayandırılmasının doğru olmadığı tartışılabilir, ancak yine de politika yapımcılar ve başta çiftçiler olmak üzere ilgili tüm paydaşlar arasında önemli düzeyde farkındalık yaratılabileceği düşünülmektedir. Bu projelerin etkilerini kısa vadede tespit etmenin zor olacağı beklenmekle birlikte, sonuçların özellikle arazi kullanımında etkili olduğu düşünülen önemli paydaşlar olan çiftçiler ve tarımsal örgütler için önemli çıkarımları olacağı öngörülmektedir. Gelecekte yapılacak çalışmalar, yeni nesil etki değerlendirme yöntemlerini kullanarak, söz konusu projenin etkilerini daha net bir şekilde ortaya koyabilecektir.

Anahtar kelimeler: Yeni nesil etki değerlendirme, sürdürülebilirlik, arazi örtü tipi, Dünya Bankası, veri laboratuvarı.

*Sorumlu yazar

Introduction

Evaluation can be envisaged as an important part of the chain of efforts to be open to criticism and contributions to the findings obtained as a result of any activity or project, and to achieve better, taking into account the experiences that have been implemented. The evaluation process can be handled in a multidimensional framework. The Global Environment Facility (GEF), which constitutes an important public financing mechanism for the global environment, can focus on understanding why, how, and to what extent desired and undesired results are realized and their possible impacts on stakeholders within the scope of its evaluation policy (Global Environment Facility [GEF], 2019).

The GEF Assembly has 186 member countries and/or participants. As a family of multilateral funds, the GEF intensively seeks to fund work to combat biodiversity loss, climate change, and pollution, and to promote land and ocean health. This funding and guidance endeavors to help developing countries overcome complex challenges and integrate their efforts towards international environmental goals. The partnership is centered on integration and inclusion and involves 186 member governments as well as civil society organizations, indigenous people, women, and youths. Over the past three decades, the GEF has provided nearly \$25 billion in funding, with a further \$138 billion available for country-centred priority projects (GEF, 2024).

When GEF projects that are actively implemented around the world are examined, 2,046 projects are supported in 152 countries, 8,265 locations, with a financing of 8,951 million dollars. It is discovered that 682 of these projects are being implemented in Africa, 509 in Asia, 423 in Latin America and the Caribbean, 232 in Global, 185 in Europe and Central Asia, and 15 regionally. When the focal areas of these projects are examined, 892 of them are climate change, 754 are biodiversity, 495 are land degradation, 469 are multi-focal areas, 255 are chemicals and waste and 149 are international waters. On the other hand, when GEF projects that have been completed and closed around the world are evaluated, 3,193 projects have been completed in 164 countries, and 3,307 locations, with a financing of 10,698 million dollars. It was defined that 958 of these projects were completed in Africa, 775 in Asia, 666 in Latin America and the Caribbean, 522 in Europe and Central Asia, 258 globally, and 14 regionally. When the focal areas of these projects are examined, 1,153 of them are biodiversity, 1,099 are climate change, 442 are multifocal areas, 391 are chemicals and waste, 246 are land degradation, and 226 are international waters (GEF, 2024).

Evaluation is generally undertaken for a variety of reasons, including accountability, transparency of results achieved by a particular activity, and learning from previous applications. In terms of evaluation policy prediction (GEF, 2019), which is the most approved and traditional public financing system, among the objectives of the evaluation, understanding the mechanisms of stakeholders is the basic key concept.

GEF Independent Evaluation Office (IEO) develops systematic approaches to understand the ways and means that lead to transformational change, and to understand the lessons, experiences, and implications of GEF interventions. For this evaluation, IEO selected and classified completed GEF projects according to the criteria set out below. 1. Relevance, 2. Depth of change, 3. Scale of change, 4. Sustainability (Batra, Garcia, and Temnenko, 2022).

According to the evaluations of GEF projects, it is defined that the funds provided made a positive contribution to the scale-up process. It can be stated that the methods and findings learned through the evaluation of GEF projects generally enable the re-demanding and use of project funds. As a good example, a GEF project implemented in Romania enabled a transition in agricultural waste management from an expensive and concrete-based model to a cheaper and more homogeneous efficient plastic-based alternative model. Another example is in China, where a lower-cost termite control initiative implemented in integrated pest management has been promoted. With additional technical training and public awareness activities, the saved costs were spread to wider segments. On the other hand, there has been significant success in investigating which interventions should be adopted and scaled, based on several case studies and real events. For example, very significant gains have been achieved in the Rural

Electrification and Renewable Energy Development project in Bangladesh (Batra et al., 2022). Similarly, in China and Brazil, the transition of farmers supported within the scope of GEF to sustainable land management was accelerated, enabling biodiversity to be protected and farmers to earn higher income (Garcia, 2018).

Negi and Sohn (2022) examined the sustainability levels of completed GEF projects and sustainability linkages. It is determined that the projects are generally sustainable, while the sustainability outlook worsens in some projects and improves in others. The catalytic processes that increase sustainability (maintenance, dissemination, multiplication, scale-up, and market change) have higher positive effects. It is clarified that factors such as financial and political support for traceability, monitoring, and capacities of the executing institution, participation of stakeholders, and project design have very important roles and duties in ensuring the sustainability of the project (Evaluation Cooperation Group [ECG, 2012]). The evaluation is calculated both retrospectively (considering accumulated net benefits) and prospectively (estimating the probability of accruing net benefits in the future).

Carugi and Viggh (2022) introduced strategic country cluster evaluations (SCCEs), which are a concrete example of how the GEF copes with the increasing complexity of GEF programming. It is emphasized that this complexity reflects their interconnectedness in terms of both synergy and exchange. The relationship between socioeconomic development priorities and environmental protection obligations, where GEF projects and programs are implemented was analyzed.

One of the most concrete results of the system is the increase in income obtained because of the increase in dairy production. In terms of program evaluation, the change in actual net farm income was examined and matched to minimum income for living (Fitzpatrick and Akgungor, 2019). The calculation of this income criterion for the program was based on Anker and Anker's (2014) work in Malawi where tea is grown. Since the program is in Malawi, adjustments have been made based on different costs such as food and shelter. All prices are adjusted to a 2015 base, for a linear analysis, like the poverty linkage (Fitzpatrick, 2022).

It is clarified that a detailed analysis of GEF projects implemented in Türkiye was carried out under the auspices of the Ministry of Environment, Urbanization and Climate Change (MEUCC, 2024), with the participation of all relevant stakeholders. The topics covered in the study, the topics focused on by the project stakeholders, and the main results and findings obtained have been tried to be summarized in the study. The project aims to improve the sustainability of land use management in agricultural and forest areas by adapting and disseminating low-carbon emission technologies within the framework of land degradation, climate change, protection of biological diversity, and efficient use of agricultural and forest areas. It is stated that this model is integrated into all project components by using various investments as a way of strengthening the knowledge base of local resource users and public extension officials. It is declared that the farmer field school model will provide a channel for the continuation of the learning service between public personnel and farmers. It is explained that this channel will also provide the necessary encouragement, information, and support for the creation of enabling environment strengthening.

In this study, a comprehensive analysis and evaluation of the GEF projects implemented in Türkiye was performed, by taking advantage of the opportunities offered by the GEF, which is included in the World Bank Maps tool, which provides comprehensive content. According to the literature review, it is discovered that there are a very limited number of studies conducted with this scope and method in Turkey, and it is envisaged that this study may guide future research.

Methodology

Methodologically, a model like the approach applied by Negi and Sohn (2022) is used. The study found that factors such as project-based funding, financial support for the monitoring and evaluation process, political support, follow-up and capacity of the implementing organization, stakeholder involvement,

and project design play a crucial role in determining the sustainability of the project and increasing its effectiveness. In this research, the World Bank Map tool was mainly used (World Bank Maps, 2024). By entering the GEF in the Toolkit sub-tool of The World Bank Map tool, detailed analysis and interpretations were attempted to be made by obtaining data on GEF projects implemented in Türkiye. At the same time, the land cover type in the provinces where GEF projects are being carried out was examined according to the land cover analysis type in the World Bank Map tool using Modis Combined. All reviews and analyses were performed based on data obtained from the relevant website between 1-10 July 2024. In essence, the study presents the financial support provided by the GEF in Turkey in the recent period by provinces on the one hand and compares the vegetation type in the provinces where GEF financial support was provided in the same period on the other. In effect, this study is a baseline study. By following the process of development and change in vegetation cover in subsequent studies, clearer conclusions can be drawn.

There is no need for an ethics committee decision in this study.

Findings

In the process to date in Türkiye, 21 projects have been carried out in 3 locations and 70 million dollars of financing has been provided. When the focal areas of these projects are examined, 9 of them are climate change, 6 are biodiversity, 4 are chemicals and waste, 2 are multi-focal areas, 1 is international waters, and 1 is land degradation.

In Türkiye, 17 GEF projects are actively being carried out in 27 locations (Figure 1), with a financing of 46 million dollars. When the focal areas of these projects are examined; it consists of climate change (7), land degradation (7), biodiversity (6), multifocal area (3), and chemicals and waste (7).

These projects were examined in detail, considering focal areas. First, projects being carried out within the framework of climate change were examined (Table 1). To help the Turkish economy within the framework of sustainable soil management, climate-friendly agriculture, and green growth, the highest supported project funds have been provided for sustainable biomass production. These items were followed by projects to produce energy-efficient engines in small and medium-sized enterprises and the establishment of low-cost buildings made of wood.

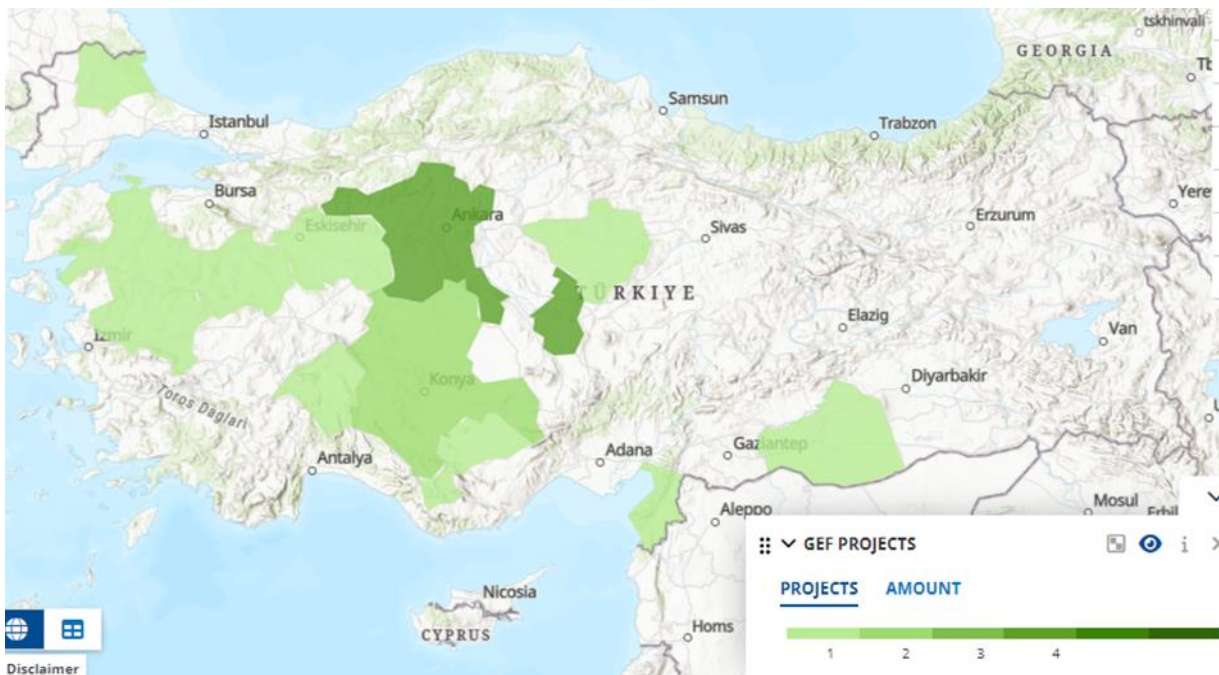


Figure 1. Distribution of GEF Projects Carried Out in Türkiye by Location

Table 1: *Projects Being Carried Out Within the Scope of Climate Change*

Projects	Finance (\$M)	Period
Innovative clean technology enterprise development-Institutionalisation and expansion of the Global Innovation Programme for SMEs in Türkiye	1.78	2021-2026
Promoting energy-efficient motors in small and medium-sized enterprises	3.75	2016-2024
Promoting low-cost energy-efficient wooden buildings in Türkiye	3.80	2023 – N/A ¹
Support for the proportion of Türkiye's seventh national communication (7 th NC) and third biennial report (3 rd BR) to UNFCCC	0.85	2017-2022
Sustainable energy financing mechanism for solar PV in forest villages in Turkey	3.78	2015-2023
Sustainable land management and climate-friendly agriculture	5.75	2014-2023
Sustainable use of biomass to assist the development of Turkey's economy towards green growth	4.42	2018-2024

Not available.

The types of support given regarding land degradation are also crucial (Table 2). At this stage, the most finance was provided to the sustainable land management and climate-friendly agriculture project, which is also under the title of climate change, followed by the land degradation and biodiversity conservation project provided to the Kazdaglari region. Studies implemented under the subheading of biodiversity are also examined below (Table 3). In this section, it is defined that the project fund sources examined in the previous section come first. It is clarified that the 3 supported projects regarding multi-focal areas have also been analyzed under the headings examined above (Table 4).

Table 2: *Projects Supported Within the Scope of Land Degradation*

Projects	Finance (\$M)	Period
Contributing to land degradation neutrality (LDN) target setting by demonstrating the LDN approach in the Upper Sakarya Basin for scaling up at the national level	2.39	2019-2024
Enhancement of agro-ecological management system through promoting ecosystem-oriented food production	0.70	2022-N/A ¹
Integrated natural resource management in very humid climatic regions of the Eastern Black Sea Region in Türkiye	1.25	2023-N/A
Strengthening the conservation of biodiversity and sustainable management of forest landscapes in Türkiye's Kazdaglari Region	4.66	2022-N/A
Sustainable and integrated water resource management in Gediz River Basin in Türkiye	1.14	2022-N/A
Sustainable land management and climate-friendly agriculture	5.75	2014-2023
Türkiye Irrigation Modernization Project	2.00	2018-2026

Not available.

Table 3: *Studies Implemented Within the Framework of Biodiversity*

Projects	Finance (\$M)	Period
Addressing invasive alien species threats at key marine biodiversity areas	3.34	2017-2025
BS support for the implementation of the national biosafety framework	0.54	2011-2017
Conservation and sustainable management of Türkiye's steppe ecosystem	2.33	2016-2022
Strengthening the conservation of biodiversity and sustainable management of forest landscapes in Türkiye's Kazdaglari Region	4.66	2022-N/A ¹
Sustainable and integrated water resource management in Gediz River Basin in Türkiye	1.14	2022-N/A ¹
Sustainable land management and climate-friendly agriculture	5.75	2014-2023

Not available.

Table 4: *Projects Implemented Under the Multi-Focal Area*

Projects	Finance (\$M)	Period
Strengthening the conservation of biodiversity and sustainable management of forest landscapes in Türkiye's Kazdaglari Region	4.66	2022-N/A ¹
Sustainable and integrated water resource management in Gediz River Basin in Türkiye	1.14	2022-N/A ¹
Sustainable land management and climate-friendly agriculture	5.75	2014-2023

Not available.

Only one project is implemented within the scope of chemicals and waste in Türkiye (Table 5).

Table 5: *Projects Under the Chemicals and Waste*

Projects	Finance (\$M)	Period
Enhancing environmental performance in the expanded and extruded polystyrene foam industries in Türkiye	3.19	2021-2025

When the start and end dates of some of the projects discussed under different headings above are examined, it is observed that they have been completed. On the other hand, since these projects are included under ongoing projects under the main source from which the data used in the conduct of the study is obtained, no changes have been made to the continuation status of the projects.

Similar results were obtained by Negi and Sohn (2022). It is envisaged that numerous factors may affect sustainability, including the availability of financial support for monitoring and follow-up, political support and facilitation for the project, follow-up and capacity capabilities of the implementing partner, stakeholder involvement, and deficiencies in project design. It is considered that it is very important for development projects such as GEF-supported to pay attention to the mentioned factors and possibly other local factors to increase the possibility of sustainability, especially land cover type and vegetation.

When the distribution of GEF projects implemented in Türkiye by province is examined, it is explored that Ankara and Nevşehir are at the top in terms of the number of projects and the funding provided (Table 6).

Table 6: *GEF Projects Implemented in Türkiye by the Regions*

Regions	Finance (\$M)	The number of projects
Ankara	11.8	4
Nevşehir	11.7	4
Konya	7.8	2
Karaman	5.8	1
Kırklareli	3.3	1
Balıkesir	3.3	1
Hatay	3.3	1
Eskişehir	2.4	1
Şanlıurfa	2.3	1
Yozgat	2.0	1
Manisa	2.0	1
Isparta	2.0	1

In the final stage of the study, the land cover type in the provinces where GEF projects are being carried out was examined (Table 7) according to the land cover analysis type in the World Bank Map tool. In this way, the possible partial effects of the projects being implemented, even at a certain level, on the vegetation grown on the land can be analyzed at the macroscopic level. Of course, although it is accepted that this evaluation will be a very ambitious interpretation at this stage, it is envisaged that it may shed

light on future studies. The presentation of the land cover type of the provinces in question on the map was also examined (Figure 2).

When analyzing the type of land cover by province, the following results are obtained. In Ankara, grasslands have the highest share, followed by croplands. In the provinces of Nevşehir, Konya, Karaman, Kırklareli, Kırklareli, Eskişehir, and Yozgat, croplands and grasslands are in first place. In Balıkesir province, in addition to croplands and grasslands, savannas, woody savannas, and evergreen needleleaf forests are important. In Hatay province, croplands, savannas, and grasslands have the highest shares of land cover type. In Şanlıurfa Province, croplands are at a very high level, followed by open shrublands and grasslands. In Manisa province, grasslands, savannas, and croplands are in first place respectively, while in Isparta province, grasslands are in first place with a very high area, followed by croplands and savannas.

Table 7: Land cover type by the regions implemented GEF projects (km²)

Regions	Grasslands	Croplands	Savannas	Urban and built-up plants	Open shrublands	Barren	Evergreen needleleaf forests	Water	Woody savannas	Permanent wetlands	Snow and ice	Cropland / natural vegetation mosaic	Mixed forests	Deciduous broadleaf forests	Evergreen broadleaf forests
Ankara	12,045	9,442	989	601	414	365	363	351	334	102	8	2	2	-	-
Nevşehir	2,004	3,217	-	23	-	10	-	-	-	1	-	-	-	-	-
Konya	19,043	18,057	33	345	1,137	828	21	931	3	91	56	-	-	-	-
Karaman	5,830	1,607	91	18	733	26	1	21	1	9	-	-	-	-	-
Kırklareli	1,061	3,154	76	30	11	0	15	45	395	10	0	15	24	1,463	-
Balıkesir	3,282	4,530	2,720	159	0	2	1,099	339	1,539	92	-	197	425	201	1,099
Hatay	725	2,157	1,036	251	28	3	303	464	298	84	-	227	151	117	15
Eskişehir	8,098	3,087	326	101	1,032	34	288	3	102	45	-	-	8	6	-
Şanlıurfa	2,363	10,786	5	204	5,514	57	-	207	-	36	0	-	-	-	-
Yozgat	5,756	7,870	99	30	-	14	45	2	59	6	-	1	-	-	-
Manisa	4,679	3,472	3,610	266	300	7	358	60	313	25	-	96	10	0	-
Isparta	6,072	1,082	926	136	44	20	82	470	71	89	0	-	-	-	-

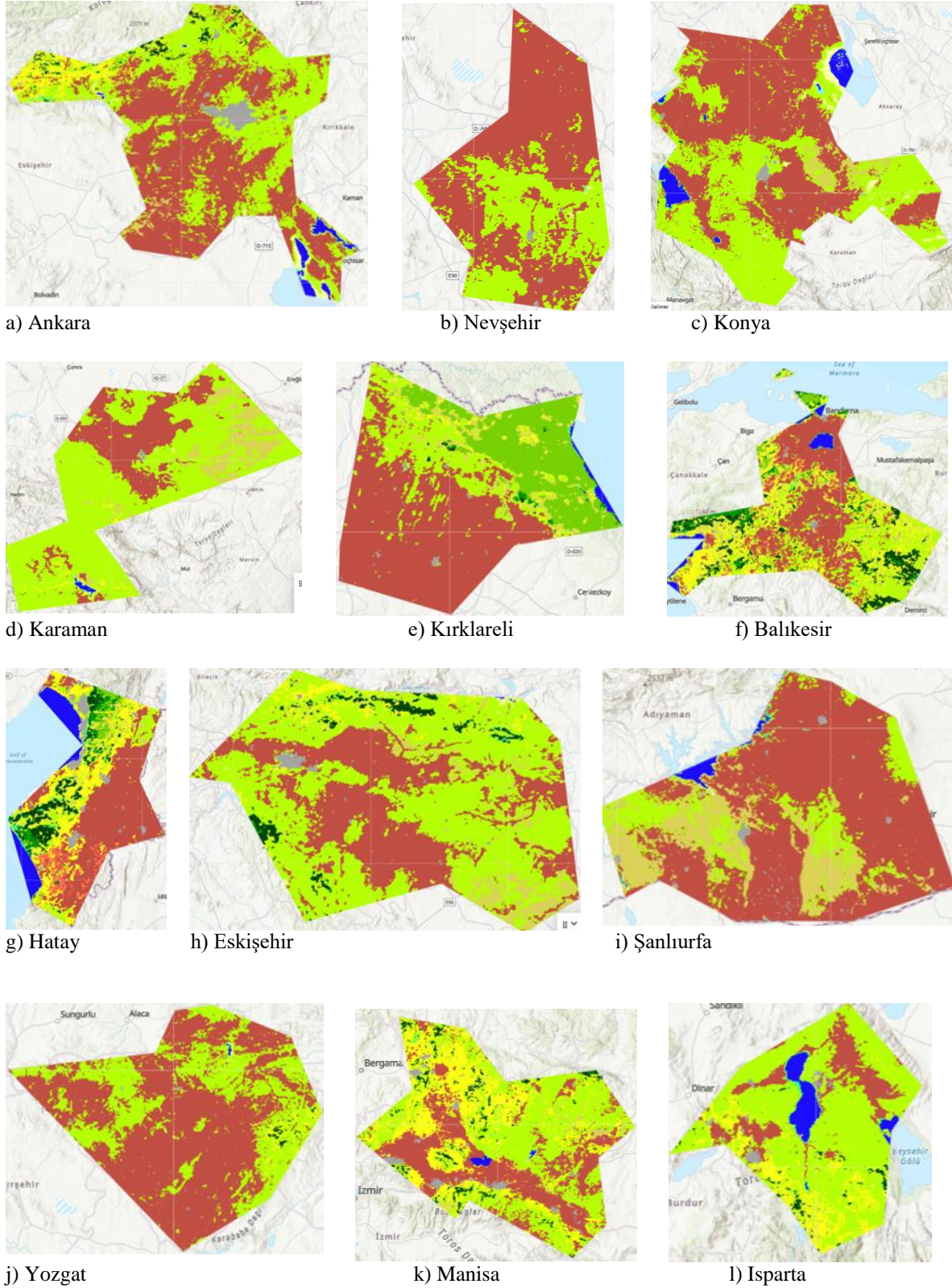


Figure 2. Differences in Land Cover Types of Provinces Benefiting from GEF Project Support

Many factors, primarily climate conditions and geographical features, are effective on the existing land cover and therefore biodiversity in a region. On the other hand, developing technology and industrialization concepts can cause excessive exploitation and destruction of many resources such as soil and water resources and biodiversity. In this study, it is determined which types of GEF projects are supported and funded according to the provinces in Türkiye, and it also tried to determine the

differentiation in the land cover in the provinces where these projects are implemented. Of course, it is accepted that it is not correct to base the differentiation according to the provinces only on GEF projects, but it is still evaluated that it can create a significant level of awareness among policymakers and all relevant stakeholders, especially farmers. It is evaluated that this study will form the basis of studies planned to be carried out using new-generation impact evaluation methods in the coming years.

Conclusion and Recommendations

As is the case around the world, there are many projects supported by the GEF in Türkiye. In this study, using the data obtained from the World Bank Maps tool, the projects that are actively being carried out in Türkiye with the support of this fund were first identified. Then, since the main purpose of this Fund is the sustainable use of natural resources, the distribution of land cover plants in the provinces where the projects are implemented was tried to be determined numerically and on the map. Although it is expected that it will be difficult to detect the effects of these projects in the short term, it is predicted that the results will have important implications, especially for farmers and agricultural organizations, which are important stakeholders that are considered to be effective in land use. The results of this study should be considered as a baseline study. Future studies will be able to reveal the effects of the project in question more clearly by using new-generation impact evaluation methodologies.

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The Effect of Spiritual Leadership on Organizational Cynicism and Organizational Loyalty¹

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ABSTACT

The fact that the effect of human resources on productivity, which is important with the competition process, has come to the fore has made the concept of leadership more important. For this reason, the labour factor, which is handled in many aspects in the field of management, has become a frequent subject in academic studies by being handled in terms of spiritual and moral values. However, in the leadership approaches applied until today, it is seen that the spiritual aspect of the employees is generally left incomplete.

Objective: The main purpose of this study, which is addressed in order to measure the reflection of this deficiency, is to reveal the effect of spiritual leadership on the level of loyalty and cynicism of the employee.

Method: The study was conducted by sampling 170 employees of private schools operating in Kars city centre. In the study where convenience sampling method was used, the data were obtained by using the questionnaire technique. The data obtained were analysed using SPSS statistical software, the hypotheses created to achieve the purpose were tested with correlation and structural equation modeling and the results were interpreted accordingly.

Findings: In the findings obtained as a result of the analyses, while there is a negative effect between spiritual leadership and organisational cynicism, there is a positive effect between spiritual leadership and organisational loyalty.

Keywords: Leadership, Spiritual Leadership, Organisational Loyalty, Organisational Cynicism

Ruhsal Liderliğin Örgütsel Sinizm ve Örgütsel Sadakate Etkisi

ÖZ

Yaşanan rekabet süreci ile önem arz eden insan kaynağının verimlilikteki etkisinin ön plana çıkması, liderlik kavramını daha önemli bir hale getirmiştir. Bu nedenle yönetim alanında birçok yönden ele alınan emek faktörü günümüzde manevi ve ahlaki değerler açısından da ele alınarak akademik çalışmalarda sıkça yer alan konular haline gelmiştir. Ancak günümüze değin uygulanan liderlik yaklaşımlarında genel olarak çalışanların manevi yani ruhsal yönünün eksik bırakıldığı görülmektedir.

Amaç: Bu eksikliğin yansımaları ölçmek adına ele alınan bu çalışmada temel amaç ruhsal liderliğin çalışanın sadakat ve sinizm düzeyine olan etkisini ortaya koymaktır.

Yöntem: Kars il merkezinde faaliyet gösteren özel okullardaki 170 çalışan örneklem alınarak çalışma yürütülmüştür. Kolayda örneklem yönteminin kullanıldığı çalışmada veriler anket tekniği kullanılarak elde edilmiştir. Elde edilen veriler SPSS istatistik programı kullanılarak analiz edilmiş, amaca ulaşmaya yönelik oluşturulan hipotezler, korelasyon ve yapısal eşitlik modeli ile test edilerek, sonuçlar bu doğrultuda yorumlanmıştır.

Bulgular: Analizler sonucunda elde edilen bulgularda, ruhsal liderlik ile örgütsel sinizm arasında negatif bir etki söz konusu olurken, ruhsal liderlik ile örgütsel sadakat arasında pozitif yönlü bir etkinin olduğu görülmüştür.

Anahtar Kelimeler: Liderlik, Ruhsal Liderlik, Örgütsel Sadakat, Örgütsel Sinizm

¹ This study is derived from the thesis titled "The effect of spiritual leadership on organizational cynicism and organizational loyalty".

* Sorumlu Yazar

Introduction

Making people, who are social beings, happy and enabling them to work more efficiently are among the problems encountered in every period and different approaches and ideas are tried to be put forward in search of solutions. While the motivation and leadership approaches that have been put forward as a result of the studies can offer solutions suitable for the conditions of the relevant period because they are approaches that focus on personal interests, these approaches are insufficient to produce solutions to the needs of the new order with the development of information and technology and bring new searches.

Leaders are one of the most important factors affecting organizational and individual outcomes. For this reason, many organizational variables such as organizational productivity, performance and workplace relations are affected by the personality traits of the leader. However, it is seen that the spiritual aspect of the employees is generally left incomplete in the leadership approaches applied until today. Spiritual leadership, which is defined as the values, attitudes and behaviors necessary for motivating oneself and others from within, aims to meet the spiritual and psychological needs of employees working in organizations by eliminating their deficiencies in this sense. This behavior creates peace in the employee's life, increases the connection of the person with the organization, leads to an increase in productivity and performance in his/her work and strengthens his/her loyalty to the organization. The concept of organizational loyalty, which is an important concept in success, refers to the commitment of individuals who provide services within the organization to their institutions, while the organization protects individuals against external factors. Research shows that positive organizational behaviors cause a high level of satisfaction in employees who have quality relationships with their colleagues at work and make the best use of organizational opportunities. Therefore, when this effect is positive, the idea of cynicism will emerge when loyalty is negative. Organizational cynicism has meanings such as distrust, skepticism, disbelief, pessimism that arise in individuals against the organization and organizational elements, as well as fault-finding, disliking and criticizing. The fact that the employee has negative attitudes and behaviors towards the organization will definitely negatively affect the level of contribution. Ultimately, having employees with low levels of organizational cynicism but high levels of organizational loyalty is an important issue in achieving sustainable competitive advantage and generating above-average revenues. In this study, which is based on this issue, does addressing the spiritual aspect of employees' orientation have any effect on their loyalty and cynicism levels? If there is an effect, it is aimed to reveal how it affects.

Spiritual Leadership

Developments in economic life cause pressures and anxieties in modern society, and this causes employees to suffer from interpersonal alienation and burnout in the workplace. In particular, overwork and professional burnout of leaders can cause them to use abusive language and violence, and these behaviors can cause employees to feel anxious and experience excessive pressure (Palmer, 1994; Cavanagh, 1999). How individuals can achieve internal and external balance in organizations is an important issue. The body (physical), mind (logical/rational thinking), heart (emotions/feelings) and soul, which are the basic entities of existentialist philosophy, are like the four legs of a table, and the lack of one of these legs will put the table in danger of falling (Moxley 2000). Traditional centralized, standard, bureaucratic organization-type leadership is no longer sufficient to meet these different balance needs of employees. Spiritual leadership theory has received widespread attention in the field of management because of its focus on what is missing from the four corners of this table, particularly by addressing the key assets that are seen to be missing, namely the role of spirituality in leadership, how it works, and its utility as a dynamic force in supporting or hindering aspects of the organization (Chen and Yang 2011:108). Several factors have played a role in the emergence of spiritual leadership. The reasons for the emergence of leadership include the excessive distress that has recently manifested itself in working environments, machines that replace manpower, the rapidly increasing desire for consumption, the speed of access to information, the isolation of individuals and isolation from work environments (Süle, 2019: 13).

Spiritual leadership is the leader's aim to give meaning to his/her employees' work by always telling them the ideal (Polat, 2011: 33). The concept argues that the spiritual aspects of people are ignored when defining human beings, and in fact, spiritual aspects are as important as other characteristics, and that spirituality must first be discovered before other characteristics can be realized, because the discovered spirituality is effective in revitalizing other characteristics (Gulsan, 2019: 10). In this regard, it utilizes the "soul" element that other leadership theories lack for human happiness and aims to appeal to the "soul". In another definition, spiritual leadership refers to a process that involves bringing together values, attitudes and behaviors that give the employee a sense of duty and belonging and enable him to motivate himself and others from within (Kurtar, 2009: 21). This understanding of leadership enables followers to perceive their work as a means of achieving the goal by attributing a sense of meaning to it in order to meet not only their basic needs but also their high-level needs (Reave 2005).

Fry et al. (2005) define spiritual leadership as building a learning organization through the use of employees' intrinsic motivation to achieve organizational transformation. Thus, the main purpose of spiritual leadership is to use the strategies and empowerment of individuals and teams to build consensus about organizational vision and values, thereby increasing organizational commitment and performance. In addition, spiritual leadership appreciates leaders' attitudes, values, and behaviors by unifying them, inspiring intrinsic motivation in employees, and enabling employees to realize the meaning of their work and the call of mission, to feel that they can make a difference and are understood (Chen & Yang, 2012:107). This understanding suggests that spiritual leadership embodies spiritual values such as integrity, honesty and humility, and creates itself as an example to be trusted, relied upon and admired.

Organizational Cynicism

Cynicism, a philosophical movement whose first representative is known to be Antisthenes, emerged in 500 BC. However, when it is evaluated from an organizational perspective, it is seen that it became widespread towards the early 90s (James, 2005:24). Today, it is seen that different meanings are attributed to the philosophy, which aims to bring the person to the forefront by criticizing the order and tries to explain the truth, and cynicism has become a concept of great importance in recent years, especially because it affects the success of the organization.

While the problems experienced in the management of businesses due to the change and the resulting destructive competition have been researched as organizational difficulties, they have also started to examine the negative attitudes and behaviors that employees develop towards the organization under the name of cynicism (Ögel, 2021: 42).

Cynicism is a current of thought defined for individuals who are very difficult to like, who are not satisfied with any transaction, who contain lies, false and selfish behaviors, who criticize and have high self-interest (Torlak, 2000: 27). Cynical individuals believe that employers prioritize their own interests, benefits and economic welfare levels over employees because they attach importance to their own interests in their lives (Çetinkaya and Korlu, 2012: 8). Andersson (1996) defines the concept as a mindset characterized by hopelessness, frustration and disappointment and states that it is also associated with contempt, disgust and suspicion. The cynical attitudes of individuals who make up organizations have led to the consideration of cynicism in the organizational dimension (Dean et al., 1998: 345-346). Organizational cynicism has different meanings such as distrust, skepticism, disbelief, pessimism that arise in individuals against the organization and organizational elements, as well as different meanings such as fault-finding, disliking and criticizing (Mustafa, 2011: 9). Organizational cynicism can be explained as a set of negative behaviors exhibited by individuals against the organization. In other words, organizational cynicism can also be defined as the negative feelings that individuals feel towards organizations, ideas, traditions and people, or the distrust of individuals towards organizations and people (Sezgin et al., 2016: 12). According to Dean (1998), organizational cynicism includes three negative phenomena towards the organization for which the individual is responsible. These phenomena are believing that the organization and individuals are not honest, having negative feelings towards the organization and the tendency to exhibit insulting and critical behaviors towards the organization. Based on these ideas, Dean et al. (1998) conceptualized organizational cynicism in three dimensions: cognitive,

affective and behavioral (Özdemir, 2013: 39). *The cognitive dimension* is defined as distrust and disbelief in human behaviors, the *affective dimension* is defined as the emotional reactions to the negativities experienced in the organization, and the *behavioral dimension* is defined as the negative attitudes and behaviors of the individual towards the organization against these situations (Dean et al. 1998: 345-346).

Organizational Loyalty

Retaining qualified employees plays an important role in the long-term survival of an organization. In order to increase the sense of belonging of the organization's employees, they need to do their activities in the long term and to increase loyalty. In today's business world, where classical organizational assets have been replaced by knowledge management and intellectual capital has gained importance, the basic idea that comes to the forefront in all organizations that act with the aim of profit or service is to make their relations with employees strong and to achieve their goals as a result of these relations.

While the first studies on the concept of loyalty were directed towards the organization or work groups, later studies were directed towards managers (Allen and Mayer, 1990: 540). Organizational loyalty is considered as emotional commitment between employees. Emotional commitment is defined as the desire of employees to maintain their relationship with the organization (Hakan, 2009: 8). Employee loyalty is the unity of organizations with individuals. The formation of a sense of loyalty in businesses is a long and powerful process. Loyalty is the last stage of the sense of belonging that an employee feels towards the business he/she serves, and in order for the employee to be loyal to the workplace, he/she must see a future in that workplace. As a matter of fact, the individual does not perform in an environment where he/she does not see a future for himself/herself and does not feel safe. The employer can bring the workplace to better places with the trust it provides in the employee (Göksal, 2020: 84). Organizational loyalty has a feature that includes promoting the organization to outsiders, protecting and defending it against external threats, and remaining loyal to the organization even under adverse conditions (Organ et al., 2006). In addition, this feature will also enable the employee to stay in the organization and to communicate positively through word-of-mouth. In this way, employees' feelings of emotional attachment to the organization will increase and employees will stay in the organization. Losing a knowledgeable and qualified employee has significant economic effects (Ramlall, 2004; Snell & Dean, 1992). The recruitment and training costs of a new employee can be a huge burden for organizations. Expenditure to replace skilled workers are not limited to financial costs, but also include the reduced productivity and effectiveness of new employees until they reach previous levels. Therefore, the effort to retain skilled workers by organizations will affect their profitability and provide them with a sustainable competitive advantage (Rust et al., 1995).

Effects of Variables in the Literature

When the literature on spiritual leadership is examined, it is found that spiritual leadership reduces the feeling of burnout (Yıldız, 2020); is effective in the development of employees' self-efficacy (Akıncı, 2017), increases the performance of employees (Duchon and Plowman, 2005); contributes to the development of citizenship behavior, job satisfaction, locus of control and self-efficacy in organizations (Subhaktiyasa et al., 2023; Pandia et al, 2023; Çimen, 2016), contributes to employees' creative and innovative behaviors by creating organizational climate and working environment (Khaddam et al., 2023; Bayighomog and Arasli, 2022; Anser et al. 2021; Hunsaker, 2022 ; Jain, 2023 ; Usmanova et al., 2021 ; Yang et al, 2021 ; Zhang and Yang, 2021), commitment to the organization (Bozkuş and Gündüz, 2016; Çayrak, 2022) and increasing workplace quality (Naktiyok and Zengin, 2021) and reducing employees' exhibiting incivility (Malik et al., 2024). Therefore, it is one of the types of leadership that can be applied to carry out activities that will be effective in ensuring success in a globalized and highly differentiated worldview.

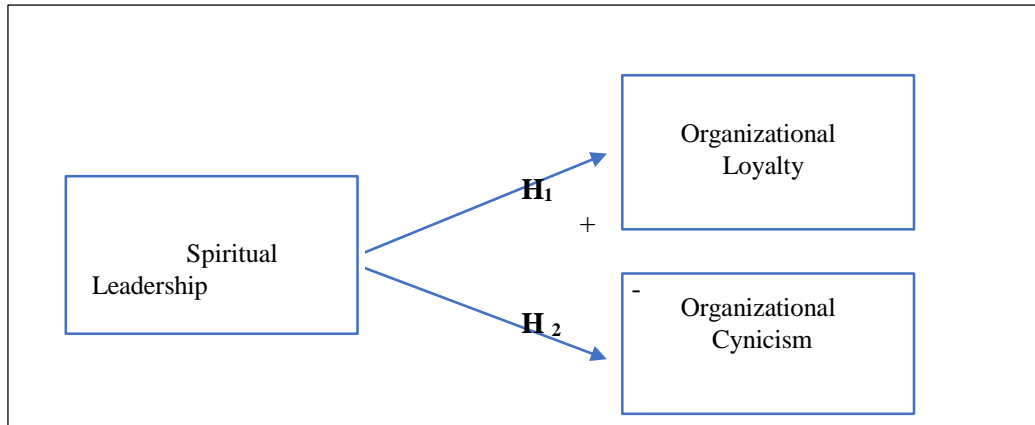
In addition to the reflections of this effect created by the spiritual aspect of leadership on employees, when other factors affecting the variables are examined, it is seen that managerial behaviors are positively reflected on employee loyalty (Inesona et al., 2013; Sincer, 2021). In addition, employee

satisfaction, organizational support and perceived diversity climate (Jauhari and Singh, 2013; Esmaeilli et al., 2017), employee voice (Whiting et al., 2008; Hoffmann, 2006), person-organization fit (Sun et al., 2019), organizational justice (Hur et al, 2014), employee empowerment, shared values and organizational identity (Boussaleem, 2014 ; Lim, 2016) positively affect organizational loyalty, while behaviors such as job stress (Wu et al., 2007), whistleblowing (Gökçe, 2013), and negative working conditions in the workplace (Golparvar and Nadi, 2011) cause negativity. In terms of organizational cynicism, which is the other variable, Battal and İbrahim (2023), Gündüz (2017), Polatcan and Titrek (2014) found that in organizations where organizational cynicism is intense, the effect of spiritual leadership is low and decreases commitment. In addition, it was determined that in organizations with cynical feelings, behaviors that negatively affect organizations such as low performance, low morale, high absenteeism and high turnover intention (Byrne and Hochwarter, 2008; Cordes and Dougherty, 1993), frustration (Pugh et al. , 2003), burnout (Simha et al. 2014), insecurity (Johnson and O'Leary-Kelly, 2003), job dissatisfaction and low citizenship behavior (Hochwarter et al., 2004) occur.

When the theoretical framework for the variables and the results of the literature review are examined, it is seen that leadership has an undeniable place especially in organizational success. Financial, physical and qualified workforce opportunities, which are the keys to success, can serve the purpose when an effective leader is in question. In the intense competitive process created by change, managers who realize that they can only respond with an effective workforce rather than classical production factors know that they have to change their current managerial understanding and add new tools to the classical motivational tools. One of these tools is the mental internal structure of the employees. In the light of the explanations, the research question that will serve the purpose of the study will be as follows:

Research Question: Can leaders influence employees by emphasizing their sense of spirituality? What role does this sense of spirituality play in the employees' perspective towards the organization? If the role has an effect, what is the direction of this effect?

Based on the theoretical explanations about the concepts that constitute the subject of the study and the results obtained from the literature research, the research model and the hypotheses prepared to be tested based on the model will be as follows.



H₁: Spiritual leadership has a significant and positive effect on employees' organizational loyalty level.
H₂: Spiritual leadership has a significant and negative effect on employees' organizational cynicism level.

Methodology of the Study

Purpose and Importance of the Research

The main purpose of this study is to examine the relationship between spiritual leadership and organizational loyalty and organizational cynicism and the effect, if any, of the dependent variable that is effective in this relationship on other independent variables. In addition, the idea of comparing the results to be obtained from the psychological and intrinsic motivation factors used by leaders in managing employees based on their spiritual feelings with the results of previous studies in the literature reveals another purpose of the study. It has been observed that in the studies on leadership to date, the reflections of the extrinsic factors used in the motivation of employees on performance and productivity have been discussed more. In this study, by measuring the impact of spiritual leadership behavior, which is a type of leadership based on spirituality rather than external factors, on the effectiveness of employees, it is aimed to reveal the role of using the "spiritual-spiritual state" of the employee in the employee-leader relationship, which has been left incomplete so far, in this process. The idea of revealing this distinction makes the study important in this sense. In addition, revealing the reflection of this new situation on the relationship levels of the employees in their own relationships and with the people who guide them is considered as another reason to make the study important.

Assumptions and Limitations of the Study

Before the survey questions were directed to the employees in the enterprises contributing to the research, it was emphasized that personal information (such as name/surname) would not be asked in the questions in the sample survey form and that the answers given to the questions would only be used in statistical analysis. Thus, it is assumed that the concerns of the employees were eliminated and that they answered the questions in the questionnaires accurately and reliably. The limitations of the study are that the research is only province-based, covers private school employees and the survey technique is used to obtain data.

Population and sample selection

The main mass of the research consists of employees and administrators of private schools operating in the province of Kars. According to the information received from the managers of the institution, the number of employees is 276 people. The number of sample lines determined by estimating a 5% margin of error within the 95% reliability limits from the research population was calculated as 161. The sample size was calculated with the help of the following formula (Akbulut and Yıldız, 1999; Yamane, 1967: 250).

$$n = \frac{NPQZ^2}{(N-1)d^2 + PQZ^2} \quad n = \frac{276(0,5)(0,5)(1,96)^2}{(276-1)(0,05)^2 + (0,5)(0,5)(1,96)^2} \cong 161$$

A total of 200 questionnaires were sent to the organizations that contributed to the research, 170 of which were returned. Therefore, the questionnaires completed by 170 employees were taken into consideration.

Data Collection Tools and Data Collection

Questionnaire technique was used to collect the data for the study. Consisting of 4 (four) sections, the first section of the form includes demographic information including descriptive information about the participants. The second section, which includes spiritual leadership, includes questions developed by Fry and used by Şafak Gündüz in his doctoral thesis, consisting of 21 items and 5 sub-dimensions. In the third part, the organizational cynicism scale developed by Brandes et al. (1999) and used by Ahmet Uslu in his doctoral thesis, consisting of 13 items and 3 sub-dimensions; and in the fourth part, the organizational loyalty scale developed by Ali Faruk Yaylacı and used by Yener Akman in his doctoral thesis, consisting of 3 sub-dimensions and 11 items were used.

Analysis Findings

Descriptive statistical methods were used for the findings regarding the demographic characteristics of the participants in the study. Frequency and percentage distributions of the participants are shown in Table 1.

Table 1. Findings Related to Demographic Characteristics

Demographic Characteristics		N	%
Gender	Woman	96	56,5
	Male	74	43,5
Marital Status	Single	57	33,5
	Married	113	66,5
Age	23-27	44	25,9
	28-32	54	31,8
	33-37	34	20
	38-42	20	11,8
	43 and above	18	10,6
Education Status	Secondary education	17	10
	High School	14	8,2
	Associate degree	21	12,4
	License	108	63,5
	Above bachelor's degree	10	5,9
Working Time	Less than 1 year	34	20
	1-3 years	51	30
	4-6 years	48	28,2
	7-9 years	21	12,4
	10 years and above	16	9,4
Working Position	School Principal	4	2,4
	Assistant Manager	8	4,7
	Teacher	112	65,9
	Office staff	21	12,4
	Support Personnel	25	14,7
Income	0-3000	41	24,1
	3001-5000	78	45,9
	5001-7000	30	17,6
	7001-10000	21	12,4

Table 1, which shows the demographic characteristics of the participants, shows that 56.5% of the participants are female, 43.5% are male, 66.5% are married and 33.5% are single. In terms of education level, 10% of the participants had secondary education, 8.4% had high school, 12.4% had associate's degree, 63.5% had bachelor's degree and 5.9% had master's degree. In terms of age ranges, 25.9% of the participants are between 23-27 years old, 31.8% between 28-32 years old, 20% between 38-42 years old, and the remaining 10.6% are over 43 years old. While 20% of the employees have been working for less than one year, 30% have been working for 1-3 years, 28.2% for 4-6 years, 12.4% for 7-9 years and 9.4% for more than 10 years. When evaluated in terms of the position they work in, it is seen that 12 people have administrative duties (7.1%), 65.9% (112 people) are teachers, and the rest are clerical and support staff.

Findings Related to Scales

Reliability and Confirmatory Factor Analysis of Spiritual Leadership Scale

The spiritual leadership scale used in the study consists of 21 statements. Reliability levels of the scale were calculated by internal consistency method and "Cronbach Alpha" coefficient was analyzed. Cronbach Alpha value can take values between 0 and 1 and the reliability of the scale increases as it approaches 1 (Morgan et al. 2004).

Confirmatory factor analysis was conducted to support the construct validity of the spiritual leadership scale. In the CFA, factor loading values were examined and it was seen that the values were higher than 0.50. Kaiser-Meyer-Olkin (KMO) was used to analyze the values in the scale and to determine whether it was appropriate or not, and Barlett sphericity test results were examined to determine the significance of the relationships between the variables. The KMO coefficient is a value between 0 and 1 and is an index that compares the magnitude of the correlation coefficient and partial correlation coefficients. The KMO ratio should be above 0.5 (Kalaycı, 2010).

The results of the factor values are as in Table 2.

Table 2. Exploratory Factor Analysis of Spiritual Leadership Scale

Variables	Scale Items	Factor Loadings	Dimensions	Cronbach Alpha	KMO / Barlett Test of Sphericity (p)	
Spiritual Leadership	RL12	,844	Vision	,977	,944; 4468,9 df: 210 ; p< 0,00	
	RL18	,835				
	RL16	,828				
	RL17	,789				
	RL6	,877	Altruistic Love	,947		
	RL1	,869				
	RL7	,763				
	RL14	,716	Membership	,911		
	RL3	,821				
	RL20	,764				
	RL13	,735				
	RL5	,729	Meaning	,920		
	RL8	,751				
	RL11	,738				
	RL15	,714	Hope	,938		
	RL2	,525				
	RL4	,776				
	RL10	,697				
	RL9	,647				
	RL21	,619				

In the EFA conducted for the scale, it is seen that the spiritual leadership scale is grouped under five dimensions in accordance with the original structure. However, the statement numbered RL 19 was excluded from the analysis since it overlapped more than one factor.

The CFA model for the five dimensions and 20 statements in the spiritual leadership scale is presented in Figure 1.

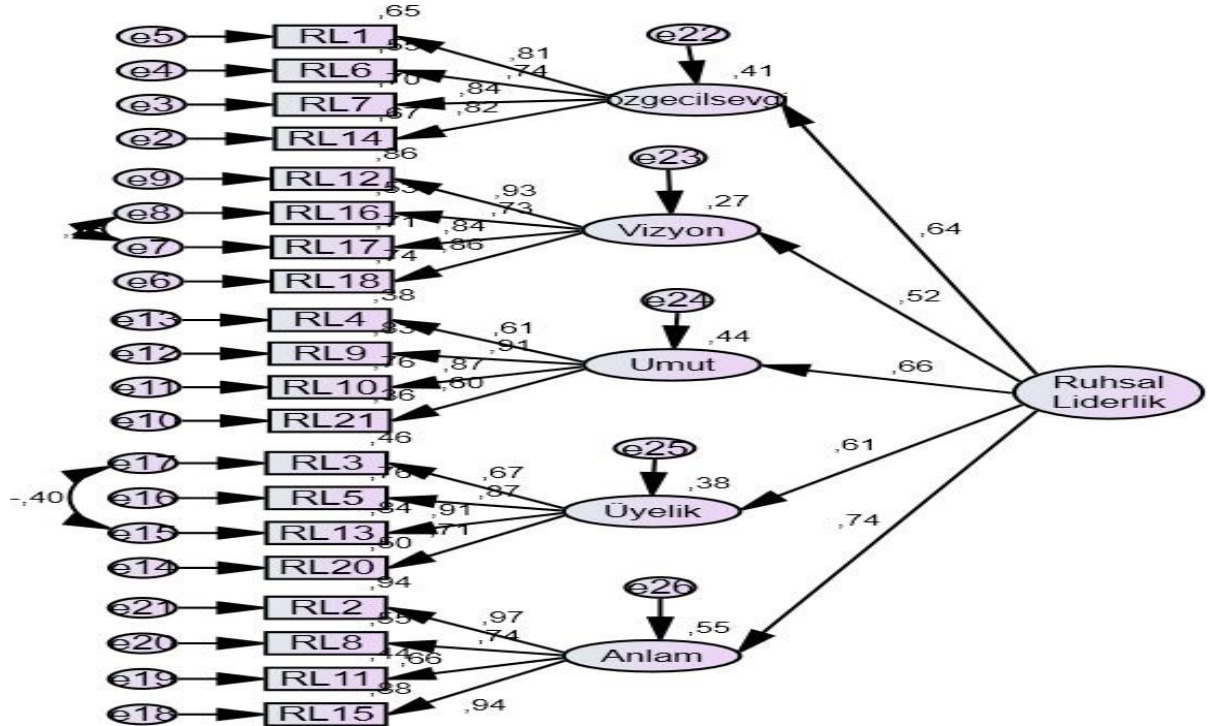


Figure 1. Confirmatory Factor Analysis of Spiritual Leadership Scale After Modification

As seen in Figure 1, the standardized factor loading values of the items are above 0.50 and meet the reference values. For the validity of the analysis, goodness of fit values were examined, but since it was seen that they were not within the desired ranges, modifications were made between the items. Modifications were made between RL3 and RL15 and between RL16 and RL17 and as a result of the modification, it was determined that the goodness of fit values (χ^2/df : 1.54; RMSEA: 0.054; TLI: 0.95; CFI: 0.96; IFI: 0.96; RMR: 0.89) were within the acceptable threshold values in the literature.

Reliability and Confirmatory Factor Analysis of Organizational Loyalty Scale

The organizational cynicism scale used in the study consists of 11 statements. Reliability levels of the scale were calculated by internal consistency method and "Cronbach Alpha" coefficient was examined. While examining the Cronbach Alpha values, item analysis was performed at the first stage and the factor loading value of item numbered SSA7 was below .300, so it was excluded from the analysis. The results of the item factor values are shown in Table 3.

Table 3. Exploratory Factor Analysis of Organizational Loyalty Scale

Variables	Scale Items	Factor Loadings	Dimensions	Cronbach Alpha	KMO / Barlett Test of Sphericity (p)
Organizational Loyalty	OSA2	,875	To the manager Loyalty	,822	,781; 1263,3 df: 55 ; p< 0,00
	OSA3	,750			
	OSA1	,672			
	OSA4	,626			
	OSA9	,854	Loyalty to Colleagues	,817	
	OSA10	,843			
	OSA11	,825			
	OSA8	,679			

OSA6	,722	Employees	,893
OSA5	,710	Loyalty	

In the CFA conducted for the scale, it is seen that the organizational loyalty scale is structurally grouped under three dimensions in accordance with the original. The CFA model for the three dimensions and 10 statements in the organizational loyalty scale is presented in Figure 2.

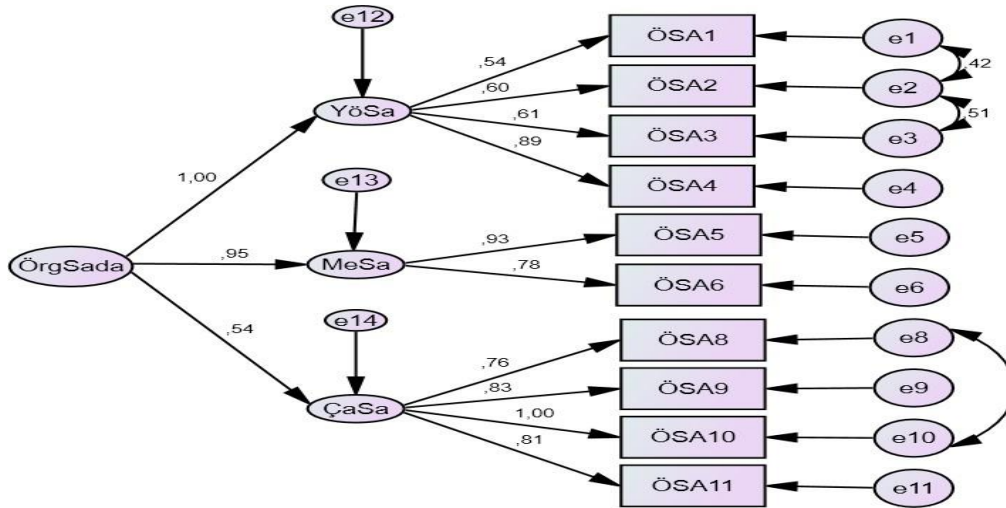


Figure 2. Confirmatory Factor Analysis of Organizational Loyalty Scale

As a result of the analysis, a modification was made between the items of the CTS1 and CTS2, CTS2 and CTS3, and CTS 8 and CTS 10, and as a result of the modification, it was determined that the goodness of fit values were within the range of χ^2/df : 1.83; RMSEA: 0.07; TLI: 0.96; CFI: 0.98; IFI: 0.98; RMR: 0.97 and within the acceptable threshold values in the literature.

Findings Related to Organizational Cynicism Scale Reliability and Confirmatory Factor Analysis

The organizational cynicism scale used in the research consists of 13 statements. Reliability levels of the scale were calculated by internal consistency method and "Cronbach Alpha" coefficient was examined. Exploratory factor analysis was performed to support the construct validity level of the scale. In the EFA, factor loading values were examined, and item S10 was excluded from the analysis due to its low factor loading value and overlapping. The results of the item factor values are shown in Table 4.

Table 4. Exploratory Factor Analysis of Organizational Loyalty Scale

Variables	Scale Items	Factor Loadings	Dimensions	Cronbach Alpha	KMO / Barlett Test of Sphericity (p)
Organizational Cynicism	ÖS2	,887	Cognitive Cynicism	,933	,876; 1884,01 df: 78 ; p< 0,00
	ÖS1	,846			
	ÖS4	,822			
	ÖS3	,798			
	ÖS5	,790	Affective Cynicism	,928	
	ÖS8	,884			
	ÖS7	,867			
	ÖS9	,838			
	ÖS6	,725	Behavioral Cynicism	,774	
	ÖS12	,895			
	ÖS13	,886			
	ÖS11	,719			

In the CFA conducted for the scale, it is seen that the organizational cynicism scale is structurally grouped under three dimensions in accordance with the original. The CFA model for the three dimensions and 12 statements in the organizational cynicism scale is presented in Figure 3.

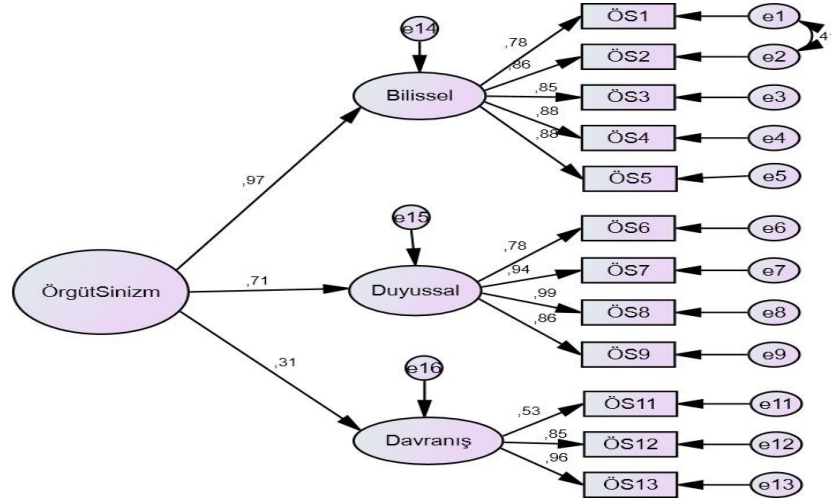


Figure 3. Confirmatory Factor Analysis of Organizational Cynicism Scale

As a result of the analysis, a modification was made between the items of SC1 and SC2, and as a result of the modification, it was determined that the goodness of fit values were within the range of χ^2/df : 1.99; RMSEA: 0.077; TLI: 0.96; CFI: 0.97; IFI: 0.97; RMR: 0.1 and within the acceptable threshold values in the literature.

Testing Hypotheses

Pearson Correlation analysis was used to determine the relationships between spiritual leadership, organizational loyalty and organizational cynicism variables, and Structural Equation Modeling (SEM) was used to test the hypotheses.

Table 5. Pearson Correlation Analysis Table for the Relationships between Variables and Sub-Dimensions

	Average	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Spiritual Leadership	3,85	1												
2. Altruism	3,79	,917**	1											
3. Vision	3,66	,870**	,737**	1										
4. Hope	3,93	,894**	,764**	,656**	1									
5. Membership	3,79	,923**	,864**	,754**	,785**	1								
6. Meaning	4,10	,869**	,740**	,676**	,842**	,724**	1							
7. Organizational Cynicism	2,22	-,603**	-,603**	-,525**	-,510**	-,550**	-,511**	1						
8. Cognitive Cynicism	2,37	-,491**	-,535**	-,432**	-,384**	-,469**	-,356**	,868**	1					
9. Affective Cynicism	2,02	-,518**	-,500**	-,460**	-,421**	-,439**	-,500**	,852**	,678**	1				
10. Behavioral Cynicism	2,28	-,396**	-,367**	-,317**	-,407**	-,377**	-,325**	,559**	,250**	,217**	1			
11. Organizational Loyalty	3,38	,595**	,521**	,515**	,554**	,507**	,576**	-,430**	-,282**	-,353**	-,379**	1		
12. Loyalty to the manager	3,69	,586**	,491**	,463**	,584**	,554**	,558**	-,424**	-,305**	-,363**	-,342**	,798**	1	

13. Colleague Loyalty	3,33	,431**	,413**	,426**	,348**	,337**	,387**	-,283**	-,206**	-,212**	-,231**	,813**	,510**	1
14. Loyalty to Employees	3,10	,481**	,410**	,408**	,462**	,396**	,495**	-,370**	-,208**	-,308**	-,357**	,875**	,546**	,548**

** , and * indicate significance at 1% and 5% level.

When Table 5, where Pearson Correlation analysis results are shown, it is seen that there is a positive, moderate and significant relationship ($r: .595$; $p < 0.05$) between spiritual leadership and organizational loyalty. Therefore, there is a significant relationship between spiritual leadership and organizational loyalty. When the level of relationship between spiritual leadership and organizational cynicism is examined, it is found that there is a negative, moderate and significant relationship ($r: -.603$; $p < 0.05$), and there is a negative, moderate and significant relationship ($r: -.430$; $p < 0.05$) between organizational loyalty and organizational cynicism. These results show that there is a positive relationship between spiritual leadership and its sub-dimensions and organizational loyalty, and a negative relationship with organizational cynicism.

The structural equation model test was utilized to reveal the statistical effect levels of the variables in the study. The previously determined structural model was analyzed using the AMOS program. The model that determines the level of influence between the variables and the goodness of fit values of the model are shown in Figure 4.

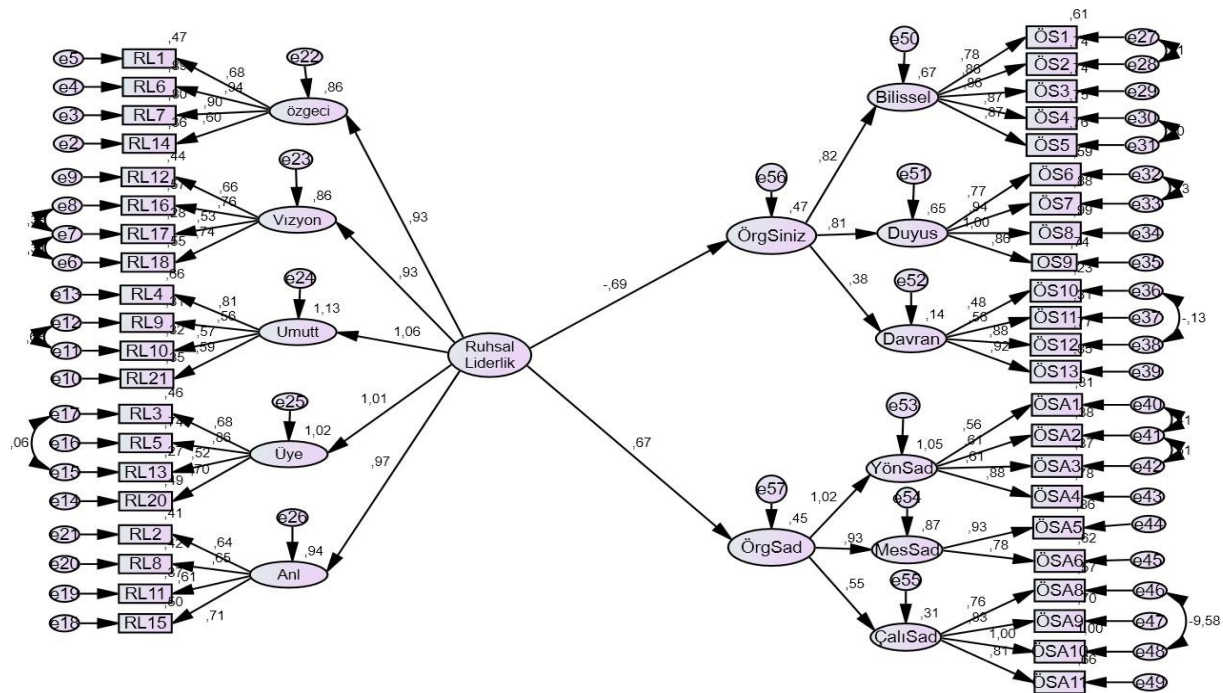


Figure 4. Structural Model of the Study

As a result of the analysis, modifications were made between RL17 and RL18, RL9 and RL10 items in the Spiritual leadership variable and as a result of the modification, it was determined that the goodness of fit values were within the range of χ^2/df : 2;63; RMSEA: 0.076; TLI: 0.97; CFI: 0.94; IFI: 0.96; RMR: 0.09 and within the acceptable threshold values in the literature.

When the results of the model prepared to examine the level of influence between the variables in the study are examined, it is determined that there is a negative effect of - 0.69 between spiritual leadership and organizational cynicism, and a positive effect of 0.67 with organizational loyalty. In line with these results, it is seen that the hypotheses **H₁** and **H₂**, which were created to test the problematic part of the study, are **accepted**.

Conclusion

In a competitive environment, it is one of the most difficult issues for businesses to maintain their activities and gain a sustainable competitive advantage, and in this process, businesses are looking for different starting points to gain advantage. At this point, businesses strive to motivate their employees with leadership styles with different attitudes and behavioral characteristics and to reveal their effective and efficient performance. One of the starting points of this endeavor is the concept of spiritual leadership. Spiritual leadership, which is a new concept in the literature and is the subject of research in the academic field, is seen as an appropriate understanding in adapting to today's conditions and is important in this process. In this study, which was carried out on the basis of this importance, it was aimed to reach the result of how it would create an effect on their working process and their behavior towards the organization by addressing the spiritual souls of the employees. The results of the analysis of the data obtained from the employees in private education institutions using the survey technique, comparisons of the literature and suggestions are as follows:

Pearson Correlation analysis was conducted to reveal the relationship between the variables. The findings of the analysis are as follows: While there is a positive, moderate and significant relationship between spiritual leadership and organizational loyalty ($r = .595$; $p < 0.05$), there is a negative, moderate and significant relationship between spiritual leadership and organizational cynicism ($r = -.603$; $p < 0.05$). Therefore, when this positive level of significance between spiritual leadership and organizational loyalty touches the spiritual aspects of the employees and makes them feel this feature, the employees in the organization will feel themselves differently with the privilege of the spiritual pleasure created by this feeling that was left incomplete before, and they will exhibit a more loyal tendency towards their organization and leader because they feel happy and safe. When the level of relationship between the independent variables of organizational loyalty and organizational cynicism was examined, it was found that there was a negative, moderate and significant relationship between these two variables ($r = -.430$; $p < 0.05$).

When the effect levels are examined based on the relationships between the variables, it is seen that spiritual leadership has a significant and positive effect on organizational loyalty (0.67) and a significant and negative effect on organizational cynicism (0.69). These results show that both the answer to the "study question" that constitutes the main purpose of the study and the hypotheses H1 and H2 are accepted. Therefore, in order to ensure organizational success, managers should strive to show the necessary behaviors that increase the motivation of the workforce, which is the most important actor, in the best way possible based on the current situation, provided that they do not ignore other factors that are necessary in the success process. When the results are compared with the results of the studies in the literature, Yıldız (202), Akıncı (2017), Gündüz (2014), Duchon and Plowman, (2005), Khaddam et al., (2023); Bayıghomog and Arasli, (2022); Anser et al. (2021); Hunsaker, (2022) ; Jain, (2023) ; Usmanova et al., (2021) ; Yang et al, (2021) ; Zhang and Yang, (2021), Altınöz, et al. (2011) and Bozkuş (2016), Özgan, et al. (2013), Polat and Tülübaş (2013), Yanmaz (2022), Uslu (2012), Uçak (2022);

Naktiyok and Zengin, (2021) Görgülü (2022), Gülay (2022), Ankaralıoğlu (2020), Akıncı (2017), Altınöz, et al. (2011), Ineson et al, (2013); Sincer (2021), Esmaeilli et al. (2017) and support the ideas expressed. In addition, these results clearly show that positive behaviors in the organization reduce or eliminate negative behaviors and negative behaviors reduce or eliminate positive behaviors. In other words, good expels bad and bad expels good. In today's economic structure where competition makes itself felt intensely, sectoral similarities, homogeneous productions and products, low consumer loyalty and many negative effects of globalization for businesses, taking the necessary precautions against the necessary measures and turning them into opportunities with a proactive behavior process can be realized with an effective leadership behavior. If management is expressed as an action carried out through others and the result is to be evaluated as success, then the behavior of the leaders according to the roles of the "others" who come to the fore in this success will create positive results both for themselves and for the success of the organization they manage.

In future studies to be conducted on variables, it is thought that the application to different sectors in a larger sample by including existing variables or different variables will contribute to the diversity of results in the literature.

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Dış Açılma Sürecinde Türkiye Dış Ticaretinde Belirleyici Faktörlerin Ampirik Analizi

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ÖZ

1980 sonrası dönem dünyadaki birçok ülkede olduğu gibi Türkiye’de de finansal serbestleşme ve dışa açılmanın ve buna bağlı olarak dış ticaret hacminde artışların yaşanmaya başladığı bir dönem olmuştur. Bu süreçte dış ticaret döviz kurları, doğrudan yabancı yatırımlar, ekonomik büyüme ve enflasyon gibi göstergelerdeki değişimlere karşı daha hassas bir hale gelmiştir. Bu nedenle dış ticaretin önemli birer belirleyicisi olarak kabul edilen bu göstergeler çok sayıda ampirik analizin konusu olmuştur. Bu çalışmanın amacı 1980-2022 döneminde Türkiye’nin dış ticaretinde belirleyici olan faktörlerin ampirik olarak analiz edilmesidir. Çalışmanın temel motivasyonu literatürdeki çoğu ampirik çalışmanın aksine, analizde dünya gayrisafı yurt içi hasılası ile dünya ticaret hacminin birer değişken olarak yer almasıdır. Çalışmanın temel yöntemi ARDL (Gecikmesi Dağıtılmış Otoregresif) Sınır Testidir. Çalışmanın temel sonuçlarından biri uzun dönemde sadece dünya ticaret hacminin Türkiye’nin dış ticaretinde belirleyici olduğudur. Diğer bir sonuç ise çalışma kapsamında kurulan hata düzeltme modelinin çalıştığı ve kısa dönem dengesindeki bir sapmanın yaklaşık 2 yıllık sürede uzun dönem dengesine yakınsadığıdır. Ayrıca çalışmada yer alan tüm değişkenlerin çeşitli gecikme uzunluklarında dış ticareti etkilediği bulunmuştur.

Anahtar Kelimeler: Dış ticaret, dış ticaretin belirleyicileri, Türkiye, ARDL yöntemi.

Determinants of Türkiye's Foreign Trade in the Process of Openness: An Empirical Perspective

ABSTRACT

After 1980, like many countries around the world, Türkiye entered a period of financial liberalization and openness, leading to an increase in foreign trade volume. During this period, foreign trade became more sensitive to changes in indicators such as exchange rates, foreign direct investments, economic growth, and inflation. Consequently, these indicators, considered significant determinants of foreign trade, have been the subject of numerous empirical analyses. The aim of this study is to empirically analyze the factors that determine Türkiye's foreign trade between 1980 and 2022. The motivation of the study is to include global gross domestic product and world trade volume as variables, which contrasts with many existing empirical studies. ARDL (Autoregressive Distributed Lag) Bound Test is the main method of the study. One of the main findings is that in the long term, just world trade volume is determining factors in Türkiye's foreign trade. Another result is that the error correction model established within the study works, and a deviation from short-term equilibrium converges to long-term equilibrium in approximately 2 years. Furthermore, it was found that all variables in the study affect foreign trade at various lag lengths

Keywords: Foreign trade, determinants of foreign trade, Türkiye, ARDL method.

Giriş

Dış ticaret, iktisadın bir disiplin olarak sistematik hale gelmeye başladığı 18. yüzyılın sonlarından bu yana en önemli konulardan biri olmuştur. Henüz o yıllarda Adam Smith, David Ricardo gibi ekonomi biliminin öncüleri bu konuya eğilmiş ve günümüze kadar çeşitli yönleriyle çalışılmakta olan bir alan ortaya çıkmıştır. Dünya genelinde genel olarak uzun yıllar boyunca artan üretim ve dış ticaret hacmindeki büyüme, iktisatçıları dış ticaretin belirleyicilerini araştırmaya, bu alanda ampirik çalışmalarla kanıtlar ortaya koymaya sevk etmiştir. Belli başlı ekonomik göstergeler bir ülkenin dış ticaretine çeşitli etkilerde bulunabilmektedir. Bu göstergelerin başında döviz kurları, ekonomik büyüme, doğrudan yabancı yatırımlar (DYY) ve enflasyon gelmektedir.

Döviz kurlarının ticaret üzerine etkisinin iki temel yönü bulunmaktadır. Bunlardan birincisi döviz kuru dalgalanmaları iken, ikincisi döviz kurlarındaki yanlış hizalanmalardır (Nicita, 2013:47-61). Döviz kurlarındaki dalgalanmalarla ilgili olarak ülke para biriminin değer kaybetmesi ve değer kazanması biçiminde iki temel boyutu bulunmaktadır. Buna göre ceteris paribus bir ülkenin para birimi değer

kaybettiğinde yabancı ülkeler için ihraç malları ucuz hale gelir ve bu durum genel olarak ihracatı artırabilir. Buna karşın ithalat daha pahalı hale gelebileceğinden ithal mal talebi azalabilir. Ülke para biriminin değerlendirilmesi durumunda ise ihracat pahalı hale gelerek ülkeyi dış ticarete dezavantajlı bir duruma getirebilmektedir. Öte yandan ülke parasındaki değerlendirilme ithalat eğilimini artırarak dış ticaret açıklarının meydana gelmesine veya mevcut açıkların daha da artmasına neden olabilmektedir. Dış ticaret açıkları ile ilgili bu tür gelişmeler ülke cari açığında da benzer sonuçlara yol açabilmekte ve açıkların şiddetine bağlı olarak döviz krizleri gibi olumsuzluklar yaratabilmektedir. Goldberg ve Knetter (1997) döviz kuru dalgalanmalarının uluslararası piyasalarda belirsizliğe yol açtığını ve bu durumun ticarete caydırıcı etki yaratarak döviz kuru riskine karşı korunma maliyetlerini yükseltebileceğini ifade etmişlerdir. Bahmani-Oskooee ve Hegerty (2007) ise döviz kuru hareketlerinin yalnızca ticaret hacmini değil, aynı zamanda ticareti yapılan mal çeşitlerini de etkilediğini bunun nedeninin daha düşük kâr marjına sahip sektörlerin döviz dalgalanmalarına karşı daha hassas olmasından kaynaklandığını belirtmişlerdir. Döviz kurunun uzun dönem dengesinden sapması olarak tanımlanan *yanlış hizalanma* para biriminin değerine bağlı olarak uygulanan politikalara rehberlik etmesi dolayısıyla önem arz etmektedir. Çünkü bir ülkenin döviz kuru düzeyi dış ticarete rekabetin temel etkenlerinden biridir (Özdemir ve Bilgen, 2021: 543-559).

DYY'nin dış ticaretle ilişkisi ise erken dönem ve son dönem çalışmalarına göre farklı biçimde ele alınmıştır. Erken dönem çalışmalarda ticaret engellerinin varlığı durumunda DYY'nin dış ticaretin önüne geçerek ticaret üzerinde olumsuz etkilere yol açabileceği gibi bir kabul söz konusu iken son dönem çalışmalarda DYY'nin dış ticaret üzerine etkisinin DYY türüne bağlı olduğu ifade edilmektedir (Anwar ve Nguyen, 2011: 39-52). Bununla birlikte Aizenman ve Noy (2006) DYY ile dış ticaret arasındaki ilişkinin DYY'nin yatay veya dikey olmasına göre farklı sonuçlar doğuracağını ifade etmiştir. Buna göre *yatay DYY* olarak adlandırılan ve üreticilerin ticaret politikaları, mesafe, ulaşım maliyeti gibi ticaret engellerini aşmak için yaptıkları yatırımlar ticaret yaratmak yerine ticaretin yerini almaktadır. Öte yandan maliyet farkları, üretim sürecini emek yoğun ve sermaye yoğun aşamalara göre parçalara ayırmak vb. nedenlerle gerçekleştirilen ve *dikey DYY* olarak ifade edilen DYY'ler bizzat ticaret yaratma eğilimindedir.

Dış ticareti etkilediği düşünülen bir diğer ekonomik gösterge olan ekonomik büyüme bir ülkenin üretim kapasitesini artırması dolayısıyla ihracat artışlarına yol açabilmektedir. Ekonomiler büyüdükçe endüstriler daha üretken ve rekabetçi hale gelmekte bu da ihracat artışları biçiminde kendini gösterebilmektedir. Helpman ve Krugman'a (1985) göre büyüyen ekonomiler daha karmaşık ve katma değeri yüksek ürünler ihraç etmeye başlamaktadırlar. Benzer şekilde Frankel ve Rose (2002) de ekonomik büyümenin hem ticaret hacmini hem de ticaretin karmaşıklığını artırdığını, zenginleşen ülkelerin daha fazla mal ithal edebildiğini ve ihracat yeteneklerini genişlettiğini dile getirmişlerdir. Bunun yanı sıra dış ticaret de ekonomik büyüme üzerinde etkili olabilmektedir. Bu etki ihracat dolayısıyla elde edilen dövizin ekonomik büyümeye kaynaklık eden girdiler ile teknoloji ithalatını finanse etmesi dolayısıyla gerçekleşmektedir. Ayrıca ithalat dolayısıyla elde edilen rekabet üstünlüğü verimliliği artırarak ölçek ekonomilerine yol açmakta bu da ekonomik büyümeyi hızlandırmaktadır (Yılmaz, 2022: 21-32).

Daha önce sözü edilen diğer göstergeler gibi enflasyon da dış ticarete çeşitli şekillerde etki edebilmektedir. Bu etki ağırlıklı olarak bir ülkenin ürün ve hizmetlerinin küresel pazardaki rekabetçiliğini değiştirmesi biçiminde ortaya çıkmaktadır. Bir ülke yüksek enflasyon yaşadığında ihracat fiyatları genellikle artar, bu da onları düşük enflasyon oranlarına sahip ülkelerin ürünlerine kıyasla daha az çekici hale getirir (Cote, 1994: 109-123). Bu durum, ihracat hacminde bir düşüşe yol açarak ticaret dengesini olumsuz etkileyebilir. Öte yandan, enflasyon, yabancı tedarikçilerin fiyatları enflasyonist ortama göre ayarlama yoluna gidebileceğinden ithalat maliyetlerini artırabilir, bu da yerli tüketicilerin alım gücünü zorlayarak toplam ithalat talebini azaltabilir (Dornbusch ve Fischer, 1990: 960-971). Enflasyon dış ticareti etkilediği gibi dış ticaret de bir ülkede enflasyona etkide bulunabilmektedir. Nitekim uluslararası uzmanlaşma ve ölçek ekonomilerinin maliyetleri düşürücü etkisi dolayısıyla dış ticaret enflasyonda düşüşlere yol açabilmektedir (Güneş ve Konur, 2013: 7-20).

1980'li yıllar dünyanın birçok ülkesinde olduğu gibi Türkiye'de de ekonomi politikalarında köklü değişikliklere gidildiği bir döneme denk gelmektedir. Bu bağlamda finansal serbestleşme hızlanmış ve dış ticaret önündeki engeller adım adım kaldırılmaya başlanmıştır. Yabancı yatırımların teşvik edilmesi, döviz kurlarıyla ilgili daha esnek politikaların izlenmesi, enflasyonla mücadele programları ve ekonomik dalgalanmalar bu dönemin temel karakteristiğini oluşturmaktadır.

Bu çalışmanın temel motivasyonu yukarıda sözü edilen etkilerinden dolayı dış ticaretin belirleyicilerine gerek Türkiye özelinde gerekse küresel anlamda yaşanan iktisadi krizler gibi farklı boyutları da dahil ederek analiz yapma ihtiyacıdır. Bu bağlamda çalışmada 1980-2022 dönemi için Türkiye'de dış ticaretin belirleyicilerinin ARDL sınır testi yöntemiyle araştırılması amaçlanmaktadır. Çalışma analizde kullanılan değişkenlere ait serilerin aynı dönem sayısında uyumlaştırılması kaygısı ve bu nedenle daha uzun bir dönem için yapılamaması; öte yandan çalışmaya dahil edilmesi düşünülen örneğin teknoloji, ar-ge gibi etkenlerin yine yeterince veri olmaması nedeniyle analizde yer almaması dolayısıyla kısıtlar içermektedir. Çalışmanın ana gövdesi giriş bölümünün ardından ampirik literatür; sonrasında veri seti, model ve yöntem, hemen ardından bulgular ve son olarak sonuç ve değerlendirme bölümlerinden oluşmaktadır. Yapılan bu çalışmanın literatüre veri seti, model ve yöntem kısmında ayrıntılarıyla açıklanan dünya GSYH'sinin ve dünya ticaret hacminin analize dahil edilmiş olması dolayısıyla katkı vermesi beklenmektedir.

Literatür

Dış ticaretin belirleyicileriyle ilgili literatüre bakıldığında ampirik çalışmaların ağırlıklı olarak panel analizlere nispeten tek ülke özelinde yapıldığı söylenebilir. Söz konusu çalışmalardan Yurtkur ve Bayramoğlu (2012) ile Wahab ve Kaplan'ın (2017) çalışmaları panel analizleri içerirken; zaman serisi analizlerini esas alan çalışmalar arasında Afzal ve Haider (2011), Altıntaş ve Türker (2014), Erdey ve Pöstényi (2017) ile Cizakca'nın (2024) çalışmaları sayılabilir. Bununla birlikte bazı çalışmalarda dış ticaretin belirleyicileri belli bir sektörle ilgili olarak analiz edilmiştir (Ozun ve Turk, 2010; Gachena vd., 2020; Sertoğlu ve Doğan, 2016). Bu çalışmanın, dış ticarete belirleyici faktörler araştırılırken Türkiye özelinde yapılan diğer çalışmalardan farklı olarak dünya GSYH'sinin ve dünya ticaret hacminin etkilerini göz önünde bulundurması ve yapılan analizde bu faktörlere birer değişken olarak yer vermesi dolayısıyla literatürdeki bir boşluğu dolduracağı düşünülmektedir. Aşağıda, bazı ampirik çalışmalara öncelikle panel verilerden hareketle sonrasında zaman serisi bağlamında yapılan çalışmalar Türkiye ve Türkiye dışındaki ülkeler bakımından, kronolojik olarak en eskiden en güncel doğru olacak şekilde yer verilmiştir.

Birden çok ülke için yapılan çalışmalardan, Yurtkur ve Bayramoğlu (2012) panel regresyon analizi ile 1994-2009 döneminde gelişmekte olan piyasa ekonomileri için yaptıkları çalışmada reel döviz kuru, yurt içi gelir, enflasyon oranı ve ithalatın ihracat açısından önemli değişkenler olduğunu bulgulamışlardır.

Wahab ve Kaplan (2017) 15 Afrika ülkesinin BRICS ülkelerine ek olarak Türkiye, Meksika ve Filipinler'le yaptığı ticaretin belirleyicilerini geleneksel Çekim Modeli ile 2001-2015 dönemi için analiz etmişlerdir. Analiz sonuçları çekim modelinin temel unsurları olan GSYH ve mesafenin ikili ticareti açıklamada anlamlı olduğunu göstermektedir. Bununla birlikte çalışmanın bulgularında mineral üretiminin petrol üretimine göre ikili ticarete daha etkili olduğu belirtilmiştir. Ayrıca ortak din ve ortak dilin dış ticareti olumlu etkilediği buna karşın kalkınma yardımı büyülüğü, ekonomik özgürlük ve toplam ticaret hacmi bakımından anlamlı ilişkilerin bulunmadığı çalışmadan çıkan diğer sonuçlardır. Çalışmadan çıkan ilginç bir sonuç ise yolsuzluğun daha yoğun olduğu ülkelerin daha az yolsuzluğun olduğu ekonomilere göre analize konu olan ülkelerle daha yüksek ticaret hacmine sahip olmalarıdır.

Zaman serisi analizleri temelinde Türkiye için yapılan çalışmalara bakıldığında gerek nicelik gerekse çeşitlilik bakımından zengin bir literatürün olduğu söylenebilir. Bu çalışmalardan Ozun ve Turk (2010) çok değişkenli GARCH modeli ile Türkiye'nin 01/1990-12/2007 dönemi için tarım sektörünün ihracatında ve ithalatındaki temel belirleyicileri araştırmışlardır. Çalışmanın sonuçları tarım sektörü dış

ticaret hacminin tarımsal üretim, tüketici fiyat endeksi, firmaların piyasa değerlemesi ve uluslararası tarım fiyatlarıyla ilişkili olduğunu göstermektedir.

Altıntaş ve Türker (2014) 1987-2011 dönemi için, eşbütünleşme ve Granger nedensellik testleriyle Türkiye’de dış ticaretin belirleyicilerini araştırmışlardır. Çalışmanın sonuçları ihracat bakımından kısa dönemde yabancı gelir, reel döviz kuru ve ihraç fiyatından ihracata doğru tek yönlü bir ilişkinin varlığını uzun dönemde ise yabancı gelir, DYY, reel döviz kuru ve ihraç fiyatının ihracatı etkilediğini göstermektedir. İthalat için ise çalışma uzun dönemde reel GSYH, DYY ve reel döviz kurunun ithalatı etkilediğini bunun yanı sıra kısa dönemde DYY, reel döviz kuru ve ithalat fiyatından ithalata doğru tek yönlü bir nedensellik ilişkisinin var olduğu sonucuna ulaşmıştır.

Sertoğlu ve Doğan (2016) Türkiye’nin tarımsal ticaret dengesinin belirleyicilerini 1994Q1-2012Q3 dönemi için ARDL yöntemi ile analiz etmişlerdir. Analiz sonucunda reel döviz kuru, reel GSYH ve tarımsal üretici fiyatlarının anlamlı birer belirleyici olduğunu bulgulamışlardır. Yine çalışmanın sonuçlarına göre bu belirleyiciler tarımsal ticaret dengesi ile negatif yönlü bir ilişki içindedir.

Mete ve Bozgeyik (2017) Türkiye’nin 1994-2016 dönemi için eşbütünleşme, VAR analizi ve Granger nedensellik testi yöntemleriyle yapmış oldukları çalışmada dış ticaret dengesinin DYY, yabancı gelir ve reel döviz kuru ile pozitif; yurt içi tüketim ve reel faiz oranı ile negatif ilişki içinde olduğu sonucunu elde etmişlerdir.

Taşseven vd. (2019) 1998-2018 dönemi için ARDL yöntemiyle yaptıkları çalışmada reel kurdaki ve petrol fiyatlarındaki artışın Türkiye’nin dış ticaret açığını anlamlı bir biçimde azalttığını bulgulamışlardır. Çalışmanın diğer bir sonucuna göre gerek yurt içi gelirden gerekse yurt dışı gelirden artışlar uzun dönemde ticaret dengesini iyileştirmektedir.

Cizakca (2024) çalışmasında regresyon ve eşbütünleşme tekniklerini kullanmış ve 1990-2022 döneminde mevduat faiz oranı, reel faiz oranı ve reel döviz kurunun Türkiye’nin dış ticaret hacmi ile negatif yönlü bir ilişki içinde olduğunu ortaya koymuştur. Çalışmadan çıkan diğer bir temel sonuç ise DYY ile dış ticaret hacmi arasında pozitif yönlü bir ilişkinin varlığıdır.

Türkiye dışındaki ülkeler için tek ülke özelinde yapılan çalışmalara bakıldığında ise söz konusu çalışmaların ağırlıklı olarak az gelişmiş ve gelişmekte olan ülkeler için yapıldığı görülmektedir. Bu çalışmalardan Afzal ve Haider (2011) Pakistan’ın geleneksel ticaret ortakları ve bazı Asya ülkeleri ile 1973-2008 döneminde yaptığı ticareti en küçük kareler yöntemi ile analiz ettiği çalışmada gelir ve döviz kurunun dış ticaretin en önemli belirleyiciler olduğu sonucuna ulaşmıştır.

Urrutia vd. (2014) nin Filipinler için 1990-2013 dönemini kapsayan ve SARIMA (Seasonal Autoregressive Integrated Moving Average) yöntemiyle yaptıkları çalışmada ithalat ve ihracatın belirleyicileri ayrı ayrı analiz edilmiştir. Çalışmanın sonuçları ithalatın belirleyicilerinin döviz kuru, aylık yurt içi ham petrol fiyatları, enflasyon oranı ve faiz oranı iken; ihracatın temel belirleyicilerinin ise döviz kuru, aylık yurt içi ham petrol fiyatları ve enflasyon oranı olduğunu göstermektedir.

Islam (2016) Bangladeş ekonomisi için 1981-2013 yıllarını en küçük kareler yöntemiyle analiz ettiği çalışmada dış ticaretin temel belirleyicisinin GSYH olduğunu bunun yanı sıra döviz kuru ve enflasyon oranının da önemli birer belirleyici olduğu bulgusuna ulaşmıştır.

Erdey ve Pöstényi (2017) genişletilmiş bir çekim modeli çerçevesinde faktör donatımlarının dış ticaret üzerine etkilerini araştırdıkları çalışmayı 1993-2014 dönemini içerecek şekilde en küçük kareler tekniğini kullanarak Macaristan için yapmışlardır. Çalışmanın sonuçlarına göre ekonomik büyüklük, ortak sınırların varlığı ve serbest ticaret anlaşmaları ihracat üzerinde anlamlı ve olumlu bir etkiye sahipken mesafe ile ihracat arasında negatif yönlü bir ilişki söz konusudur.

Bista ve Adhikari (2021) Nepal’in 2010-2019 döneminde 21 ticaret ortağı ile yaptığı ticaret çerçevesinde dış ticaretin belirleyicilerini araştırmışlardır. Regresyon modelleri ile yapılan tahminler Nepal

GSYH'sindeki artışın Nepal'in gerek ihracatını gerekse ithalatını artırdığını, öte yandan ticaret ortaklarının GSYH'sindeki artışın da Nepal ihracatındaki artışlara kaynak teşkil ettiğini göstermiştir. Çalışmadan çıkan bir diğer sonuç ticaret ortakları ile Nepal arasındaki mesafenin Nepal'in hem ihracatına hem de ithalatına olumsuz etkide bulunduğuudur. Çalışma ayrıca reel döviz kurunun ihracatın yanı sıra ithalatı da olumlu etkilediğini, ticaret ortaklarının özgürlük endeksi ve SAFTA'nın (Güney Asya Serbest Ticaret Anlaşması) da ihracata olumlu yansıdığı sonuçlarına ulaşmıştır.

Ise vd. (2023) en küçük kareler yöntemiyle Nijerya için 1999-2022 dönemini kapsayacak şekilde yaptıkları çalışmada dış ticaretin yeterli altyapı ve döviz kurlarındaki artıştan olumlu, ithalat vergisi, iş yapma maliyeti ve enflasyondaki artışlardan ise olumsuz etkilendiği sonucunu elde etmişlerdir. Öte yandan söz konusu bu değişkenlerin açıklama gücünün orta dereceli olmasından dolayı Nijerya dış ticaretinin ana belirleyicileri olarak değerlendirilemeyeceği çalışmanın yazarlarınca ifade edilmiştir.

Hossain (2023) Bangladeş'in 1979-2020 dönemi kapsamında hazır giyim sektörü ihracatının belirleyicilerini araştırmıştır. ARDL yönteminin esas alındığı çalışma görece fiyatlar, reel döviz kuru, dünya geliri ve istihdamın ihracat ile anlamlı ilişkilere sahip olduğunu ortaya koymuştur.

Veri Seti ve Model

Türkiye dış ticaretinde 1980-2022 dönemi için belirleyici faktörlerin araştırıldığı bu çalışmada yıllık veriler kullanılmış olup değişkenlere ilişkin verilerin kaynağı, verilerin ham hali ve kaynak veri tabanındaki veri kaynağının koduna ilişkin bilgiler Tablo 1'de gösterilmiştir.

Tablo 1: Değişkenler ve Veri Kaynakları

Değişken	Veri Kaynağı	Ham Veri Adı	Veri Kaynağının Kodu
TRADE	OECD	Ticaret Hacmi(%GSYH)	NE.TRD.GNFS.ZS
EXCHANGE (Yıllık % Değişim)	OECD	DEC Alternatif Dönüşüm Faktörü, USD başına TRY değeri	PA.NUS.ATLS
FDI (Yıllık % Değişim)	OECD	Net Doğrudan Yatırımlar (USD Bazında)	BN.KLT.DINV.CD
GDP	OECD	Ekonomik Büyüme (Yıllık % değişim)	NY.GDP.MKTP.KD.ZG
GDPW	OECD	Dünya Ekonomik Büyümesi (Yıllık %)	NY.GDP.MKTP.KD.ZG
INF	OECD	Enflasyon (Tüketici Fiyatlarıyla, Yıllık)	FP.CPI.TOTL.ZG
TRADEW	OECD	Dünya Ticaret Hacmi (%GSYH)	NE.TRD.GNFS.ZS

Tablo 1'de de görüleceği üzere tüm veriler OECD veri tabanından sağlanmıştır. Analize konu olan değişkenlerden TRADE değişkeni çalışmanın bağımlı değişkeni olup Türkiye'nin ticaret hacminin GSYH'ye oranını ifade etmektedir. Bağımsız değişkenlere bakıldığında ise EXCHANGE değişkeni DEC alternatif dönüşüm faktöründen hareketle döviz kurlarındaki yıllık yüzde değişimler hesaplanmak suretiyle analize dahil edilmiştir. FDI değişkeni ise analizin kapsadığı dönem için Türkiye'ye giren doğrudan yabancı yatırımlarla, Türkiye'den çıkan yabancı yatırımlar arasındaki farkı ifade eden net DYY'deki yıllık yüzde değişimler olarak analizde yer almıştır. GDP ve GDPW değişkenleri ise sırasıyla Türkiye GSYH'si ve Dünya'da yaratılan GSYH'nin yıllık yüzde değişimlerini temsil etmektedir. Çalışmada yer alan dünyada yaratılan toplam GSYH değişkeni Hossain (2023)'in çalışmasından hareketle analize dahil edilmiştir. Yine bağımsız değişkenlerden INF değişkeni tüketici fiyatlarıyla yıllık enflasyonu, TRADEW değişkeni ise dünya genelinde yapılan dış ticaretin toplamının dünyada yaratılan toplam GSYH'ye oranını göstermektedir. Bu değişkenlerin yanında ayrıntıları yöntem ve bulgular kısmında bahsedilen, yapısal kırılmalı birim kök testleri sonucunda modele dahil edilmesine karar verilen iki tane kukla değişken kullanılmıştır. Bu değişkenlerden DKRIZ2001 değişkeni Türkiye'de yaşanan Kasım 2000-Şubat 2001 krizlerini, DKRIZ2008 ise 2008 yılında Amerika Birleşik Devletleri'nde başlayıp yayılan küresel finans krizini temsil etmektedir. Sözü edilen bu değişkenlerden hareketle kurulan model (1) nolu denklemde gösterilmiştir.

$$\begin{aligned}
TRADE_t = & \beta_1 + \beta_2 EXCHANGE_t + \beta_3 FDI_t + \beta_4 GDP_t + \beta_5 GDPW_t + \beta_6 INF_t + \beta_7 TRADEW_t \\
& + \gamma_1 DKRIZ2001_t + \gamma_2 DKRIZ2008_t \\
& + \varepsilon_{1t}
\end{aligned} \tag{1}$$

Çalışmada yer alan değişkenlere ait ortalama, ortanca (medyan), maksimum değer, minimum değer ve standart sapmayı içeren tanımlayıcı istatistikler Tablo 2’de verilmiştir.

Tablo 2: Tanımlayıcı İstatistikler

	TRADE	EXCHANGE	FDI	GDP	GDPW	INF	TRAD
Ortalama	44.67	0.40	0.85	4.61	2.95	39.39	48.47
Ortanca	46.69	0.29	0.03	5.04	3.12	34.61	49.44
Maksimum	81.17	1.69	24.49	11.43	6.26	105.21	62.50
Minimum	17.09	-0.08	-0.76	-5.75	-2.93	6.25	34.53
Standart Sapma	12.98	0.38	3.82	4.26	1.57	30.24	9.07

Tablo 2’ye göre 1980-2022 döneminde hem Türkiye için hem de dünya genelinde ticaret hacminin en yüksek seviyeleri GSYH’nin bir yüzdesi olarak sırasıyla 81.17 ve 62.50 değerleriyle 2022 yılında gerçekleşmiştir. Bununla birlikte söz konusu değişkenlerin en düşük seviyeleri Türkiye için 17.09 değeriyle 1980, dünya geneli için ise 34.53 değeriyle 1986 yılına aittir. Bu dönemde ortalama ticaret hacmi yine GSYH’nin yüzdesi biçiminde Türkiye için 44.67 olarak gerçekleşirken dünya geneli için 48.47 olmuştur. Bu veriler ticaret hacmi bakımından Türkiye’nin dünya geneline uyumluluk gösterdiği biçiminde yorumlanabilir. Türkiye için GDP ve dünya geneli için GDPW ile temsil edilen büyüme oranları bakımından ise en yüksek düzeyler 2022 yılında görülmüştür. Nitekim 2022 yılında Türkiye %11.43 oranında büyürken dünya genelinde büyüme %6.26 düzeyinde gerçekleşmiştir. Buna karşın en düşük büyüme oranları bakımından Türkiye dünya genelinden ayrılmış, 2001 yılında ekonomi %5.75 küçülmüş; dünya genelinde ise en düşük büyüme 2020 yılında -%2.93 olarak gerçekleşmiştir. Bu veriler değerlendirilirken 2001 yılının Türkiye açısından bir kriz yılı, 2020 yılının ise dünya genelinde yaşanan Covid-19 pandemisinin yaşandığı bir yıl olduğu göz önünde bulundurulmalıdır. Ekonomik büyüme ile ilgili olarak 1980-2022 döneminde Türkiye ortalama %4.61 büyüme gösterirken, dünya geneli için bu oran %2.95 olmuştur. Döviz kurları yönünden Türkiye’de en yüksek artış 1994 yılında en düşük artış ise 2007 yılında meydana gelmiştir. Nitekim DEC alternatif dönüşüm faktöründeki yüzde değişim en yüksek 1.69, en düşük -0.08 olarak gerçekleşmiştir. DYY’deki yüzde değişim açısından veriler ise dikkat çekici biçimde çalışmanın kapsadığı dönem içerisinde en yüksek seviyesini 24.49 değeri ile 2001 yılında, en düşük seviyesini ise -0.76 değeri ile 1999 yılında görmüştür. Bunun yanında DYY’deki ortalama değişim %0.85 düzeyinde gerçekleşmiştir. Yine 1980-2022 döneminde Türkiye’nin enflasyon oranı en yüksek seviyesi olan %105.21 seviyesine döviz kurlarındaki artışa benzer bir biçimde 1994 yılında ulaşmıştır. En düşük enflasyon ise 2008 küresel krizinin hemen ardından yani 2009 yılında %6.25 olarak gerçekleşmiş, anılan dönemde ortalama enflasyon oranı %39.39 olmuştur.

Analizde yer alan değişkenlere ait grafikler Şekil 1’de yer almaktadır. Buna göre TRADE ve TRADEW değişkenlerinin analizin kapsadığı dönem içerisinde genel olarak sürekli bir yükseliş trendinde olduğu bununla birlikte TRADEW değişkeni için bu artış trendinin yaklaşık 2008 yılı sonrasında inişli çıkışlı bir süreç yaşadığını ve 2020’den sonra yeniden yükselişe geçtiği görülmektedir. EXCHANGE değişkenine bakıldığında ise 1980’li yılların başından itibaren düşmeye başlayan döviz kurlarının 1990’ların ortasına kadar bir istikrar yakaladığı fakat 1990’larda yaşanan iktisadi krizlerle birlikte keskin bir yükselişin olduğu, bu krizlerin ardından genel olarak 2020’lere kadar bazı dönemler hariç olmak üzere nispi bir istikrarın yaşandığı ve 2020’lerden sonra yeniden keskin bir biçimde yükseldiği söylenebilir. FDI değişkeni bakımından ise 2000’li yılların başlangıcındaki birkaç yıllık dönem sayılmazsa genel olarak stabil bir sürecin yaşandığı görülmektedir. GDP ve GDPW değişkenlerinin birbirine benzer şekilde sürekli iniş çıkışlı bir görüntü verdiği yine Şekil 1’den görülecektir. Enflasyonu temsil eden INF değişkeni ise 1980’li yılların başından 1990’lı yılların ortalarına kadar bir artışın, akabinde yaklaşık 2005’e kadar bir azalışın ve 2015’e kadar bir istikrarın varlığını göstermektedir.

Şekil 1: Değişkenlerin 1980-2022 Dönemindeki Seyri



Yöntem

Çalışmada kullanılacak temel yöntemin belirlenebilmesi amacıyla ilk olarak değişkenlerin birim kök içerip içermedikleri gerek standart gerekse yapısal kırılmayı dikkate alan birim kök testleriyle araştırılmıştır. Söz konusu standart birim kök testleri Dickey ve Fuller (1979) tarafından geliştirilen ADF (Augmented Dickey-Fuller), Elliot vd. (1996)'nin ADF testinden hareketle geliştirdiği DF-GLS testi ve Phillips ve Perron (1988)'nin geliştirdiği PP (Phillips-Perron) testleri iken. Bu testlerden ADF testi değişkenin durağanlığını sınamak için birim kökün var olduğunu ifade eden hipotezi test eder ve gecikme terimlerini dikkate alarak güçlü sonuçlar elde eder. Bununla birlikte DF-GLS testi değişkenle ilgili trend etkisini engellemek suretiyle birim kökün varlığını sınar. PP testi ise ADF testine benzemekle birlikte otoregresif hata terimlerinin varlığını dikkate almasından dolayı heterokedastisiteye karşı daha dayanıklıdır. Yapısal kırılmayı dikkate alan birim kök testinde ise Dickey-Fuller testlerinden hareketle tek kırılmanın dikkate alındığı birim kök testi ile durağanlık yapısı araştırılmıştır. Bu birim kök testinde trendin bir kırılma ile durağan olduğu alternatif hipoteze karşı, verilerin olası bir kırılmanın varlığında birim köke sahip olduğu biçimindeki yokluk hipotezi değerlendirilir. Testin değerlendirmesi ise test sonucundaki t-istatistik değerlerinin Vogelsang'ın (1993) kritik değerleriyle karşılaştırılmasıyla yapılır.

Ekonometrik analizlerde gecikme uzunluğunun belirlenmesi rutin uygulamalardan biri olup bu çalışmada da birim kök sınamalarının ardından en uygun gecikme uzunluğu araştırılmıştır. Akabinde değişkenlere ait verilerin normal dağılıma sahip olup olmadığının tespiti için Jarque-Bera normallik testi, otokorelasyon ve değişen varyansın araştırılması için sırasıyla Breusch-Godfrey LM ve Breusch-Pagan-Godfrey testlerine başvurulmuştur. Ampirik çalışmalarda modelin yanlış kurulması sonuçların sapmalı veya tutarsız olmasına neden olabilmektedir. Bu nedenle çalışmada bir model kurma hatasının varlığını test edebilmek adına Ramsey Reset testi yapılmıştır.

Çalışmada başvurulan uygulamalardan önemli bir tanesi de modele ait serilerin istikrarlılığının analizidir. Bu nedenle öncelikle CUSUM, sonrasında daha hassas bir test olan CUSUM of Squares testleri uygulanmıştır.

Çalışmanın ana yöntemi Pesaran vd. (2001) tarafından geliştirilen ve farklı durağanlık seviyelerindeki değişkenlerin analizine olanak tanıyan ARDL sınır testi (Autoregressive Distributed Lag Bound Test) yaklaşımıdır. Pesaran (1997) geleneksel ARDL yaklaşımıyla ilgili olarak birim kök testlerinin gücünün genellikle düşük olması dolayısıyla birim kök- eş bütünleşme ile ilgili konularda sorunlar yarattığını buna karşın analizlerde yer alan değişkenlerin birim kök varlığı için ön testler gerektirmemesi

dolayısıyla ARDL yaklaşımının ek bir avantaj yarattığını vurgulamıştır. ARDL yöntemi çerçevesinde ve analizde yer alan değişkenler bağlamında uzun dönemli ilişki yani eşbütünlük ilişkisi (2) nolu denkleme dayanılarak araştırılmıştır.

$$\begin{aligned} \Delta TRADE_t = & a_1 + \sum_{i=1}^m a_{2i} \Delta TRADE_{t-i} + \sum_{i=0}^n a_{3i} \Delta EXCHANGE_{t-i} + \sum_{i=0}^p a_{4i} \Delta FDI_{t-i} + \sum_{i=0}^q a_{5i} \Delta GDP_{t-i} \\ & + \sum_{i=0}^r a_{6i} \Delta GDPW_{t-i} + \sum_{i=0}^s a_{7i} \Delta INF_{t-i} + \sum_{i=0}^v a_{8i} \Delta TRADEW_{t-i} + \gamma_1 TRADE_{t-1} \\ & + \gamma_2 EXCHANGE_{t-1} + \gamma_3 FDI_{t-1} + \gamma_4 GDP_{t-1} + \gamma_5 GDPW_{t-1} + \gamma_6 INF_{t-1} + \gamma_7 TRADEW_{t-1} \\ & + \mu_1 DKRIZ2001_t + \mu_2 DKRIZ2008_t \\ & + \varepsilon_{2t} \end{aligned} \quad (2)$$

ARDL sınır testi yönteminde eşbütünlük ilişkisinin varlığı durumunda değişkenler arası kısa dönemli ilişkiler araştırılmakta ve kısa dönemde meydana gelen bir sapmanın uzun dönem dengesine ne kadar sürede yakınsayacağı bulunabilmektedir. Bu tür bir araştırma hata düzeltme modeli kurulmak suretiyle mümkün olabilmektedir. Hata düzeltme modeli kurulurken hata teriminin hesaplanmasına ihtiyaç duyulmaktadır. Bu bağlamda hata teriminin hesaplanması için (3) nolu denklem oluşturulmuştur.

$$\begin{aligned} ECT_t = & TRADE_t - \beta_1 - \beta_2 EXCHANGE_t - \beta_3 FDI_t - \beta_4 GDP_t - \beta_5 GDPW_t - \beta_6 INF_t \\ & - \beta_7 TRADEW_t - \Omega_1 DKRIZ2001_t - \Omega_2 DKRIZ2008_t \end{aligned} \quad (3)$$

Hata teriminin hesaplanmasından sonra kurulan hata düzeltme modeline ait (4) nolu denklem aşağıda yer almaktadır.

$$\begin{aligned} \Delta TRADE_t = & \alpha_1 + \sum_{i=1}^m \alpha_{2i} \Delta TRADE_{t-i} + \sum_{i=0}^n \alpha_{3i} \Delta EXCHANGE_{t-i} + \sum_{i=0}^p \alpha_{4i} \Delta FDI_{t-i} + \sum_{i=0}^q \alpha_{5i} \Delta GDP_{t-i} + \sum_{i=0}^r \alpha_{6i} \Delta GDPW_{t-i} + \\ & \sum_{i=0}^s \alpha_{7i} \Delta INF_{t-i} + \sum_{i=0}^v \alpha_{8i} \Delta TRADEW_{t-i} + \pi_1 DKRIZ2001_t + \pi_2 DKRIZ2008_t + \phi ECT_{t-1} + \\ & \varepsilon_{3t} \end{aligned} \quad (4)$$

Bulgular

Yöntem kısmında bahsedilen aşamalar ve kurulan modellerden sonra yapılan uygulamalar sonucunda elde edilen bulgular bu kısımda raporlanmıştır. Bu kapsamda öncelikle yapılan birim kök testleriyle ilgili bulgulara, akabinde uygun gecikme uzunluğunun belirlenmesi, ekonometrik uygunluk testleri ve CUSUM testleri ile ilgili bulgulara yer verilmiş ve sonrasında ARDL yöntemi ile ilgili bulgular yorumlanmıştır.

Tablo 3: Standart Birim Kök Testleri Sonuçları

Değişkenler	ADF		DF-GLS		PP		KARAR
	Düzyey	1.Fark	Düzyey	1.Fark	Düzyey	1.Fark	
TRADE	-2.40	-5.02***	-2.38	-5.40***	-2.59	-4.88***	I(1)
EXCHANGE	-4.23***	-	-3.57**	-	-4.63***	-	I(0)
FDI	-6.83***	-	-6.91***	-	-6.85***	-	I(0)
GDP	-7.00***	-	-6.38***	-	-8.20***	-	I(0)
GDPW	-6.52***	-	-6.51***	-	-7.41***	-	I(0)
INF	-1.46	-5.88***	-1.65	-3.46**	-1.71	-5.88***	I(1)
TRADEW	-2.43	-6.01***	-2.32	-6.21***	-2.47	-5.96***	I(1)

Not: “***” ve “**” sembelleri sırasıyla %1 ve %5 anlamlılık düzeylerini ifade etmektedir. Ayrıca birim kök testleri her üç test için trendli ve sabitli modelde MacKinnon (1996) kritik değerlerinden hareketle değerlendirilmiştir.

Değişkenlerin durağanlıklarının incelendiği standart birim kök testlerine ait sonuçlar Tablo 3’te yer almaktadır. Tablo gerek ADF gerekse DF-GLS ve PP birim kök testi sonuçlarının birbiriyle benzer

olduğunu göstermektedir. Değişkenler özelinde birim kök testleri ele alındığında TRADE ve TRADEW değişkenlerinin her üç test için düzey değerlerinde birim köke sahip olduğu bununla birlikte değişkenlerinin birinci farkları alındığında yine üç test için %1 anlamlılık düzeyinde durağanlaştığı görülecektir. FDI, GDP ve GDPW değişkenleri ise yine üç testin sonucuna göre %1 anlamlılıkta, düzeyde durağan bir yapıdadır. Bir diğer değişken olan EXCHANGE değişkeni ADF ve PP testleri yönünden %1 anlamlılıkta, DF-GLS testi bakımından ise %5 anlamlılıkta düzeyde durağandır. Son olarak INF değişkeni düzeyde birim köke sahip olup birinci farkı alındığında ADF ve PP testlerine göre %1, DF-GLS testine göre ise %5 anlamlılıkta durağan hale gelmektedir.

Tablo 4: Yapısal Kırılmalı Birim Kök Testi Sonuçları

Değişken	Düzye t-İstatistiği	Olasılık Değeri	Kırılma Dönemi	1. Fark		
				t-İstatistiği	Olasılık Değeri	Kırılma Dönemi
TRADE	-4.72	0.152	2015	-6.40	<0.01***	2017
EXCHANGE	-7.28	<0.01***	2001	-	-	-
FDI	-8.86	<0.01***	2000	-	-	-
GDP	-7.72	<0.01***	2009	-	-	-
GDPW	-7.79	<0.01***	2019	-	-	-
INF	-3.89	0.593	2002	-7.33	<0.01***	2022
TRADEW	-4.20	0.391	2004	-7.00	<0.01***	2021

Not: "****" simgesi %1 anlamlılık düzeyini ifade etmekte olup, yapısal kırılmalı birim kök testi Vogelsang (1993) tek taraflı asimptotik kritik değerlerinden hareketle değerlendirilmiştir.

Tek kırılmayı dikkate alan birim kök testi sonuçlarına Tablo 4'te yer verilmiştir. Buna göre değişkenlerden TRADE, INF ve TRADEW değişkenleri birim köke sahip olup 1.farklarında durağan hale gelmekte iken, EXCHANGE, FDI, GDP ve GDPW değişkenleri düzeyde durağan bir yapıdadır. Söz konusu değişkenlerin durağan olduğu seviyedeki yapısal kırılmalara bakıldığında ise TRADE değişkeninde 2017; GDPW, INF ve TRADEW değişkenlerinde ise sırasıyla 2019, 2022 ve 2021 yıllarına ait bir yapısal kırılmanın varlığı görülecektir. Söz konusu kırılmalar Covid-19 pandemisi ve sonrasında dünyada yaşanan gelişmelere bağlanabilir. EXCHANGE, FDI ve GDP değişkenleri ile ilgili yapısal kırılmalar ise sırasıyla 2001, 2000 ve 2009 yıllarına ait olup bu kırılmaların 2000 Kasım-2001 Şubat krizi ve 2008 küresel finans krizi ile ilgili olduğu değerlendirilmektedir. Yapılan birim kök testleri sonucunda TRADE, INF ve TRADEW değişkenlerinin I(1), EXCHANGE, FDI, GDP ve GDPW değişkenlerinin ise I(0) seviyesinde durağan olduğuna karar verilmiştir.

Tablo 5: En Uygun Gecikme Uzunluğunun Belirlenmesi

Gecikme Sayısı	LR	FPE	AIC	SC	HQ
0	NA	11568.26	34.90	35.28	35.03
1	350.19	6.24	27.27	31.07*	28.65
2	90.00	9.43	27.04	34.26	29.65
3	103.76*	0.92*	22.44*	33.08	26.29*

Not: "*" simgesi ilgili bilgi kriterince uygun görülen gecikme uzunluğunu ifade etmektedir.

Yapılan birim kök testlerinin sonuçlarına göre bağımlı değişken olan TRADE değişkeninin I(1) seviyesinde durağan iken bağımsız değişkenlerin I(0) ve I(1) gibi farklı durağanlık seviyelerinde olmaları dolayısıyla ARDL analizinin uygun bir yöntem olduğuna karar verilmiştir. ARDL yönteminin uygulanmasına geçmeden önce en uygun gecikme uzunluğu araştırılmış ve bulguları Tablo 5'te gösterilmiştir. Tabloya göre olabirlik oranı (LR), son kestirim hatası (FPE), Akaike (AIC) ve Hannan-Quinn (HQ) bilgi kriterlerine göre gecikme uzunlukları 3 iken, Schwarz (SC) bilgi kriterine göre 1 olduğundan en uygun gecikme uzunluğu 3 olarak belirlenmiştir.

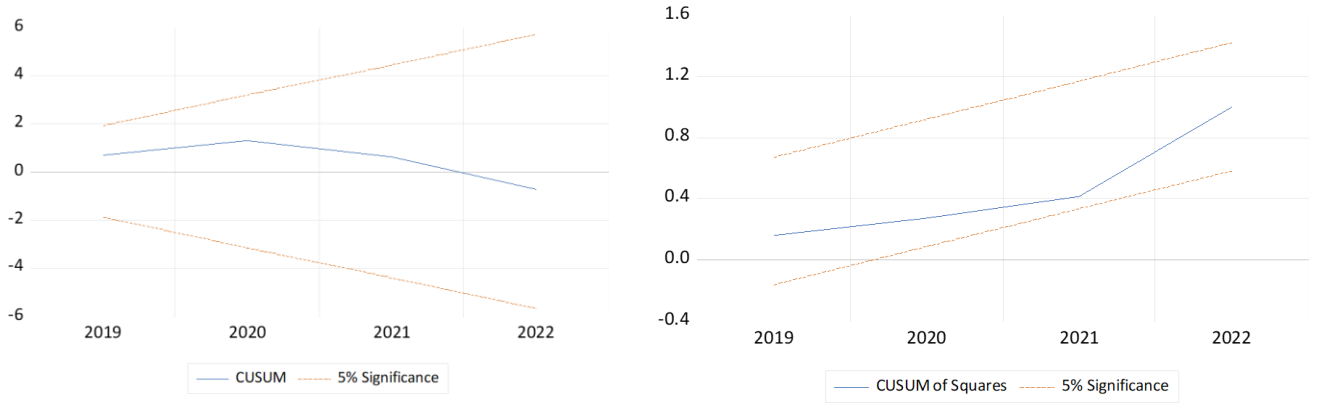
Tablo 6: Ekonometrik Uygunluk Testleri

Test Adı	Test İstatistiği	Olasılık Değeri
Jarque-Bera Normallik Testi	0.44	0.802

Breusch-Godfrey LM Testi (F-İstatistiği)	2.93	0.400
Breusch-Pagan-Godfrey Testi (F-İstatistiği)	0.85	0.661
Ramsey Reset Testi (F-İstatistiği)	4.58	0.179

Gerek değişkenlere ait seriler bakımından gerekse modelin bütünü için yapılan ekonometrik uygunluk testleri Tablo 6'da yer almaktadır. Söz konusu testlerden Jarque-Bera normallik testi 0.44 test istatistiği ve 0.802 olasılık değeri ile hata terimlerinin normal dağıldığını, Breusch-Godfrey testinin F-istatistiği 0.2.93 ve 0.400 olasılık değeri ile değişkenler arasında güçlü bir otokorelasyonun olmadığını göstermektedir. Bu testlerin akabinde yapılan Breusch-Pagan-Godfrey testi ise 0.85 F-istatistik değeri ve 0.661 olasılık değeri ile değişen varyansın var olduğu hipotezi reddetmiştir. Buna göre hata terimleri arasında değişen varyans sorunu bulunmamaktadır. Çalışma kapsamında yapılan ekonometrik uygunluk testlerinden sonucunu olan Ramsey Reset testi ek terim sayısı 2 olmak kaydıyla hesaplanan 4.58 F-istatistiği ve 0.179 olasılık değeri ile model kurma hatası olmadığını göstermektedir.

Şekil 2: Cusum ve Cusum SQ Testleri



Çalışmada parametre veya varyans istikrarsızlığının olup olmadığını ölçmek için yapılan CUSUM ve CUSUM Square testlerinin sonuçlarına Şekil 2'de yer verilmiştir. Parametre veya varyans istikrarının varlığından söz edebilmek için CUSUM testinde yinelemeli kalıntıların kümülatif toplamının, CUSUM Square testinde ise kümülatif kare toplamının iki çizgi arasında kalması gerekmektedir. Nitekim Şekil 2'de hem CUSUM hem de CUSUM Square testi için kümülatif toplamın iki çizgi arasında kaldığı görülmektedir. Bununla birlikte parametre veya varyansların istikrarlı olduğu %5 anlamlılıkta bulunmuştur.

Tablo 7: ARDL Sınır Testi Analiz Sonuçları

F İstatistiği	K	Alt Sınır I(0)	Üst Sınır I(1)
4.85	8	2.62	3.77

Not: K bağımsız değişken sayısını göstermekte olup sonuçlar %1 anlamlılık düzeyine göre değerlendirilmiştir.

Çalışmanın ana yöntemi olan ARDL kapsamında değişkenler arasında eşbütünlüğün varlığını sınanan ARDL sınır testi analiz sonuçları Tablo 7'de yer almaktadır. Tablodan da görüleceği üzere F istatistik değeri olan 4.85; alt sınır (2.62) ve üst sınır (3.77) değerlerinin üzerinde olduğundan değişkenler arasında %1 anlamlılık düzeyinde bir eşbütünlüğün varlığına işaret etmektedir.

Eşbütünlüğün varlığına dair bulgular ARDL modeli bağlamında uzun dönem ve kısa dönem katsayılarının tahminine olanak sağlamıştır. Bu nedenle yapılan uzun dönem etkilerinin analiz sonuçlarına Tablo 8'de, hata düzeltme modeliyle yapılan kısa dönemli ilişkilerin analiz sonuçlarına ise Tablo 9'da yer verilmiştir.

Tablo 8: ARDL Model Uzun Dönem Etkileri Analiz Sonuçları

Değişken	Katsayı	t-İstatistiği	Olasılık Değeri
EXCHANGE	95.46	1.73	0.158
FDI	-1.83	-0.38	0.721
GDP	-1.36	-0.81	0.465
GDPW	3.72	0.86	0.440
INF	-0.96	-1.73	0.158
TRADEW	1.10	4.09**	0.015
DKRIZ2001	3.67	0.07	0.949
DKRIZ2008	-9.29	-0.70	0.522
C	-10.88	-0.67	0.539

Not: “***” simgesi %5 anlamlılık düzeyini ifade etmektedir.

Tablo 8’e göre bağımsız değişkenlerden TRADEW ile bağımlı değişken TRADE değişkeni arasında uzun dönemli ilişki söz konusu olup bu ilişkinin anlamlılık düzeyi %5’tir. Ayrıca 2001 ve 2009 krizlerini temsil eden kukla değişkenler DKRIZ2001 ve DKRIZ2008’in de TRADE değişkeni ile uzun dönemli anlamlı bir ilişkiye sahip olmadığı bulgulanmıştır. Katsayıların işareti bağlamında TRADEW değişkenindeki artışın (azalışın) TRADE değişkeninin de aynı yönlü olacak şekilde artışa (azalışa) yol açacağı sonucu elde edilmiştir. Türkiye’nin dış ticaret hacmindeki gelişimin dünya ticaret hacmindeki gelişime uyumlu bir seyir izlemesi 1980 sonrası süreçte ekonomi politikasındaki köklü değişiklikler doğrultusunda atılan finansal serbestleşme adımlarının doğal bir sonucu olarak yorumlanabilir. Bununla birlikte anılan dönemde meydana gelen politik olaylar, döviz kuru, faiz ve enflasyonla ilgili konularda hükümetlerce zaman zaman farklı programların uygulanması bu değişkenlerin ticaret hacmi ile uzun dönemli ilişkilerin önünde engel teşkil etmiş olabilir. DYY’ler bakımından ise uzun dönemli analiz sonuçları dünya konjonktüründeki değişim dolayısıyla ucuz işgücü, vergi avantajları vb. konularda alternatiflerin artışı dolayısıyla firmaların yatırım tercihleriyle ilişkilendirilebilir. Ticaret hacminin ekonomik büyüme ile uzun dönemli ilişkisinin olmaması ise birden çok nedene bağlanabilir. Bu nedenler temel olarak iktisadi açıdan doygunluk, iç pazarın göreceli dinamiği, ticaret alanındaki yapısal faktörler, dış ticaret açıkları ve borçluluğun yüksek olması biçiminde sıralanabilir. İktisadi doygunluk bağlamında bir ülkede belli bir ekonomik büyüme seviyesine ulaşıldıktan sonra ticaretin ekonomik büyüme üzerindeki etkisi azalabilir. Çalışmanın kapsadığı dönemde Türkiye’nin ortalama büyüme oranı dünya genelindeki ortalama büyüme oranından fazla gerçekleşmiştir. İç pazarın dinamikleri açısından ise 1980 öncesinde uygulanan ithal ikameci politikaların etkisinin bir anda sönümlenmemiş olması etkili olmuş olabilir. Yapısal faktörler bağlamında ticarete konu olan malların katma değeri düşük mallar olmasının, yüksek ticaret hacmine karşın büyüme üzerinde uzun dönemli bir etkide bulunamamasının nedenlerinden biri olarak görülebilir. Öte yandan 1980-2022 döneminde dış ticaret açıklarındaki artış ve ticaretin borçlanma yoluyla finansmanı ticaret hacmindeki artışla birlikte GSYH’ye katkı sağlayamamıştır.

Tablo 9: Kısa Dönemli (Hata Düzeltme Modeli) Analiz Sonuçları

Değişken	Katsayı	t-İstatistiği	Olasılık Değeri
D(TRADE (-1))	-0.12	-1.38	0.240
D(TRADE (-2))	0.02	0.19	0.860
D(EXCHANGE)	13.04	5.55***	0.005
D(EXCHANGE (-1))	-24.52	-7.96***	0.001
D(EXCHANGE (-2))	-15.90	-8.74***	0.001
D(FDI)	0.52	2.53*	0.065
D(FDI (-1))	1.38	4.34**	0.012
D(FDI (-2))	0.47	2.25*	0.087
D(GDP)	0.36	4.11**	0.015
D(GDP (-1))	0.88	5.74***	0.005
D(GDP (-2))	0.21	1.64	0.176

D(GDPW)	-0.33	-1.61	0.182
D(GDPW (-1))	-2.66	-6.91***	0.002
D(GDPW (-2))	-1.92	-5.77***	0.005
D(INF)	0.00	0.02	0.982
D(INF (-1))	0.39	7.10***	0.002
D(INF (-2))	0.23	7.47***	0.002
D(TRADEW)	1.47	7.78***	0.002
D(TRADEW (-1))	1.21	4.44**	0.011
D(TRADEW (-2))	0.49	2.27*	0.085
D(DKRIZ2001)	-3.51	-1.75	0.156
D(DKRIZ2001(-1))	-15.59	-3.01**	0.040
D(DKRIZ2001(-2))	-8.72	-1.65	0.175
D(DKRIZ2008)	2.07	1.48	0.213
D(DKRIZ2008(-1))	6.73	4.22**	0.014
D(DKRIZ2008(-2))	1.57	0.72	0.509
ECM(-1)	-0.50	-12.56***	0.000

Not: “***”, “**” ve “*” simgeleri sırasıyla %1, %5 ve %10 anlamlılık düzeylerini ifade etmektedir.

Tablo 9’da değişkenler arasındaki kısa dönemli ilişkilerin analizi için kurulan hata düzeltme modeli katsayısını ifade eden ECM’nin katsayı değeri -0.50 ve olasılık değeri ise 0.000’dır. Bu da hata düzeltme modelinin %1 anlamlılıkta çalışır olduğunu göstermektedir. Yine bu katsayıdan (-0.50) hareketle kısa dönemde meydana gelen istikrarsızlıkların uzun dönem dengesine ($1/|-0.50| = 2$) 2 yılda yakınsayacağı söylenebilir. Kısa dönemli analiz için tüm değişkenler bağlamında çeşitli gecikme düzeylerinde ağırlıklı olarak %1 anlamlılıkta olmak üzere %1 ve %5 anlamlılık düzeylerinde ilişkilerin varlığı elde edilen bir diğer bulgudur. Öte yandan Kasım 2000-Şubat 2001 krizi ile 2008 küresel finans krizinin de kısa dönemde dış ticareti etkilediği yine Tablo 9’dan görülecektir. Kısa dönemli analiz sonuçlarına göre dış ticaretin döviz kurları ile yüksek derecede anlamlı ilişkilere sahip olması, dış ticaret işlemlerinin bizatihi yabancı paralarla yapılması dolayısıyla hem teori hem de pratikle uyumluluğu göstermesi bakımından önemlidir. Ayrıca dış ticaret hacminin DYY ile kısa dönemde anlamlı ama zayıf ilişkilere sahip olması yatırımların uzun vadeli stratejilere bağlı olması ve beklentilerin etkisinden kaynaklanmış olabilir. Ekonomilerin geneli için olduğu gibi Türkiye için de üretim düzeyini ve tüketim kapasitesini doğrudan etkilemesi bakımından dış ticaretin ekonomik büyüme ile kısa dönemli ilişkisine dair bulgular beklentilerle uyumludur. Bunlara ek olarak Türkiye’nin 1980-2022 döneminde dış ticaret ile enflasyon arasındaki kısa dönemli anlamlı ilişkileri döviz kurlarının ve ithalat maliyetlerinin enflasyonu etkilediğine dair kabulü destekler niteliktedir. Son olarak Türkiye dış ticareti ile dünya ticareti arasındaki kısa dönemli anlamlı ilişkiler küresel ekonomiye önemli ölçüde eklemlenmiş bir ülke olduğundan hareketle oldukça olağandır.

Sonuç ve Değerlendirme

Dış ticaret ülkelerin çeşitli makroekonomik göstergeleri ile etkileşim içinde olan uluslararası ekonomik bir işlemdir. Bir ülkenin dış ticaret hacmi ülkenin büyüklüğüne, gelişmişlik düzeyine, dünya konjonktürüne, dış dünyayla eklemlenme boyutu gibi unsurlara bağlı olabilmektedir. Bunun yanı sıra döviz kurları, enflasyon vb. ekonomik göstergeler de ülke dış ticaretini etkileyebilmektedir.

Bu çalışmada Türkiye’nin dış ticaretinde, hangi ekonomik faktörlerin ne ölçüde belirleyici olduğunun ampirik olarak araştırılması amaçlanmıştır. Çalışmanın kapsadığı dönem 1980-2022 olup, analiz değişkenlere ait yıllık verilerle gerçekleştirilmiştir. Çalışmada ilk olarak bağımlı değişken olan ticaret hacminin GSYH’ye oranı ile bağımsız değişkenler olan döviz kurları, net DYY, ekonomik büyüme, dünyanın tümü için ekonomik büyüme, enflasyon oranı ve dünyanın tümü için ticaret hacminin GSYH’ye oranı ADF, DF-GLS ve PP gibi standart testlerin yanı sıra yapısal kırılmayı dikkate alan birim kök testlerine tabi tutulmuştur. Yapısal kırılmayı dikkate alan birim kök testleri Kasım 2000-Şubat 2001 Türkiye ve 2008 yılında meydana gelen küresel finans krizinin birer yapısal kırılmaya işaret ettiğini

göstermiştir. Birim kök testleri sonucunda bağımlı değişkenin birim kök içermesi, buna karşın bağımsız değişkenlerin bazılarının seviyede durağan bazılarının birim köke sahip olması nedeniyle temel analiz yöntemi olarak ARDL modeli esas alınmıştır. Yapılan analiz sonucunda değişkenler arasında eşbütünleşme ilişkisinin varlığı yapılan sınır testi ile kanıtlanmıştır. Analiz uzun dönemde değişkenlerden sadece dünya ticaretinin Türkiye'nin ticaretinde etkili olduğunu ve dünya ticaretinin, Türkiye'nin dış ticaretiyle aynı yönlü ilişkide bulunduğunu göstermektedir. Öte yandan döviz kurları, enflasyon, DYY, ekonomik büyüme ve dünya ekonomik büyümesinin Türkiye'nin dış ticaretiyle uzun dönemde anlamlı ilişkileri söz konusu değildir. Bu sonuçlar uzun dönemde döviz kuruyula ilgili sonuçlar bağlamında Altıntaş ve Türker'in (2014), Urritia vd. (2014)'ün çalışmalarıyla farklılık göstermektedir. Enflasyonla ilgili sonuçlar bağlamında ise sonuçlar yine Urritia vd. (2014)'nin çalışmasından farklılık göstermiştir.

Analizin kısa dönemle ilgili sonuçlarına bakıldığında ise döviz kurları, DYY Türkiye'nin ekonomik büyümesi, dünyanın ekonomik büyümesi, enflasyon ve dünya ticaretinin çeşitli gecikme düzeylerinde olmak kaydıyla Türkiye dış ticaretiyle anlamlı ilişkilere sahip olduğu kanıtlanmıştır. Kısa dönemli analiz sonuçları da literatürde yer alan birçok çalışma ile benzer sonuçlar ortaya koymuştur (Altıntaş ve Türker, 2014; İse vd., 2023; İslam, 2016).

Çalışmada analize dahil edilen kukla değişkenler bağlamında, yaşanan ekonomik krizlerin 1980-2022 dönemi için uzun dönemde Türkiye dış ticaretinde etkili olmadığını buna karşın kısa dönemde krizlerin Türkiye dış ticaretinde etkili olduğunu ortaya koymuştur. Bu durum krizlerin piyasa ekonomileri bakımından bir iş çevrimi olarak gerçekleşmesine bağlanabilir.

Bu çalışma Türkiye dış ticaretinin temel belirleyicilerini analizde dünya GSYH büyümesini ve dünya ticaret hacmini dikkate alarak ve uzun dönem için dünya ticaret hacmi ile kısa dönemde ise hem dünya GSYH büyümesi hem de dünya ticaret hacmi ile anlamlı ilişkilerin varlığını kanıtlamıştır. Bu nedenle gelecekte konu ile ilgili olarak yapılacak ampirik çalışmaların bu iki faktörü de dikkate alması önerilmektedir. Buna ek olarak Türkiye gibi ülkeler için yapılan analizlerin yapısal kırılmaları dikkate alınarak yapılması kısa dönemli ve uzun dönemli politika geliştirmede karar vericilere yol gösterici olabilir. Ayrıca uzun dönemli analiz sonuçlarında da görüldüğü üzere Türkiye dış ticareti, dünya ticaretinden etkilenmekte olduğu için bazı politikaların üzerinde özellikle durulmalıdır. Söz konusu politikalar bağlamında ilk olarak ticaret politikası esnek hale getirilerek küresel ticaret trendlerinden kaynaklı dış şoklara karşı daha hızlı yanıt verecek stratejiler geliştirilmelidir. Bu stratejilerle ilgili olarak ihracat teşvikleri, finansal destekler ve uygun kredi sağlama gibi araçlardan yararlanılabilir. İkinci bir politika Pazar ve ürün çeşitlendirmesi suretiyle dış talepteki ani düşüşlerin etkisi ortadan kaldırılamasa bile hafifletilebilir. Bir diğer politika yerel üretimi ve teknoloji desteklemek suretiyle küresel ticarete meydana gelen olumsuzluklardan korunulabilir. Bunun yanı sıra küçük ve orta büyüklükteki işletmeler (KOBİ) yeterli düzeyde desteklenmek suretiyle hem pazar çeşitliliği artırılabilir hem de dış pazarlarda daha hızlı hareket edilerek dış ticaret hacmindeki artış ihracat kanalıyla sağlanabilir.

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Social Perception and Intention to Use Service Robots: An Evaluation Based on Accommodation Businesses in Çanakkale

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ABSTRACT

This study examines the intention to use service robots in accommodation businesses in Çanakkale, with a focus on employees' social perception and the perceived value of robots as key determinants of usage intention. Survey results show that while the advantages of service robots (such as speed, accuracy, and cost savings) create a positive perception among employees, they do not directly influence the intention to use them. Social perception, particularly the capacity of robots to engage in social interaction with humans, plays a crucial role in the acceptance of this technology. Although participants believe that robots cannot fully replace human interaction, they recognize the potential of robots to accelerate business processes and enhance work safety. The study emphasizes that enhancing robots' social perception through anthropomorphic features (human-like appearance, voice, and movements) can increase users' trust and acceptance. However, as described by the concept of the "uncanny valley," when robots resemble humans too closely, this similarity may provoke negative feelings among some users. The study highlights that technological innovations have a significant impact on the social adaptation process, suggesting that businesses should carefully consider this during the technology integration process. The research was conducted under the ethics committee approval of Çanakkale Onsekiz Mart University, dated 28/12/2023 and numbered 16/7, Data for the research were collected through face-to-face interviews.

Keywords: Service Robots, Social Perception, Tourism Industry, Accommodation Businesses, Technological Adaptation

Toplumsal Algı ve Hizmet Robotlarını Kullanma Niyeti: Çanakkale Konaklama İşletmeleri Üzerine Bir Değerlendirme

ÖZ

Çanakkale'deki konaklama işletmelerinde hizmet robotlarının kullanım niyetini inceleyen bu çalışmada, çalışanların sosyal algısı ve robotların algılanan değeri kullanım niyetinin temel belirleyicisi olarak öne çıkmaktadır. Anket sonuçlarına göre, hizmet robotlarının avantajları (hız, doğruluk ve maliyet tasarrufu gibi) çalışanlar arasında olumlu bir algı yaratmakta ancak doğrudan kullanım niyetini etkilememektedir. Sosyal algı, yani robotların insanlarla sosyal etkileşime girme kapasitesi, insanların bu teknolojiyi kabul etmesinde kritik bir rol oynamaktadır. Çalışmada katılımcılar, robotların insan etkileşiminin yerini tam olarak alamayacağını düşünse de robot kullanımının iş süreçlerini hızlandırma ve iş güvenliğini artırma potansiyeline sahip olduğuna inanmaktadırlar. Robotların sosyal algıya katkıda bulunması, yani antropomorfik özellikler göstermesi (insana benzer görünüm, ses, hareketler), kullanıcıların robotlara olan güvenini ve kabulünü artırmaktadır. Ancak, "tekisiz vadi" olarak bilinen kavram gereğince, robotlar insana çok benzemeye başladığında bu durum bazı kullanıcılar arasında olumsuz duygular uyandırabilmektedir. Çalışma, teknolojik yeniliklerin sosyal uyum süreci üzerinde önemli bir etkisi olduğunu vurgulamaktadır; bu da işletmelerin teknolojiyi adaptasyon sürecine özen göstermesi gerektiğini göstermektedir. Araştırma, 28/12/2023 tarihli ve 16/7 numaralı Çanakkale Onsekiz Mart Üniversitesi etik kurul onayı ile gerçekleştirilmiştir. Araştırma verileri yüz yüze görüşmeler yoluyla toplanmıştır.

Anahtar Kelimeler: Hizmet Robotları, Sosyal Algı, Turizm Sektörü, Konaklama İşletmeleri, Teknolojik Adaptasyon

Introduction

In today's tourism sector, the increasing influence of technology enables businesses to implement innovative applications across a wide range of operational processes and service delivery. In this context, the use of service robots has become a significant factor, transforming the effects of technology on the workforce and the customer service experience.

*Sorumlu Yazar

Tourism businesses aim to gain a competitive advantage by effectively utilizing technology while striving to provide quality service to customers. The integration of service robots into the tourism sector not only provides labor savings but also has the potential to improve service quality. However, the adoption of these technologies brings various challenges in terms of cultural capital accumulation, technological adaptation, and social impacts.

With the advent of artificial intelligence, the use of robotic systems developed to simplify daily life practices and reduce people's workload has become widespread in many areas, from daily routines to business relationships. Along with the introduction of robotic systems into daily or working life, people's, employees', and customers' attitudes and acceptance of them have emerged as an issue. According to Başer & Bakırtaş (2023), the use of service robots in Turkey is dominated by an engineering perspective, and there is not a widespread field of study in terms of social sciences regarding their usage. For service robots to adapt to service culture, it is essential to humanize their appearance and improve their mobility (Murphy et al., 2017).

Along with mobility, the developing artificial intelligence allows humanoid robots or service robots to become increasingly usable by engaging in social learning when interacting with people (Breazeal et al., 2009). With the development of robotic systems, humanoid robots have started to be used in many fields. It can be said that while our attitudes towards humanoid robots are relatively more positive, we still do not fully accept them. Indeed, the assumption in the literature that as a robot's resemblance to a human increase, the sense of familiarity and trust it evokes in individuals also increases, but that this similarity reaching a point of realism can cause negative feelings, is expressed by the concept of the "Uncanny Valley" (MacDorman, K. F., 2006). Additionally, Dogan and Vatan (2019), who examined user/customer reviews in hotels where service robots are used, found that positive comments used adjectives like cool, fun, modern, cute, nice, wonderful, and interesting, while negative comments included words such as bad, difficult, unresponsive, creepy, disappointing, scary, strange, eerie, and lifeless. The humanoid appearance, sought as a feature in service robots given communication tasks with humans, increases their acceptability. These types of robots, especially in the service sector, are seen to have humanoid features such as being structured to resemble the human body, having a human-like voice and face, and the ability to move their heads, arms, and legs (Christou, 2020).

A robot's anthropomorphism affects people's acceptance of it, increases their trust, encourages them to spend more time with robots, or leads to greater tolerance for a robot's errors (Mourey et al., 2017). While the perception of anthropomorphism can facilitate and deepen human-robot interaction, inappropriate designs of anthropomorphism can cause discomfort in consumers, especially eerie feelings and a threat to human identity (Mende et al., 2019).

While it is an important topic how robot design can adapt to and develop service culture (Murphy et al., 2017), it is seen that robot manufacturers are producing synthetic robots that resemble human appearance (Duffy, B. R., 2003). According to Thomsen, service robots will replace humans in basic hotel services in the near future (Thomsen, 2020). While technology is a phenomenon encountered in every aspect of human life and its every phase, it is also a fact that many errors and failures occur. For this reason, service robots are generally seen to be used in areas where there is little dialogue with humans, rather than directly interacting and communicating with people (Lee et al., 2021).

According to Aslantürk & Erdem, service robots in hotels are more easily preferred in services such as food and beverage service or room/corridor cleaning, where there is less physical contact with people. According to Özgürel & Şahin, in situations where physical interaction between humans needs to be minimized, as experienced during the Covid-19 pandemic, the idea of robots taking more place in production and service delivery has become widespread. Similarly, applications of robotization in tourism, including robot-human relationships and interactions, are becoming a reality of life.

Tourism, as a service industry, has historically developed as a human-to-human service, and there has been an established understanding in this direction. However, with the changes and transformations

happening now, it is foreseen that the replacement of interpersonal contact with robots will go beyond what has been theorized in tourism literature so far (Tussyadiah, 2020).

In both year-round and seasonal tourism businesses, using robots 24/7 reduces the need for human resources, increases service production, avoids issues such as work safety or occupational disease problems, saves time and money, and enhances the business's efficiency in operational processes (Belanche et al., 2020). The presence of robots in tourism businesses will have a positive effect on creating an innovative tourism business image (Kuo et al., 2017). These robots not only perform basic and routine tasks in hotels and restaurants but also carry out advanced front-office tasks that involve attracting the social interest of customers (Belanche et al., 2020). Adding human-like features to such products to encourage consumer familiarity, participation, and positive evaluations is important (Kayabaşı et al., 2022). Lin and Mattila (2021) state that after the COVID-19 pandemic, various technologies, including service robots, were preferred to ensure and attract guests. Considering the rapid rise of robotization in the first quarter of the 21st century, it is predicted that service providers will largely transition to automation in the coming years (Frey and Osborn, 2017).

Although the widespread use of service robots is anticipated, it is stated that service robots do not aim to replace humans in service delivery and that a deeper technological system is required for this (Lu et al., 2019). For example, Japan's Henn-na Hotel, which opened in 2015 with an all-robot staff, decided to remove half of its robots from service processes due to unsatisfactory performances (Go et al., 2020). Lee et al. (2018) found that the potential positive business outcomes of restaurant service robots (such as speeding up the customer order-taking and delivery processes) positively influenced managers' attitudes and intentions to use robots.

It is expected that service robots will facilitate service processes and increase service capacity in proportion to the technology (Ivanov et al., 2020). This expectation also leads businesses to change their working structures and adopt robotic technologies (Ince, Başer, 2023). The tourism industry is emphasized to be central to the use of service robots (Nannelli et al., 2023). Besides technology, social impact plays a role in the widespread use of service robots. How others perceive a new technology user is important in the adoption of new technology (Ivkov et al., 2020). One important factor in the adoption of new technologies is the level of social pressure applied to the individual. When someone wants to use a new technology, they may change their behavior based on the reactions they expect to receive from their close ones or environment (Venkatesh et al., 2003), or they may use robotic technologies based on the opinions and thoughts of others (Bishop et al., 2019).

Given today's technological capabilities, in addition to the existing robots at Henn-na Hotel, it can be predicted that in the future, robots such as chef robots, bartender robots, and waiter robots will be developed and used in both different departments of the accommodation sector and different sectors (Durna, Baysal, 2021).

With the help of the sensors they use, robots can make real-time assessments and adapt to the situation. Thus, many new services have been opened to accommodation and travel businesses in the tourism sector (De Kervenoael et al., 2020).

Service robots facilitate easy and continuous connection with other people in social life, encourage the social participation of disabled or elderly people, and improve their quality of life (Turchetti et al., 2011). As AI-powered robot technology advances, care robots are becoming more independent and are evolving into companions that help people beyond physical care support, through more social interaction. According to Metzler and Barnes (2014), care robot applications can redefine the meanings of concepts like "friendship" and "care"; interacting with care robots cannot be a one-way activity but rather a two-way one, where people and robots shape each other in the end.

Innovations in robotic technologies can help elderly adults live independently by taking on some care functions. There is no universal definition of care robots. In general, care robots are perceived as technological devices integrated into care practices for healthcare or care personnel. Different categories

have been defined for elderly care robots; for example, assistive social robots and rehabilitation robots (Broekens et al., 2009) or healthcare robots providing physical assistance, companionship, and health monitoring/security tracking (Broadbent et al., 2009) are among the main categories.

It is estimated that more than 1.5 billion robots will be operational worldwide by 2025, and that the number of robots will surpass the number of humans by the early 2030s. This brings to mind how humanoid robots, being more involved in human life as service and service robots in various fields, will affect human-robot relationships (Başer, Bakırtaş, 2023).

Due to the reasons mentioned above, the use of service robots in the tourism sector is important. To measure the necessity and awareness of this usage, a study was conducted with hotel managers and employees in Çanakkale, which ranks 5th in Turkey with 746 certified establishments according to 2021 data. Table 1 presents data regarding the hotels located in Çanakkale, obtained from the Ministry of Tourism.

Table 1: *Numbers of Accommodation Establishments in Çanakkale*

		Number of facilities	Number of rooms	Capacity
Aparthotel		2	39	80
Boutique Hotel		7	137	294
Camping		3	123	369
Rural Tourism Facility		5	56	126
Hotel	1 Star	5	76	152
	2 Stars	6	148	281
	3 Stars	46	1955	3919
	4 Stars	10	823	1667
	5 Stars	2	438	946
Boarding		15	119	237
Holiday Village		1	99	396
Thermal otel	3 Stars	1	40	80
	4 Stars	2	129	276
Total		105	4182	8823

Out of the 105 establishments located in Çanakkale, face-to-face surveys were conducted with 49 of them. This survey aimed to gather the opinions of employees and managers in hotels in Çanakkale regarding service robots and to specifically measure their intention to use them. For this purpose, the answers to the research questions provided below were investigated.

Question 1) How do the perceived advantages and disadvantages of service robot usage, the perceived value if a service robot is used, and the problems they might encounter affect the intention to use service robots among hotel employees in Çanakkale? Is the intention to use service robots dependent on these variables?

Question 2) Are there differences in the averages of service robot usage intention, advantages, disadvantages, perceived value without using service robots, and the difficulties encountered based on subgroups of various demographic factors?

Question 3) What is the factor that affects the intention to use service robots among hotel owners in Çanakkale?

To answer these questions, literature research was conducted, and scales were found. The subsequent sections of the study include the implementation phase, results, and discussions.

Method and Application

In the study, a face-to-face survey was conducted to investigate various aspects of the use of service robots in accommodation businesses operating in Çanakkale. The scales used in the study were adapted from Lu et al. (2019), Ivanov et al. (2018), and Qui et al. (2020) to measure the advantages of service robots, and from Qui et al. (2020) and Ivanov et al. (2018) to measure the disadvantages of service

robots. The perceived value from service robots was measured using scales obtained from Zhong et al. (2020) and Kervenael et al. (2020). The intention to use service robots and the basic challenges were measured based on the study by Xu et al. (2019).

The population of the study consists of accommodation businesses operating in Çanakkale, and the sample consists of 49 establishments selected through convenience sampling. The research was conducted under the ethics committee approval of Çanakkale Onsekiz Mart University, dated 28/12/2023 and numbered 16/7, Data for the research were collected through face-to-face interviews. The construct validity of the measurement tool was assessed using Exploratory Factor Analysis, while reliability was assessed with the Cronbach alpha coefficient. Subsequently, the data were interpreted through multivariate regression analysis and variance analyses. SPSS for Windows 25.0 statistical software was used for the analyses.

Research Model and Hypotheses

The research model is presented below. The intention to use service robots by accommodation business managers and employees was measured in four dimensions.

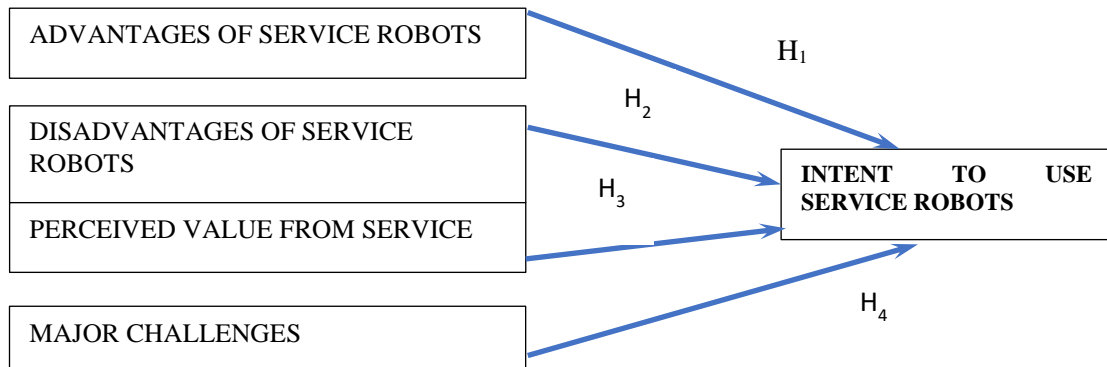


Figure 1. Research Model

The hypotheses created based on the established model are presented below.

Hypothesis 1 (H1): The perceived advantage of service robots explains the intention to use services.

Hypothesis 2 (H2): The perceived disadvantages of service robots explain the intention to use services.

Hypothesis 3 (H3): The perceived value in the use of service robots explains the intention to use services.

Hypothesis 4 (H4): The major challenges that may be encountered in using service robots explain the intention to use services.

A multiple linear regression model was conducted to test the hypotheses. The results of the analyses are presented below.

Findings

In the analysis of the data, SPSS for Windows 28.0 (Statistical Package for Social Science) statistical software was used. Descriptive statistical methods (number, percentage, mean, standard deviation) were employed to evaluate the data. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were conducted to assess the adequacy and suitability of the sample size for the analysis. Internal consistency analysis (Cronbach's alpha coefficient) was used to evaluate the reliability of the scale. A statistical significance level of $p < 0.05$ was accepted in the analyses.

The assumptions of multiple linear regression are as follows: all variables are continuous, there is a linear relationship between dependent and independent variables, there are no significant outliers in the data series, there is no relationship between residual values and independent variables, dependent and independent variables have equal variance, residual variables are approximately normally distributed,

and there is no multicollinearity. Once these seven assumptions are met, a multiple linear regression model can be established.

The demographic characteristics of the participants are provided in Table 2. Among the participants, 24.5% are female, and 75.5% are male. Looking at the age groups of the participants, it can be seen that they predominantly belong to the middle-aged group. In terms of marital status, more than half are married. In terms of education, those with a bachelor's degree have the highest proportion at 44.9%. In terms of the type of business, hotels have the highest proportion at 79.6%. Among these hotels, 42.9% are 2-3 stars, and 34.7% are 4-5 stars. In the surveyed accommodation businesses, the years of service of the employees are equally distributed between 1 and 20 years. Among the accommodation businesses participating in the survey, 34.7% are in managerial positions, while 61.2% are in employee positions.

Table 2: Demographic Characteristics of Participants

Gender	Frequency	Row N(%)	Education	Frequency	Row N(%)
Female	12	24,5	High school and below	13	26,5
Male	37	75,5	Associate degree	8	16,3
Age			Bachelor's degree	22	44,9
18-24	6	12,2	Master's degree	4	8,2
25-31	13	26,5	Business Type		
32-38	13	26,5	Apart hotel	3	6,1
39 and +	16	32,7	Boutique hotel	7	14,3
Marital Status			Hotel	39	79,6
Single	17	34,7	Years of employment		
Bekar	29	59,2	1-2 years of employment	5	10,2
Other	2	4,1	3-6 years of employment	5	10,2
Number of stars			7-9 years of employment	3	6,1
No stars	11	22,4	10-20 years of employment	6	12,2
2 and 3 stars	21	42,9	Position		
4 and 5 stars	17	34,7	Manager	17	34,7
			Employee	30	61,2

Before the analyses were conducted, the construct validity and reliability of the scales were tested. An Exploratory Factor Analysis was performed for this purpose. The analysis results are presented in Table 3.

Table 3: Results of the Exploratory Factor Analysis

Items	Fac. Load	Skewness	Kurtosis	Mean
ADVANTAGES OF SERVICE ROBOTS				
SRA1-I think service robots will be faster than human workers	0,761	-0,393	-0,544	3,41
SRA2-I think service robots will calculate better than human workers	0,784	-0,594	-0,613	3,79
SRA3-I think service robots will provide more accurate information than human employees	0,74	-0,131	-1,127	3,35
SRA4-I think service robots can provide information in more languages than human employees	0,72	-1,343	1,273	4,06
SRA5-I think service robots will be more polite than human employees	0,792	0,025	-1,016	2,83
SRA6-I think service robots will do their job without getting tired, no matter how many questions you ask or what tasks you need	0,849	-0,993	-0,006	3,86
SRA7-I think that thanks to service robots, customers will not have to wait as much during service processes (check-in, check-out, meal, etc.)	0,789	-0,031	-1,203	3,57
SRA8-I think that thanks to service robots, customers will be able to avoid unnecessary personal contact	0,772	-0,733	-0,211	3,92
SRA9-I think service robots will be more reliable than humans in service	0,496	-0,23	-0,753	3,27
SRA10-I think service robots will be more sensitive than humans in service	0,73	0,589	-0,04	2,51

SRA11-I think that the information provided by service robots is more accurate, meaning there will be less human error in their service	0,719	-0,559	-0,122	3,57
SRA12-I think service robots will provide more consistent service than humans in service	0,809	-0,377	-0,57	3,45

KMO: 0,756 Approx. Chi-Square: 226,639 df: 66 sig.: 0,000 Total Variance Explained:%71,141

DISADVANTAGES OF SERVICE ROBOTS

SRD1- I think service robots can malfunction during service	0,618	-1,53	2,236	4,02
SRD2- I think service robots can misunderstand a question	0,913	-0,685	-0,51	3,61
SRD3-I think service robots can misunderstand an order	0,852	-0,466	-613	3,5
SRD4- I think service robots cannot make special requests from customers/only work within a programmed framework	0,526	-1,289	0,936	4,15
SRD5-I think service robots cannot understand the feelings of guests	0,88	-1,277	0,58	4
SRD6-I think service robots' standard movements and attitudes can make customers uncomfortable	0,582	-0,218	-0,812	3,37
SRD7-I think service robots limit the experience in the service environment	0,844	-0,185	-0,82	3,53

KMO: 0,648 Approx. Chi-Square: 128,696 df: 21 sig.: 0,000 Total Variance Explained: %63,705

PERCEIVED VALUE FROM SERVICE ROBOTS

SRPV1-Compared to traditional service delivery, the use of robots in a service environment is valuable to me	0,858	0,132	-0,65	2,78
SRPV2- I think the use of robots in a service environment will provide a satisfying experience	0,86	-0,03	-0,726	2,92
SRPV3- Compared to the service cost I have to pay, I think the use of robots in a service environment will cover my costs	0,818	0,63	-0,642	3,22
SRPV4- I think the use of service robots can increase hotel service efficiency	0,823	-0,331	-0,606	3,31
SRPV5- I think the use of service robots can guarantee a better service quality	0,909	-0,01	-0,662	2,96

KMO: 0,686 Approx. Chi-Square: 81,926 df: 10 sig.: 0,000 Total Variance Explained:%76,482

INTENT TO USE SERVICE ROBOTS

SRI1-Given the opportunity, I will use robots in a service environment	0,791	-0,479	-0,584	3,35
SRI2- I will use robots in a service environment in the near future	0,841	-0,552	-0,476	3,31
SRI3- I intend to use robots more in a service environment in the future	0,903	-0,495	-0,637	3,35
SRI4- I intend to use service robots	0,869	-0,159	-0,823	3,04
SRI5- I will be willing to recommend service robots to others	0,77	0,055	-0,902	2,86
SRI6- I will use service robots frequently	0,901	-0,169	-0,754	3
SRI7- I will be willing to use service robots	0,852	-0,133	-0,86	3,2

KMO: 0,852 Approx. Chi-Square: 275,309 df: 21 sig.: 0,000 Total Variance Explained:%71,912

MAJOR CHALLENGES FOR HOTEL MANAGERS TO FACE THE POTENTIAL BENEFITS OF SERVICE ROBOT TECHNOLOGIES

SRMC1-I may have difficulty dealing with technical issues (maintenance, repair, malfunctions, etc.) of service robots	0,878	-0,776	-0,507	3,67
SRMC2- I may have difficulty covering the investment/maintenance costs of service robots	0,811	-0,809	0,037	3,52
SRMC3- I may have difficulty planning where/how to deploy service robots	0,831	0,116	-1,052	2,9
SRMC4- I may have difficulty understanding the level of service that guests desire from service robots	0,700	-0,539	-0,138	3,31
SRMC5-I may have difficulty planning how my employees can best work with service robots	0,538	-0,159	-1,023	3,16
SRMC6- I may have difficulty meeting guests' desire/need for "human touch" and social interaction with service robots	0,789	-1,085	0,41	3,86
SRMC7- I think guests will be afraid/distrustful of service robots	0,872	0,26	-0,931	2,94
SRMC8- I think service robots cannot handle guest complaints	0,62	-0,359	-0,699	3,49
SRMC9- I think there will be a negative impact on my brand due to employing service robots	0,655	0,526	-0,121	2,41

KMO: 0,677 Approx. Chi-Square: 113,727 df:36 sig.: 0,000 Total Variance Explained:%65,081

The KMO values of the scales used to determine opinions regarding the use of service robots in accommodation businesses ranged from 0.677 to 0.852. This result indicates that the sample adequacy is moderate to fair, and the Bartlett test results revealed that the sample size for the scales is statistically

significant ($p < 0.05$). The results of the internal consistency analysis (Cronbach's alpha coefficient) used to assess the reliability of the scale are presented in Table 4.

Table 4: Reliability test results of the scales

Scale Name	Item	Cronbach Alfa
Advantages of service robots	12	0,825
Disadvantages of service robots	7	0,798
Perceived value from service robots	5	0,775
Intent to use service robots	7	0,934
Major challenges for hotel managers to face the potential benefits of service robot technologies	9	0,733

The Cronbach Alpha values for the scales “Disadvantages of service robots,” “Perceived value from service robots,” and “Major challenges for hotel managers to face the potential benefits of service robot technologies” ranged between $0.60 \leq \alpha \leq 0.80$, indicating they are “moderately reliable” (Altunışık et al., 2005). The Cronbach Alpha values for the scales “Advantages of service robots” and “Intent to use service robots” were found to be between $0.80 \leq \alpha \leq 1.00$, indicating they are “highly reliable.”

After the validity and reliability analyses of the scales, a multiple linear regression analysis was conducted to establish a model explaining the relationship among the variables affecting the intention to use service robots. Before performing the multiple linear regression analysis, the tests for the assumptions of multiple linear regression were conducted. The results of the assumption tests are provided below.

Correlation Analysis

In the measurement study of various aspects of service robot usage by accommodation business managers, the descriptive statistical values of the scales are presented in Table 5. Additionally, the results of the correlation analysis of the scales are provided in Table 5.

Table 5: Descriptive Statistics of the Scales

	Mean	Std. Deviation	N
Intentserrob	3,1574	1,00180	49
Advanserrob	3,4657	,67322	49
Disadvanserrob	3,7395	,76421	49
Valueserrob	3,0367	,81514	49
Challenserrob	3,2506	,65121	49

Table 6: Results of the Correlation Analysis of the Scales

	Intentserrob	Advanserrob	Disadvanserrob	Valueserrob	Challenserrob
Intentserrob	1				
Advanserrob	,418**	1			
Disadvanserrob	-,222	-,185	1		
Valueserrob	,730**	,646**	-,233	1	
Challenserrob	-,084	-,118	,177	-,128	1

In the Pearson correlation test conducted to determine the relationship between hotel managers' intention to use service robots and the perceived value of using service robots, a strong positive linear relationship was found ($r= 0.730$; $p=0.000$) between the intention to use service robots and the perceived value of using service robots. Additionally, a moderate positive linear relationship ($r= 0.646$; $p=0.000$) was observed between the advantages of using service robots and the perceived value of using service robots, as well as a moderate positive linear relationship ($r= 0.418$; $p=0.000$) between the advantages of using service robots and the intention to use service robots.

Multiple Linear Regression Analysis

Before proceeding to the Multiple Linear Regression analysis, the assumptions were tested. All data related to the variables collected for the study are continuous (1st Assumption). To test the linearity of the relationship between the dependent and independent variables, scatter plots were obtained between the dependent and independent variables. The scatter plots are presented in Figure 2.

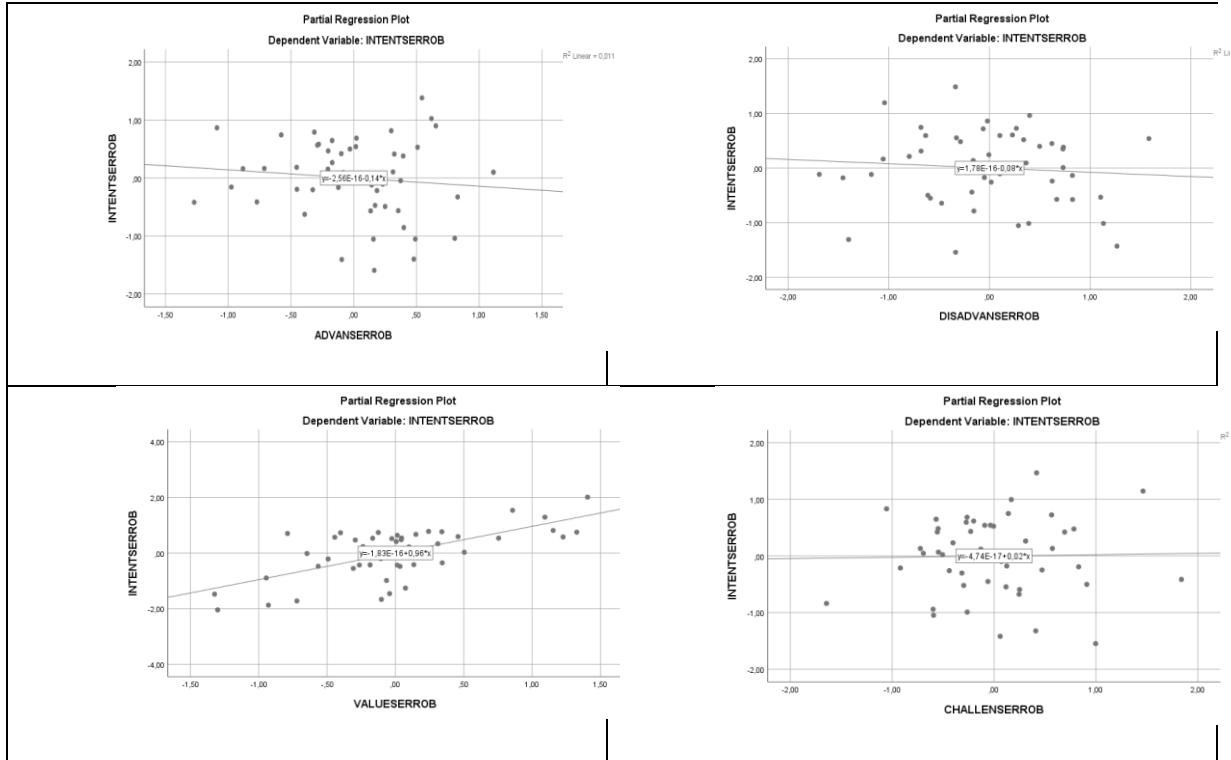


Figure 2. Scatter Plots between Dependent and Independent Variables

Upon examining the graphs presented in Figure 2, it is observed that there is a linear relationship between the dependent and independent variables. For the 3rd assumption, it was checked whether there are any outliers in the data sets. It was observed that there are no outliers for any of the variables in the data set. To test the 4th assumption, which states that there is no relationship between the residual values and the independent variables, the Durbin-Watson test was conducted. The test results are presented in Table 7.

Table 7: Relationship Test Between Residual Values and Independent Variables

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,736	,542	,500	,708	1,734

Since the Durbin-Watson value is 1.734, which is within the range $1.5 < 1.734 < 2.5$, there is no relationship between the residual values and the independent variables. To check whether there is homoscedasticity (equal variance) between the dependent and independent variables, the scatter plot of the standardized values is examined. The scatter plot is shown in Figure 3.

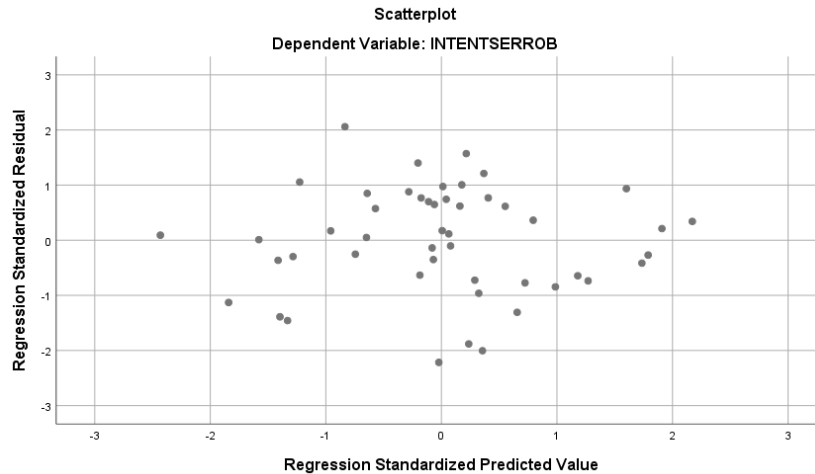


Figure 3. Scatter plot of standardized values

The presence of scatter in Figure 3 indicates that the variance is equally distributed. To test whether the residual values are approximately normally distributed, the Shapiro-Wilk values are examined. The results of the normality test are presented in Table 8.

Table 8: Results of the normality test

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	,093	49	,200*	,982	49	,664

According to the analysis results in Table 8 ($p < 0.05$), the residual values are normally distributed. The absence of multicollinearity among the independent variables is the final assumption. To check this, the VIF (Variance Inflation Factor) and Tolerance values are examined. The results of the multicollinearity test concerning the dependent and independent variables are presented in Table 9.

Table 9: Results of the multicollinearity test concerning the dependent and independent variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	,955	,960		,994	,325	-,980	2,889		
	Advanserrob	-,141	,199	-,095	-,708	,483	-,543	,261	,581	1,722
	Disadvanserrob	-,078	,139	-,060	-,562	,577	-,359	,203	,922	1,085
	Valueserrob	,958	,166	,780	5,758	,000	,623	1,294	,568	1,760
	Challenserrob	,023	,160	,015	,143	,887	-,300	,346	,959	1,043

a. Dependent Variable: Intentserrob

In Table 9, all variables have VIF values less than 10, and the tolerance values are also less than the VIF values. Therefore, there is no multicollinearity among the independent variables. Since all assumptions have been met, a multiple linear regression analysis was conducted. The results of the multiple linear regression analysis are presented in Table 10.

Table 10: Results of the multiple linear regression analysis conducted to explain the intention to purchase robots based on advantages, disadvantages, perception, and challenges

	B	Std. Error	Beta	t	sig.	R	R ²	F	P
Advantage	-0,141	0,199	-0,095	-0,708	0,483	0,736	0,542	13,007	0,000
Disadvantage	-0,078	0,139	-0,06	-0,562	0,577				
Perception	0,958	0,166	0,78	5,758	0				
Challenges	0,023	0,16	0,015	0,143	0,887				

According to the results of the multiple linear regression analysis conducted to explain the intention to purchase robots based on advantages, disadvantages, perception, and challenges, the perceived value of service robot usage among the independent variables is a significant predictor of the level of robot usage (F (4,44)=13.007, p<0.001). This independent variable explains 54.2% of the variance in the intention to use robots. Only the perceived value of service robot usage explains the intention to use service robots (p<0.05).

As a result of the analysis, the equation explaining the intention to purchase service robots is: Intention to Use Service Robots = 0.955 + (0.958 * Perception) The advantages, disadvantages, and challenges arising from the usage of service robots do not explain the intention to purchase service robots (p>0.05). To examine whether there are differences in the intention to purchase service robots among demographic groups, variance analyses were conducted. Table 11 presents the mean and standard deviation values of the intention to use service robots concerning demographic factors.

Table 11: Mean and standard deviation values of the intention to use service robots concerning demographic factors

Intention to buy a Service Robot			
Gender	N	Mean	Std. Deviation
Female	12	2,7976	0,9679
Male	37	3,2741	0,9974
Marital Status			
Married	17	3,4370	0,7293
Single	29	3,0049	1,1336
Other	2	2,7857	1,1112
Age			
18-24 years	6	3,3095	1,3444
25-31 years	13	3,1648	0,8509
32-38 years	14	3,0816	0,8211
39 years and above	16	3,1607	1,1962
Education			
High school and below	13	2,9780	1,0398
Associate degree	8	2,9286	0,9507
Bachelor's degree	22	3,4935	0,8715
Master's degree	4	3,1429	1,1838
Business type			
Apart Hotel	3	4,0000	0,7143
Boutique Hotel	7	3,4898	1,0781
Hotel	39	3,0330	0,9824
Hotel star count			
No stars	11	3,3506	1,1417
2 and 3 stars	21	2,9456	0,8421
4 and 5 stars	17	3,2941	1,0979
Employee experience			
1-2 years of employees	5	3,0286	0,9225
3-6 years of employees	5	3,3143	0,8476
7-9 years of employees	3	2,1429	0,7559
10-20 years of employees	6	3,5476	0,4555
Employee position			
Manager	17	3,2605	1,0765
Employee	30	3,0524	0,9844

As a result of the variance analyses, no statistically significant differences were observed between the means of the intention to use robots across the demographic subgroups.

Results

In this study, the perceptions, advantages, disadvantages, perceived value, and intention to use service robots in accommodation businesses in Çanakkale province were comprehensively examined. The data were obtained through the analysis of various factors influencing the intention to use service robots in the accommodation sector.

Perceived Value of Service Robots and Intention to Use The findings of the study revealed a strong and positive relationship between the perceived value of service robots and the intention to use them. Participants perceive the potential of service robots to accelerate business processes, enhance customer satisfaction, and provide cost advantages highly. In particular, the robots' ability to provide more accurate and consistent information to customers has emerged as a factor that could enhance business efficiency. According to the results of the correlation analysis, the perceived value of service robots explains 73% of the intention to use robots. This finding indicates that investment in technology and the quality of service provided to customers are critical factors in the adoption process of robots.

The advantages of service robots particularly stand out in factors such as speed, accuracy, and the potential to minimize human errors. The survey results indicate that the majority of participants have a positive view regarding the robots' ability to provide quick service and reduce the need for personal interaction. However, it was found that the advantages do not directly explain the intention to use robots. This situation suggests that advantages alone may not be sufficient to create an impact; rather, the combined effect of perceived value with these advantages is more decisive.

Regarding disadvantages, participants noted that the lack of human interaction from robots could negatively affect the customer experience and that technological failures might disrupt the flow of service. However, it was determined that disadvantages do not have a significant effect on the intention to use robots. This result shows that even though participants recognize the negative aspects of robots, they generally believe that the innovations and conveniences brought by technology outweigh these concerns.

Effects of Service Robots on Managers From the perspective of managers, the challenges faced in achieving the potential benefits of service robots emerge as one of the significant factors affecting the adoption of this technology in businesses. Some participants expressed that the maintenance and repair costs of robots could be high and that there might be uncertainties regarding guests' interactions with robots. However, it was determined that these challenges do not have a direct impact on the intention to use robots. This situation suggests that the challenges managers face in adapting to technological innovations can be tolerated in line with the overall strategy and vision of the business.

Demographic Factors Demographic analyses examined the effects of factors such as gender, age, education level, and marital status on the intention to use service robots. From a gender perspective, it was observed that male participants showed a higher intention to use service robots. However, no statistically significant difference was found among age groups. Education level emerged as an effective factor in the adoption of service robots; participants with master's and bachelor's degrees tend to view robot usage more positively, while those with lower education levels approach this technology more cautiously.

Future of Service Robots The overall findings of the study suggest that the widespread adoption of service robots in the tourism sector is inevitable. The advantages offered by robots, especially in reducing labor costs and providing more consistent and rapid service, will play a significant role in enhancing businesses' competitive advantages. However, for these innovations to be effectively implemented, businesses must invest in their technological infrastructure and develop strategic plans regarding the use of robots.

Strategic Recommendations, In this context, several strategic recommendations can be developed for tourism businesses: Training and Technological Adaptation: Training programs should be organized for

employees and managers to adapt to technological innovations, and awareness should be raised on how robots can be used more effectively.

Enhancing Customer Experience: Considering how the use of service robots affects the customer experience, robots should be enabled to better meet customer needs. Particularly, technological innovations aimed at compensating for the lack of human interaction from robots should be emphasized.

Investment and Cost Analysis: The long-term cost advantages that robots can provide to the business should be carefully calculated, and investments in technological infrastructure should be planned. *In summary, the general conclusions can be stated as follows:*

There is a medium-level positive linear relationship between the advantages of using service robots and the perceived value of service robot usage.

There is a medium-level positive linear relationship between the advantages of using service robots and the intention to use service robots.

The advantages, disadvantages, and challenges arising from the use of service robots do not explain the intention to use service robots.

The perceived value of service robots is important in explaining the intention to use them.

No statistically significant differences were observed between the means of intention to use robots across the demographic subgroups.

This study presents significant findings regarding the adoption of service robots in accommodation businesses in Çanakkale province. Service robots have the potential to trigger a significant transformation in the tourism sector. In cases where perceived value is high, the intention to use robots also increases, strengthening the competitive advantage of businesses. However, for the full adoption of these technologies, both managers and employees need to adapt to technological changes, and customer experience should be considered in this process.

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Awareness of Legal and Social Dimensions of Climate Change: The Case of Suleyman Demirel University and Applied Sciences University of Isparta Students

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ABSTACT

This study investigates whether students at Suleyman Demirel University and Applied Sciences University of Isparta have different awareness of the legal and social dimensions of climate change depending on demographic variables. The data were applied to a sample of 400 students at SDU and ISUBU between December 2023 and February 2024. The simple random sampling method was used to analyse the survey results using a t-test and ANOVA. The results showed no significant differences in age, mother's education level and father's education level. However, women showed greater general awareness and solution awareness than men. There was a difference between the 1st and 2nd classes and the 3rd class with regard to general awareness. There is a distinction in awareness of income between students with incomes of TL 1250-2000 and TL 2001-3000, and those with incomes over TL 5001. The analysis revealed a significant difference in solution awareness between students with different income levels. Students with an income of 2001-3000 TL had higher levels of legal awareness than all other income groups. SDU students had higher general awareness, but ISUBU students had higher legal awareness. In light of the aforementioned findings, it is recommended that educational programmes be developed and environmental awareness campaigns be organised with the aim of increasing climate change awareness among university students.

Keywords: Climate Change, Awareness, t-test, ANOVA, Factor Analysis.

İklim Değişikliğinin Hukuki ve Sosyal Boyutlarına İlişkin Farkındalık: Süleyman Demirel Üniversitesi ve Isparta Uygulamalı Bilimler Üniversitesi Öğrencileri Örneği

ÖZ

Bu çalışma, Süleyman Demirel Üniversitesi ve Isparta Uygulamalı Bilimler Üniversitesi'ndeki öğrencilerin demografik değişkenlere bağlı olarak iklim değişikliğinin yasal ve sosyal boyutları hakkında farklı farkındalıklara sahip olup olmadıklarını araştırmaktadır. Veriler, Aralık 2023 ve Şubat 2024 tarihleri arasında SDÜ ve ISUBÜ'deki 400 öğrenciye anket uygulaması yapılarak basit rasgele örnekleme yöntemi ile elde edilmiştir. Anket sonuçlarını analiz etmek için t-testi ve ANOVA kullanılmıştır. Sonuçlar yaş, anne eğitim düzeyi ve baba eğitim düzeyi açısından anlamlı bir farklılık göstermemiştir. Ancak, kadınlar erkeklere kıyasla daha fazla genel farkındalık ve çözüm farkındalığı göstermiştir. Genel farkındalık açısından 1. ve 2. sınıflar ile 3. sınıf arasında anlamlı bir fark vardır. Gelir farkındalığında 1250-2000 TL ve 2001-3000 TL geliri olan öğrenciler ile 5001 TL üzeri geliri olan öğrenciler arasında anlamlı bir fark vardır. Analiz, farklı gelir düzeylerine sahip öğrenciler arasında çözüm farkındalığı açısından anlamlı bir fark ortaya koymuştur. 2001-3000 TL gelire sahip öğrencilerin yasal farkındalık düzeyleri diğer tüm gelir gruplarından daha yüksektir. SDÜ öğrencilerinin genel farkındalığı daha yükseken, ISUBÜ öğrencilerinin yasal farkındalığı daha yüksektir. Çalışmadan elde edilen bu sonuçlar ışığında üniversite öğrencileri arasında iklim değişikliği farkındalığını artırmak için eğitim programlarının geliştirilmesi ve çevresel bilinçlendirme kampanyalarının düzenlenmesi gibi politika önerileri sunulmuştur.

Anahtar Kelimeler: İklim değişikliği, Farkındalık, t-test, ANOVA, Faktör Analizi.

Introduction

The sustenance of life on Earth is contingent upon the presence of favorable climatic conditions and sufficient water resources. In particular, the atmosphere must contain a specific ratio of chemical components for the continued existence of living organisms. As a consequence of fluctuations in atmospheric chemistry over time, climate change has occurred on at least four occasions over the past 4.5 billion years (Cronan, 2023). The formation of natural resources that are essential for human existence, including clean air, water, oil and coal deposits, as well as underground and aboveground

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riches, has been enabled by this process of natural climate change. In the absence of climate change on Earth, the continued existence of life is not feasible (Almazroui et al., 2019). In addition to natural climate change, human activities represent the most significant factor in accelerating global climate change (The Intergovernmental Panel on Climate Change [IPCC], 2021). IPCC assessment report has revealed that temperature increases are largely human-induced factors, yet countries do not perceive this as a major problem (Demirbaş and Aydın, 2020).

The concept of climate justice has emerged as a means of elucidating the injustices inherent in the situation whereby the countries that have a relatively minor role to play in the occurrence of climate change are the first and most severely affected, or may be affected, by the resulting situations (Kaya, 2017). In evaluating climate justice, three fundamental elements can be identified. The initial factor is the disadvantage factor, which gives rise to climate refugeeism in regions where the rate of spatial vulnerability is considerable as a consequence of the climate change problem. Secondly, disadvantages such as an inability to adapt to the climate crisis due to the low level of development of countries, gender inequality and class differences in society can be identified from an economic and social perspective. Thirdly, the rights of future generations and the ethical understanding that encompasses all assets affected by this crisis can be examined under the heading of climate justice (Akkuş, 2021). Climate justice emphasises the necessity of ensuring a fair approach in the fight against climate change on the global stage, demonstrating the value of international treaties.

The collective actions undertaken by humanity in response to the climate change crisis have constituted a global solution through the establishment of international agreements. In response to the global issue of climate change, the United Nations Framework Convention on Climate Change (UNFCCC) emerged from the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro. The convention entered into force on 21 March 1994 (Can, 2019). Its purpose is to limit the extent of greenhouse gases released into the atmosphere and to prevent negative effects on the climate (Talu and Kocaman, 2021). IPCC, which is authorized to study climate change, has emphasized that the global annual average temperature should be maintained below 2 °C. The UNFCCC has taken action to stabilize the concentration of greenhouse gases within a specified limit. The UNFCCC, whose principal objective is to prevent human activities from exerting a detrimental impact on the climate, underwent further development through the formation of the Kyoto Protocol at the 1997 Kyoto Conference. The Kyoto Protocol constitutes a significant advance in the pursuit of the objectives set out in the UNFCCC. The developed countries that are party to this Protocol have committed themselves to reducing their greenhouse gas emissions by 5% below the 1990 level between 2008 and 2012. In order for the Kyoto Protocol to be legally implemented, it was required to be signed by countries with at least fifty-five per cent of global greenhouse gas emissions (Can, 2019). Additionally, the Paris Agreement has highlighted the importance of climate justice in addressing environmental issues, human rights and the rights of Mother Earth, which extend beyond the scope of the Kyoto Protocol or the UNFCCC. Nevertheless, a detailed examination of the text of the agreement reveals that the concerns about climatic justice remain largely theoretical. The Paris Agreement was adopted on 12 December 2015 with the objective of establishing a comprehensive strategy for addressing global climate change in the post-2020 era within the framework of the UNFCCC (Kaya, 2017). In comparison to the Kyoto Protocol, the Paris Agreement is notable for its flexibility in terms of the absence of robust provisions for global action (Can, 2019).

In order to ascertain the extent of awareness among students at SDU and the ISUBU regarding the legal and social dimensions of climate change, this research has been designed to investigate the following: The research aims to examine whether there are differences in the awareness levels of students according to their demographic characteristics, including gender, age, parental education level, grade level, and income status. Furthermore, the study seeks to assess the level of awareness among students regarding potential solutions to climate change. The primary objective is to devise strategies to enhance the knowledge and awareness of university students about climate change and to evaluate the efficacy of these strategies. The findings will offer valuable insights into how educational programs and environmental awareness campaigns can be more effectively designed to increase climate change awareness.

Literature Review

The study conducted by Gerek (2022) had the stated objective of creating a scale for the assessment of awareness regarding the socio-legal dimensions of the climate change phenomenon. The study sample was composed of 327 university students. The results of the Principal Component Analysis indicated the presence of three sub-dimensions: overall awareness, awareness of potential solutions, and awareness of legal implications. The scale was determined to be a valid and reliable measurement tool. Similarly, in this study, awareness levels among students at the two universities were analysed according to demographic variables. However, in contrast to Gerek's study, income level and school variables were also considered. The findings of our study revealed that female students exhibited higher levels of general awareness and solution awareness than their male counterparts.

The objective of the study conducted by Albayrak and Atasayan (2017) was to investigate the extent of awareness of global climate change at the local level. This study analyses the effects of climate change awareness among people in Gebze, taking into account socio-economic differences and levels of trust in climate change policies. The data were collected via a questionnaire, and a total of 101 individuals participated in the survey. As a result, it was observed that the participants demonstrated awareness of climate change at the local level. The findings of this study are consistent with those of a similar study, as both studies found that socio-economic factors had a significant impact on awareness levels. However, while Albayrak and Atasayan (2017) conducted their study with a focus on local residents, this study is centered on a different population: university students. The findings of our study indicate that there are differences in the general awareness, solution awareness, and legal awareness levels of students according to their income levels. In particular, the general awareness levels of students in the income group of 1250-2000 TL and 2001-3000 TL were found to be higher.

Ataklı and Kuran (2022) developed a scale to measure climate change awareness. This scale was applied with 1088 people across Turkey. The scale consists of five dimensions: expectations from behaviors and policies, concern, causes, awareness and perception of the problem. This scale was found to be a valid and reliable measurement tool. The former study encompasses a general population, whereas this study focuses on university students. Consequently, it was determined that the overall awareness levels of SDU students were superior to those of ISUBU students. However, the legal awareness levels of the latter group were more pronounced.

The strategies implemented by various nations to address climate change and to prepare for its consequences exhibit notable diversity. It has been demonstrated that the integration of Local Climate Change Action Plans in Türkiye is insufficient. Özcan (2018) sought to enhance public awareness of this issue in his study. The level of awareness was determined through a survey conducted in fourteen provinces. The provinces of Bursa, Trabzon and Gaziantep were selected as representative sample areas. Consequently, a series of recommendations were proposed in relation to the subject matter. The findings of this study are consistent with those of the aforementioned study. However, the present study found that demographic variables, including age, maternal and paternal education levels, did not have a statistically significant effect on general awareness, solution awareness, and legal awareness.

In his study, Külçür (2021) sought to identify deficiencies in this area and to provide resources to the Turkish literature by demonstrating the significance of the gender inequality dimension in environmental justice and climate change. This research demonstrates that the gender focus on 'environmental justice' has been overlooked in Turkey and posits that this disregard will have a detrimental impact on the country's capacity to adapt to and combat the adverse effects of climate change. The findings of this study are corroborated by those of previous research, which indicates that women display higher levels of general awareness and solution awareness than men. This suggests that women are more attuned to environmental issues and demonstrate a proclivity for problem-solving strategies. Given that women are disproportionately affected by this environmental injustice, it is imperative to engage women in the formulation of policies and the minimization of impacts in order to identify effective solutions. It was also concluded that women should take a more active role in combating climate change.

The primary objective of the study conducted by Arslan and Uzun (2017) was to examine the significance of social consciousness approval in guaranteeing sustainability, the social aspect of development, the dimensions of social acceptance and the expansion of the material volume of investments in renewable energy resources. To this end, the researchers undertook a comprehensive review of existing literature on the subject. It is thus imperative to alter the extant investment paradigms by incorporating considerations of social approval. Nevertheless, this can be achieved with the involvement of informed stakeholders. The results of this study indicate that there are differences in the levels of general awareness, solution awareness and legal awareness among students according to their income levels. In particular, the general awareness levels of students in the income group of 1250-2000 TL and 2001-3000 TL were found to be higher. This finding demonstrates the impact of social and economic factors on climate change awareness.

The objective of this study, as set forth by Tuncer (2022), is to identify the specific modifications that must be made to cultural behavior at the societal level in order to mitigate the effects of the climate crisis and promote a conscious way of living. The strategy of prioritizing the role of the public in this crisis is designed to raise public awareness and focus on strategies for mitigation. The organizations responsible for implementing these activities include those at the macro level, such as national and local governments, as well as non-governmental organizations. The decisions taken as a result of these efforts should be in line with international agreements. It is society that will realize these studies and orientations.

Materials and Methods

The current study aims to ascertain the extent of awareness among university students in the Isparta province regarding the legal and social dimensions of the climate change problem, and to examine the underlying factors that have led to a shift in this awareness. In line with the purpose of the study, t-test and One-Way Analysis of Variance (ANOVA) were applied to examine whether the awareness levels differed according to demographic variables. Additionally, the study will investigate the level of awareness regarding potential solutions to the problem. To this end, a questionnaire was administered to 400 students currently enrolled at SDU and ISUBU between December 2023 and February 2024. The data were collected using the simple random sampling method. The initial section of the questionnaire is comprised of questions designed to ascertain the respondents' demographic characteristics. The subsequent section is comprised of 26 questions designed to assess their awareness of the socio-legal dimensions of climate change. Furthermore, a 5-point Likert scale was employed in the study, and it was established that the 26 questions identified through factor analysis were classified under three principal factors. The aforementioned factors can be classified as follows: The three factors were identified as awareness in general, awareness of solution and awareness of the law. The general awareness scale comprises statements of the Likert type, which are used to assess the attitudes of individuals towards environmental change. The items employed are designed to analyse the relationship between individuals' environmental knowledge and the direct effects of climate change. The statements utilised in the solution awareness scale are intended to measure individuals' attitudes towards issues such as recycling, energy saving, and reducing carbon emissions. In our study, such statements were adapted to assess individuals' level of awareness of solution strategies in combating climate change. Finally, legal awareness is designed to assess individuals' level of knowledge about international agreements such as the Paris Climate Agreement and legal regulations at the country level. The items aim to understand the level of individuals' perception of their legal responsibilities. According to the results obtained, the main hypotheses are as follows:

H₁: There is a statistically significant difference between the male and female populations with regard to their awareness.

H₂: There is a statistically significant difference between age groups in the awareness in at least one group.

H₃: There is a statistically significant difference in at least one group between mother's and father's education level and awareness.

H₄: There is a statistically significant difference between class levels in terms of awareness in at least one group.

H₅: There is a statistically significant difference between income levels in terms of awareness in at least one group.

H₆: There is a statistically significant difference between SDU and ISUBU students in terms of general awareness.

A T-test is a statistical test employed to ascertain the mean differences between two independent groups (Kalpic et al., 2014). In this study, a t-test was employed to ascertain any differences in awareness levels according to the gender variable. In order to ascertain whether there are significant differences in levels of general awareness, solution awareness and legal awareness according to gender, a t-test was employed. Additionally, ANOVA is a statistical test employed to ascertain mean differences between multiple groups (Girden, 1992). In this study, ANOVA was employed to examine the relationship between awareness levels and various demographic variables, including age, maternal and paternal education levels, grade level, and income level. The results demonstrated that age, mother's education level and father's education level did not exert a statistically significant influence on awareness levels. However, the ANOVA revealed that there were notable discrepancies in legal awareness levels contingent on income level. These analytical techniques were deemed optimal for achieving the objectives of the study. The t-test and ANOVA are efficacious instruments for discerning disparities in awareness levels according to demographic variables, thereby enhancing the reliability and validity of the study's outcomes.

Results and Discussion

The high level of awareness of future generations about climate change may prove to be an obstacle to effective climate change mitigation strategies. In this case, the objective was to ascertain the levels of awareness among students in Isparta regarding the socio-legal dimensions of climate change issue at the conclusion of the questionnaire. The survey revealed three principal factors: overall awareness, awareness of solutions, and awareness of the legal implications (Gerek, 2022). The descriptive statistics of the survey data utilized in the study are detailed in Table 1.

Table 1: Descriptive Statistics

Variable		Frequency	Percentage
Gender	Male	200	50.0
	Female	200	50.0
Age	17-19	87	21.8
	20-22	194	48.5
	23-25	72	18.0
	26+	47	11.8
Mother's Education Level	Primary School	114	28.5
	Middle School	100	25.0
	High School	110	27.5
	Bachelor's Degree and Above	76	19.0
Father's Education Level	Primary School	94	23.5
	Middle School	98	24.5
	High School	120	30.0
	Bachelor's Degree and Above	88	22.0
Grade	1	95	23.8
	2	113	28.2
	3	81	20.3
	4	63	15.8
	5+	48	12.0
Income	1250-2000	82	20.5
	2001-3000	101	25.3
	3001-5000	80	20.0
	5001+	137	34.3
School	SDU	200	50.0

The Effect of Awareness Scale on Socio-Legal Dimensions of Climate Change Problem on Gender Groups

Table 2 provides a detailed account of the results of the analyses carried out to examine the impact of the gender variable on the elements of the awareness scale regarding the socio-legal dimensions of climate change. A t-test was employed to ascertain whether there is a notable discrepancy between the relationship between the legal and social aspects of climate change, as perceived by male and female groups, in accordance with the factors of awareness.

Table 2: T-test Results for Gender Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
Gender	Awareness in General	Male	200	4.01	0.55	0.001*
		Female	200	4.29	0.47	
	Awareness of Solutions	Male	200	3.87	0.67	0.001*
		Female	200	4.09	0.58	
	Awareness of the Law	Male	200	3.58	0.64	0.427
		Female	200	3.53	0.63	

* $p < 0.05$

As indicated in Table 2, the p-value derived from the analysis was determined to be 0.001, thus rejecting the null hypothesis (H_0). A statistically significant difference between male and female subject groups was confirmed at the 95% confidence level in terms of overall awareness. Consequently, while the average general awareness of men was calculated as 4.01, it was calculated as 4.29 for women. It can therefore be stated that women have higher overall awareness.

Upon examination of Table 2, it becomes evident that the p-value, calculated as a consequence of the analysis, is 0.001. The null hypothesis is rejected, indicating a statistically significant difference between male and female participants in solution awareness at the 95% confidence level. Calculations revealed that the mean solution awareness of male participants was 3.87, while that of female participants was 4.09. These findings suggest that women demonstrate higher solution awareness. This result is also supported by the study conducted by Venghaus et al. (2022) in Germany. In their study conducted in Germany, Venghaus et al. stated that women have higher levels of awareness about climate change and that this awareness leads to behavioural changes. The study showed that women are more open to information on climate change and tend to integrate this information into their daily lives. These findings reveal that women are more sensitive and proactive towards environmental problems.

Also in Table 2, the resulting p-value from the analysis was determined to be 0.427, which indicates that the null hypothesis is not rejected. This suggests that there is no statistically significant difference between male and female participants in legal awareness at the 95% confidence level. Furthermore, the finding that women demonstrate higher levels of solution awareness than men was corroborated by the study conducted by Bayraktar et al. (2024) in Mediterranean universities. In their comparative study of university students in France and Greece, they observed that women exhibited more conscious and solution-oriented approaches in addressing climate change. The study revealed that women exhibited greater interest in solutions related to climate change and made more effort to support these solutions. The results of the t-test for the gender variable indicated that no significant difference was present with regard to the variable of legal awareness. A significant difference was observed in relation to the aforementioned points, the variables of general awareness and solution awareness. Consequently, women exhibit superior general awareness and solution awareness compared to men.

The Effect of Awareness Scale on Socio-Legal Dimensions of Climate Change Phenomenon Age Groups

Table 3 depicts the effect of age categories on the awareness of the socio-legal dimensions of climate change. The aim was to determine whether there is a significant difference in the relationship between the factors of awareness variable and the socio-legal dimensions of climate change, as perceived by individuals within the 17-19, 20-22, 23-25, and 26+ age groups. To this end, ANOVA was employed.

Table 3: ANOVA Results for Age Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
Age	Awareness in General	17-19	87	4.13	0.50	0.851
		20-22	194	4.15	0.50	
		23-25	72	4.20	0.52	
		26+	47	4.13	0.71	
	Awareness of Solutions	17-19	87	3.93	0.61	0.671
		20-22	194	3.96	0.61	
		23-25	72	4.02	0.65	
		26+	47	4.05	0.75	
	Awareness of the Law	17-19	87	3.56	0.56	0.731
		20-22	194	3.54	0.59	
		23-25	72	3.63	0.72	
		26+	47	3.52	0.78	

* $p < 0.05$

As indicated in Table 3, the p-value for general awareness was found to be 0.851. While the null hypothesis H_0 cannot be rejected, the observed difference between age groups in awareness levels was not statistically significant at the 95% confidence level. Moreover, an examination of Table 3 demonstrates that the p-value for solution awareness is 0.671. The p-value derived from the ANOVA was found to be 0.731, indicating that the null hypothesis cannot be rejected. Therefore, it can be posited that there is not a statistically significant relationship between age groups and legal awareness at the 95% confidence level. The ANOVA for the age variable revealed no statistically significant difference between the factors. The analysis revealed that age groups exert no influence on the awareness of the legal and social dimensions of the climate change problem. This result is also supported by the study conducted by Ballew et al. (2019). The study indicated that younger generations are more concerned about climate change; however, there is no significant difference in awareness levels between age groups. The results are corroborated by the finding that younger generations are more active in addressing climate change, yet there are no significant differences in awareness levels between age groups. Conversely, a study conducted by the Pew Research Center (2021) revealed that younger generations are more active in addressing climate change, yet there are no significant differences in awareness levels between age groups.

The Effect of the Awareness Scale on the Socio-Legal Dimensions of the Climate Change Problem on the Mother's Education Level

Table 4 depicts the impact of maternal educational attainment on the recognition of the legal and social dimensions of the climate change issue. The analysis employed a one-way analysis of variance (ANOVA) to ascertain whether there were notable discrepancies in the relationship between awareness of the legal and social dimensions of climate change and the factors associated with the primary, secondary, high school, undergraduate, and postgraduate groups, stratified by maternal educational attainment.

Table 4: ANOVA Results for Mother's Education Level Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
Mother's Education Level	Awareness in General	Primary School	114	4.25	0.49	0.060
		Middle School	100	4.09	0.43	
		High School	110	4.21	0.50	

Awareness of Solutions	Bachelor's Degree and Above	76	4.00	0.70	0.106
	Primary School	114	4.04	0.54	
	Middle School	100	3.97	0.58	
	High School	110	4.03	0.60	
Awareness of the Law	Bachelor's Degree and Above	76	3.83	0.85	0.452
	Primary School	114	3.48	0.54	
	Middle School	100	3.60	0.64	
	High School	110	3.61	0.67	
	Bachelor's Degree and Above	76	3.56	0.69	

* $p < 0.05$

In accordance with the data presented in Table 4, the p-value was determined to be 0.06. Therefore, the null hypothesis cannot be rejected, and it can be inferred that there is no statistically significant difference between the level of maternal education and general awareness at the 95% confidence level. This result is also supported by Pekez et al. (2024). In this study, it was stated that the mother's education level did not have a direct effect on climate change awareness, but the general education level increased climate change awareness. The results of the ANOVA indicated that the p-value was 0.106, which meant that the null hypothesis could not be rejected. This demonstrated that there was no statistically significant difference in terms of solution awareness at the 95% confidence level.

The p-value, as indicated in Table 4, was determined to be 0.452. Consequently, the null hypothesis cannot be rejected, and it can be inferred that there is no statistically significant difference in terms of legal awareness. The ANOVA for the maternal education level variable revealed no statistically significant differences between the factors. The analysis revealed that the level of maternal education has no impact on awareness of the legal and social dimensions of climate change. In addition, the results are corroborated by a study published by Ofori et al. This study indicated that the mother's educational level did not exert a direct influence on climate change awareness. However, the general educational level was found to enhance climate change awareness. In contrast with the findings of this study, Ma and Chen (2023) also reported that an increase in the level of education is associated with an enhancement in climate change awareness and adaptive capacity. The study underscores the significance of climate change education in countries within the Global South, as well as the challenges encountered in implementing this education. It is asserted that an expansion in the level of education is a pivotal factor in the enhancement of climate change awareness and adaptive capacity.

The Effect of Awareness Scale for Legal and Social Dimensions of Climate Change Problem on Father's Education Level

The effect of fathers' educational levels on their awareness of the legal and social dimensions of the climate change problem is presented below. The objective was to ascertain whether there is a significant difference in the relationship between awareness of the legal and social dimensions of climate change according to the factors between the primary, secondary, high school, undergraduate and above groups according to the father's educational levels. ANOVA was applied to achieve this.

Table 5: ANOVA Results for Father's Education Level Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
Father's Education Level	Awareness in General	Primary School	9	4.	0.	0.16
		High School	4	24	51	
		Middle School	9	4.	0.	
		Undergraduate and Above	8	15	54	

		High	1	4.	0.	
		School	20	16	46	
		Bachel	8	4.	0.	
		or's Degree and	8	05	62	
		Above				
		Primar	9	4.	0.	
		y School	4	04	61	
		Middle	9	3.	0.	
	Aware	School	8	97	67	
ness	of	High	1	4.	0.	0.4
Solutions		School	20	03	51	24
		Bachel	8	3.	0.	
		or's Degree and	8	83	76	
		Above				
		Primar	9	3.	0.	
		y School	4	48	59	
		Middle	9	3.	0.	
	Aware	School	8	60	63	
ness of the Law		High	1	3.	0.	0.8
		School	20	61	63	46
		Bachel	8	3.	0.	
		or's Degree and	8	56	69	
		Above				

***p<0.05**

The p-value derived from the analysis was determined to be 0.116 (Table 5). In light of these findings, it can be concluded that the null hypothesis cannot be rejected. There is no statistically significant difference in terms of general awareness at the 95% confidence level. Furthermore, the p-value derived from the ANOVA was determined to be 0.424. The results of ANOVA indicated that the p-value was 0.846, thereby demonstrating that the null hypothesis could not be rejected. Consequently, it can be concluded that there was no statistically significant difference between the levels of father's education and legal awareness at the 95% confidence level. The ANOVA conducted on the variable of paternal education level revealed no statistically significant difference between the factors. The analysis revealed that the level of paternal education had no impact on the awareness of the legal and social dimensions of the climate change issue.

The Effect of Awareness Scale on Legal and Social Dimensions of Climate Change Problem on Class Groups

The impact of grade levels on the awareness of the legal and social dimensions of the climate change problem is illustrated in Table 6. The objective was to ascertain whether there was a notable discrepancy between the relationship between the awareness of the legal and social dimensions of the climate change

problem according to the factors between the 1st grade, 2nd grade, 3rd grade, 4th grade and those who extended their schooling according to the grade levels, as indicated by the ANOVA results presented in Table 6.

Table 6: ANOVA Results for Grade Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
Level of Grade	Awareness in General	Grade 1	95	4.20	0.52	0.017*
		Grade 2	113	4.20	0.48	
		Grade 3	81	3.97	0.57	
		Grade 4	63	4.16	0.50	
		Extending school	48	4.21	0.60	
	Awareness of Solutions	Grade 1	95	4.05	0.62	0.119
		Grade 2	113	3.96	0.58	
		Grade 3	81	3.83	0.68	
		Grade 4	63	3.98	0.9	
		Extending school	48	4.10	0.61	
	Awareness of the Law	Grade 1	95	3.62	0.66	0.123
		Grade 2	113	3.46	0.58	
Grade 3		81	3.59	0.69		
Grade 4		63	3.48	0.59		
Extending school		48	3.71	0.64		

*p<0.05

Table 6 demonstrates that the p-value, calculated as a result of the analysis, was found to be 0.017. The null hypothesis is thus rejected. A statistically significant difference is evident between the grade levels in terms of general awareness at the 95% confidence level. Consequently, a distinction can be observed between the first and second grades and the third grades. The mean general awareness of the first and second graders was 4.20, the mean of the third graders was 3.97, the mean of the fourth graders was 4.16 and the mean of those whose school was extended was 4.21. As observed in Table 6, the p-value was calculated to be 0.119. Consequently, the H_0 cannot be rejected, and it can be concluded that there is no statistically significant difference between the grade levels in terms of solution awareness at the 95% confidence level. In light of the findings presented in Table 6, the p-value was calculated to be 0.123. The ANOVA demonstrated that there was no statistically significant difference in terms of solution awareness and legal awareness with regard to grade level. A statistically significant difference was observed in terms of general awareness. About the factor of general awareness, a distinction is evident between the first and second grades and the third grades. The general awareness of the first and second grades was found to be higher than that of the other grade groups. While the awareness of fourth graders is similar to that of the first and second graders, the general awareness of third graders is comparatively lower.

The Effect of Awareness Scale on Legal and Social Dimensions of Climate Change Problem on Income Groups

Table 7 illustrates the impact of income groups on awareness of the legal and social dimensions of the climate change issue, as evidenced by the ANOVA results. The objective was to ascertain whether there is a notable discrepancy in the correlation between awareness of the legal and social dimensions of climate change and income groups with a monthly income of 1,250-2,000 TL, 2,001-3,000 TL, 3,001-5,000 TL, and above 5,001 TL.

Table 7: ANOVA Results for Income Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
Level of Income	Awareness in	1250-2000	82	4.26	0.51	0.003*
	General	2001-3000	101	4.23	0.32	

		3001-5000	80	4.13	0.49	
		5001+	137	4.03	0.66	
		1250-2000	82	4.03	0.69	
Awareness of Solutions		2001-3000	101	4.22	0.50	<0.001*
		3001-5000	80	3.96	0.51	
		5001+	137	3.78	0.69	
		1250-2000	82	3.58	0.60	
Awareness of the Law		2001-3000	101	3.89	0.74	<0.001*
		3001-5000	80	3.39	0.52	
		5001+	137	3.40	0.53	

*p<0.05

The calculated p-value, as presented in Table 7, was found to be 0.003. In light of the aforementioned evidence, it can be concluded that the null hypothesis is rejected. It can thus be seen that there is a difference between students with an income between 1250 and 2000 Turkish Lira and those with an income between 2001 and 3000 Turkish Lira, as well as between students with an income above 5001 Turkish Lira. In particular, this result is also supported in the study by Kiley and Vaisey (2021). In their study examining the effect of income level on legal awareness, they stated that individuals in higher income groups have more knowledge about legal regulations and policies related to climate change. It was concluded that these individuals better understand the importance of the legal framework in combating climate change and are more conscious about this issue. The mean general awareness score for students with an income of 1250-2000 TL was calculated to be 4.26, while the mean for students with an income of 2001-3000 TL was 4. The mean scores for the students with an income of 3001-5000 TL was 4.13, while the mean score for the students with an income of more than 5001 TL was 4.03.

As a consequence of the ANOVA (Table 7), the calculated p-value was determined to be 0.001. The null hypothesis is thus rejected. A statistically significant difference in solution awareness is observed between income levels at the 95% confidence level. It can thus be seen that there is a difference between students with incomes between 3001 and 5000 and those with incomes above 5001, as well as between students with incomes between 2001 and 3000. The mean solution awareness of students with an income of 1250-2000 was calculated to be 4.03, while the mean for students with an income of 2001-3000 was 4.22. The mean for students with an income of 3001-5000 was 3.96, and the mean for students with an income of 5001+ was 3.78. Ultimately, as detailed in Table 7, the null hypothesis is rejected. A statistically significant difference in legal awareness is observed between income levels at the 95% confidence level. It can thus be seen that there is a difference between students with an income of 2001-3000 and all other income groups. The mean legal awareness score for students with an income of 1250-2000 was calculated to be 3.58, while those with an income of 2001-3000 exhibited a mean score of 3.89. Students with an income of 3001-5000 demonstrated a mean score of 3.39, while those with an income exceeding 5001 exhibited a mean score of 3.40.

The Effect of Awareness Scale on Legal and Social Dimensions of Climate Change Problem on School Groups

The results of the analyses examining the impact of the school variable on the factors of the awareness scale pertaining to the legal and social dimensions of the climate change problem are presented in Table 8. A t-test was employed to ascertain the differences between the students of SDU and those of ISUBU with regard to the factors pertaining to the relationship between the legal and social aspects of climate change.

Table 8: t-test Results for School Variable

Variable	Factors	Group	n	\bar{x}	Std.	p-value
School	Awareness in General	SDU	200	4.29	0.55	<0.001*

	ISUBU	200	4.01	0.48	
Awareness of Solutions	SDU	200	4.01	0.67	0.351
	ISUBU	199	3.95	0.60	
Awareness of the Law	SDU	200	3.41	0.59	<0.001*
	ISUBU	200	3.71	0.65	

* $p < 0.05$

As indicated in Table 8, the p-value derived from the analysis was determined to be 0.001. The null hypothesis is rejected, and it can thus be concluded that there is a statistically significant difference between the SDU and ISUBU students in terms of general awareness at the 95% confidence level. Consequently, the general awareness average of the SDU students was calculated as 4.29, while that of the ISUBU students was calculated as 4.01. It can therefore be stated that the SDU students have higher general awareness. Also, Table 8 indicates that the p-value is 0.351, which means that the H_0 cannot be rejected. It can therefore be stated that there is no statistically significant difference between the SDU and ISUBU students in terms of legal awareness at the 95% confidence level.

Table 8 reveals a statistically significant difference between SDU and ISUBU students in terms of legal awareness at the 95% confidence level. Consequently, the mean legal awareness of SDU students was calculated as 3.41, while that of ISUBU students was calculated as 3.71. It may therefore be concluded that ISUBU students exhibit higher levels of legal awareness. The t-test for the school variable revealed no statistically significant difference in terms of "Solution Awareness". However, a significant difference was identified in terms of general awareness, with students from SDU demonstrating higher levels of general awareness than those from ISUBU. When examining legal awareness, it was found that students from ISUBU exhibited higher levels of legal awareness than their counterparts from SDU. The results obtained in the study conducted by Ricart et al. (2023) were analogous. In their study comparing the climate change awareness levels of students at different universities, Smith et al. demonstrated that the educational programmes and environmental awareness-raising activities of universities have a significant impact on students' awareness levels. The study indicated that students of universities with more established and comprehensive environmental education programmes, such as SDU, exhibited higher levels of awareness about climate change.

Conclusion

The objective of the present study was to ascertain whether statistically significant differences existed in the awareness of SDU and ISUBU students in relation to the legal and social dimensions of the climate change problem, as a function of demographic characteristics such as gender, age, mother's education level, father's education level, class level, income level, and school. The data employed in the study were procured from students currently enrolled at SDU and ISUBU between December 2023 and February 2024. The data collection instrument employed to assess awareness of the legal and social dimensions of climate change was a scale comprising three factors: general awareness, solution awareness and legal awareness. To ascertain whether there were significant differences between these factors and demographic characteristics, an independent variables t-test and one-way ANOVA were conducted. The findings of the research study indicated that demographic variables exert varying influences on general awareness, solution awareness, and legal awareness. In particular, the study revealed that female students exhibited higher levels of general and solution awareness than male students. Additionally, the study demonstrated that income level plays a significant role in influencing

awareness. Furthermore, the study observed that students at SDU demonstrated higher levels of general awareness, while students at ISUBU exhibited superior legal awareness.

In light of these findings, a number of policies are proposed with the aim of enhancing climate change awareness among university students. Firstly, the integration of courses on climate change and sustainability into the university curriculum will facilitate students' comprehension of the legal, social, and environmental impacts of this issue. It is recommended that these courses place particular emphasis on international conventions such as the Paris Climate Agreement, as well as legal regulations in Turkey. Furthermore, the establishment of student clubs and committees with sustainability themes at universities, coupled with the organisation of practical projects and social awareness activities, can facilitate the dissemination of knowledge and the promotion of social engagement. The collaboration with local governments and non-governmental organisations in the organisation of activities such as workshops, seminars, and internship programs can also prove beneficial in this regard. Finally, the utilisation of digital platforms and social media for awareness campaigns can reach a vast audience and foster a culture of accountability and proactive behaviour among students.

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