

GREEN DEAL REGULATIONS AND READINESS OF E-COMMERCE
COMPANIES IN TEXTILE AND FOOTWEAR SECTOR IN TÜRKİYE

ONUR ÇEVİK

BOĞAZİÇİ UNIVERSITY

2025

GREEN DEAL REGULATIONS AND READINESS OF E-COMMERCE
COMPANIES IN TEXTILE AND FOOTWEAR SECTOR IN TÜRKİYE

Thesis submitted to the
Institute for Graduate Studies in Social Sciences
in partial fulfillment of the requirements for the degree of
Master of Arts
in
International Trade Management

by
Onur Çevik

Boğaziçi University

2025

Green Deal Regulations and Readiness of E-Commerce Companies
in Textile and Footwear Sector in Türkiye

The thesis of Onur Çevik

has been approved by:

Prof. Arzu Tektaş
(Thesis Advisor)

Assoc. Prof. Aslı Deniz Helvacıoğlu

Assoc. Prof. Murat Levent Demircan
(External Member)

May 2025

DECLARATION OF ORIGINALITY

I, Onur Çevik, certify that

- I am the sole author of this thesis and that I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced or published by another person or institution;
- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;
- this is a true copy of the thesis approved by my advisor and thesis committee at Boğaziçi University, including final revisions required by them.

Signature.....

Date.....

ABSTRACT

Green Deal Regulations and Readiness of E-Commerce Companies in Textile and Footwear Sector in Türkiye

Today, sustainability has become critical not only for environmental policies but also for economic and political issues, and many new regulations or incentives have been prepared. The Green Deal announced by the European Union in 2019 has been one of the most comprehensive examples of these developments. The regulation directly affects companies and organizations in countries that have commercial relations with the European Union. Türkiye is among these countries affected due to both its economic and geographical location and political relations with the EU. This study examines the awareness and readiness levels of e-commerce companies operating in the footwear and textile sectors in Türkiye regarding these environmental issues. This study aims to assess the companies' knowledge levels, strategic planning and readiness to implement the Green Deal and related regulations. The study uses primary data collected via a survey. Data analyses reveal that many companies do not have sufficient knowledge in the field of sustainability and aren't sufficiently prepared to comply with The EU Green Deal strategically and operationally. This study contributes to the literature on understanding the effects of the Green Deal on e-exporting companies and provides implications for decision makers.

ÖZET

Yeşil Mutabakat ve Türkiye'de Tekstil ve Ayakkabı Sektöründeki E-Ticaret Firmalarının Hazırlık Durumu

Günümüzde sürdürülebilirlik sadece çevre politikalarının değil, aynı zamanda ekonomik ve politik konular için de kritik bir öneme sahip olmuştur ve birçok yeni regülasyonlar yada teşvikler hazırlanmıştır. Avrupa Birliği tarafından 2019 yılında açıklanan Yeşil Mutabakat, bu gelişmeler içerisinde en kapsamlı örneklerinden biri olmuştur. Özellikle Avrupa Birliği ile ticari ilişkisi bulunan ülkelerdeki firmaları ve kuruluşları doğrudan etkilemektedir. Hem coğrafi konumu gereği hem de politik ilişkileri sebebiyle Türkiye de etkilenen bu ülkeler arasında yer almaktadır. Bu çalışma, Türkiye’de faaliyet gösteren ayakkabı ve tekstil sektöründeki e-ticaret firmaların bu çevre konularına yönelik farkındalık ve hazırlık düzeylerini incelemektedir. Anket çalışması yapılan bu çalışmada, firmaların Yeşil Mutabakat ve ilgili düzenlemelere ilişkin bilgi düzeyleri, stratejik planlamaları ve uygulamaya geçebilme hazırlık durumlarını ölçmeyi hedeflemiştir ve elde edilen veriler ışığında yapılan analizler, birçok firmanın sürdürülebilirlik alanında yeterli bilgiye sahip olmadığını, hazırlık anlamında da yetersiz seviyede olduğunu ortaya koymaktadır. Bu çalışma, Yeşil Mutabakat’ın ihracat yapan firmalar üzerindeki etkilerini anlamaya yönelik literatüre katkı sunarken, karar vericiler için çıkarımlar sağlamaktadır.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	1
CHAPTER 2: SUSTAINABILITY AND THE BUSINESS ENVIRONMENT	8
CHAPTER 3: EU REGULATORY FRAMEWORK FOR SUSTAINABILITY	11
3.1 The European Green Deal	14
3.2 Circular economy and the Green Deal Action Plan	16
3.3 Paris agreement	17
3.4 The Kyoto protocol	19
3.5 German supply chain due diligence act.....	20
CHAPTER 4: EUROPEAN UNION INITIATIVES & THE GREEN DEAL	21
4.1 Literature review on Green Deal awareness.....	23
4.2 Carbon borderline adjustment mechanism (CBAM).....	28
4.3 Corporate sustainability reporting directive (CSRD).....	30
4.4 Ecodesign for sustainable products regulation (ESPR).....	31
4.5 Renewable energy directive (RED II/III)	33
4.6 Energy efficiency directive (EED)	34
4.7 AFIR (Alternative Fuels Infrastructure Regulation)	35
CHAPTER 5: TÜRKİYE & THE EUROPEAN UNION.....	37
5.1 Trade between Türkiye and the European Union.....	37
5.2 European Union and Türkiye customs agreement	39
5.3 Türkiye's perspective and action plan on the Green Deal	41
CHAPTER 6: E-COMMERCE.....	43
6.1 E-Commerce in Türkiye	44
CHAPTER 7: METHODOLOGY	47

7.1 Scope of the study	47
7.2 Survey design	49
7.3 The questionnaire	50
CHAPTER 8: DATA ANALYSIS, FINDINGS AND DISCUSSION.....	54
8.1 Descriptive analyses	55
8.2 Chi-Square analysis	79
8.3 ANOVA.....	94
8.4 Findings and discussion.....	99
CHAPTER 9: CONCLUSION.....	103
9.1 Limitations of the study.....	106
APPENDIX A: QUESTIONNAIRE IN TURKISH	107
APPENDIX B: QUESTIONNAIRE IN ENGLISH.....	115
APPENDIX C: DEMOGRAPHIC STRUCTURE OF COMPANIES	123
REFERENCES.....	125

LIST OF TABLES

Table 1. EU's Share in Türkiye's Total Foreign Trade After 1980 (Billion \$) (Özdemir & Aytekin, 2016)	39
Table 2. Distribution of Firms' Responses to Question 1-10.....	57
Table 3. Distribution of Firms' Responses to Question 11	58
Table 4. Distribution of Firms' Responses to Question 12.....	59
Table 5. Distribution of Firms' Responses to Question 13.....	59
Table 6. Distribution of Firms' Responses to Question 14.....	60
Table 7. Distribution of Firms' Responses to Question 15.....	60
Table 8. Distribution of Firms' Responses to Question 16.....	61
Table 9. Distribution of Firms' Responses to Question 17.....	61
Table 10. Distribution of Firms' Responses to Question 18.....	62
Table 11. Distribution of Firms' Responses to Question 19.....	62
Table 12. Distribution of Firms' Responses to Question 20.....	63
Table 13. Distribution of Firms' Responses to Question 21	63
Table 14. Distribution of Firms' Responses to Question 22.....	64
Table 15. Distribution of Firms' Responses to Question 23.....	64
Table 16. Distribution of Firms' Responses to Question 24.....	65
Table 17. Distribution of Firms' Responses to Question 25.....	65
Table 18. Distribution of Firms' Responses to Question 26.....	66
Table 19. Distribution of Firms' Responses to Question 27.....	66
Table 20. Distribution of Firms' Responses to Question 28.....	67
Table 21. Distribution of Firm's Responses to Question 29.....	67
Table 22. Distribution of Firms' Responses to Question 30.....	68

Table 23. Distribution of Firms' Responses to Question 31	69
Table 24. Distribution of Firms' Responses to Question 32	69
Table 25. Distribution of Firms' Responses to Question 33	70
Table 26. Distribution of Firms' Responses to Question 34	71
Table 27. Distribution of Firms' Responses to Question 35	71
Table 28. Distribution of Firms' Responses to Question 36	72
Table 29. Distribution of Firms' Responses to Question 37	72
Table 30. Distribution of Firms' Responses to Question 38	73
Table 31. Distribution of Firms' Responses to Question 39	73
Table 32. Distribution of Firms' Responses to Question 40	74
Table 33. Distribution of Firms' Responses to Question 41	74
Table 34. Distribution of Firms' Responses to Question 42	75
Table 35. Distribution of Firms' Responses to Question 43	76
Table 36. Distribution of Firms' Responses to Question 44	76
Table 37. Distribution of Firms' Responses to Question 45	77
Table 38. Distribution of Firms' Responses to Question 46	77
Table 39. Distribution of Firms' Responses to Question 47	78
Table 40. Distribution of Firms' Responses to Question 48	78
Table 41. Chi-Square Test Between Question 3 and 22	79
Table 42. Chi-Square Test Between Question 3 and 11	80
Table 43. Chi-Square Test Between Question 3 and 16	81
Table 44. Chi-Square Test Between Question 3 and 23	82
Table 45. Chi-Square Test Between Question 3 and 26	83
Table 46. Chi-Square Test Between Question 2 and 40	84
Table 47. Chi-Square Test Between Question 2 and 38	85

Table 48. Chi-Square Test Between Question 2 and 26	86
Table 49. Chi-Square Test Between Question 2 and 22	87
Table 50. Chi-Square Test Between Question 2 and 23	88
Table 51. Chi-Square Test Between Question 5 and 12	89
Table 52. Chi-Square Test Between Question 5 and 14	90
Table 53. Chi-Square Test Between Question 5 and 18	91
Table 54. Table 52. Chi-Square Test Between Question 5 and 22	92
Table 55. Table 52. Chi-Square Test Between Question 5 and 23	93
Table 56. ANOVA Analysis Between Question 5 and 31	94
Table 57. ANOVA Analysis Between Question 5 and 32	95
Table 58. ANOVA Analysis Between Question 5 and 30	96
Table 59. ANOVA Analysis Between Employee Number and Questions 30, 31,32	98
Table 60. ANOVA Analysis Between Firm Age and Questions 30, 31,32	99

ABBREVIATIONS

AFIR	Alternative Fuels Infrastructure Regulation
CBAM	Carbon Border Adjustment Mechanism
CSRD	Corporate Sustainability Reporting Directive
CU	Customs Union
DPP	Digital Product Passport
EED	Energy Efficiency Directive
EGD	European Green Deal
ESG	Environmental, Social and Governance
ESPR	Ecodesign for Sustainable Products Regulation
ESPR	Ecodesign for Sustainable Products Regulation
ESRS	European Sustainability Reporting Standards
EU	European Union
RED II/III	Renewable Energy Directive
SDGs	Sustainable Development Goals
SMEs	Small and medium-sized enterprises
UNFCCC	UN Framework Convention on Climate Change

CHAPTER 1

INTRODUCTION

Global warming and environmental sustainability have become critical agenda items in international trade and logistics today. These issues, which concern all countries in the world, have begun to directly or indirectly affect both economic policies and strategies of countries. Environmental issues are no longer considered solely as ecological issues, but also as multidimensional risks that threaten economic stability, public health and social equality. This has led countries to reshape their development policies and put legal regulations that minimize environmental impacts on the agenda. This has led to the emergence of new agreements and regulations on a global scale; international standards have begun to be developed in many areas, from reducing carbon emissions to the circular economy. The European Union's Green Deal initiative stands out as one of the most comprehensive strategies that integrate environmental and economic goals. The compliance issues of the deal closely concern both the countries in the European Union and the countries that have commercial and political relations with the European Union.

The Green Deal announced by the European Union in 2019 aims for Europe to become the first carbon-neutral continent by 2050. In this context, issues such as reducing carbon emissions, increasing energy efficiency and adopting sustainable production models come to the fore. Basically, the European Green Deal is an expansion plan designed to encourage a green transformation. According to the Communication on the European Green Deal, it is a chance that will help the EU move toward sustainable and equitable development (Fetting, 2020). The Green Deal necessitates major transformations, especially in the supply chain and logistics

sectors, and encourages companies to develop new business models focused on sustainability. This transformation leads to major changes in various sectors such as industry, energy, agriculture, transportation and trade, and in this process, companies in sectors such as textiles and footwear have to develop new strategies, especially to reduce their impact on the environment (Höfer et al., 2020).

As part of the European Green Deal, the European Union has introduced several key regulations designed to promote environmental sustainability and accelerate the transition to a climate-neutral economy. These legislative measures aim not only to reduce environmental harm but also to transform supply chains and economic structures in line with sustainability goals (European Commission, 2019; UNEP, 2021). The primary regulations under this initiative include:

- Carbon Border Adjustment Mechanism (CBAM)
- Corporate Sustainability Reporting Directive (CSRD)
- Ecodesign for Sustainable Products Regulation (ESPR)
 - Digital Product Passport (DPP)
- Renewable Energy Directive (RED II/III)
- Energy Efficiency Directive (EED)
- Alternative Fuels Infrastructure Regulation (AFIR)

Together, these regulations illustrate the European Union's commitment to integrating environmental, economic, and social sustainability objectives within its overall policy framework.

Türkiye and the European Union are in close contact with each other due to their geographical location and political relationship. Also, the trade volume between them has been very significant over the years. In 2023, Türkiye became the fifth largest trading partner of the EU with a share of 4.1% in total foreign trade. During

this period, Türkiye's exports to the EU were 111.3 billion Euros, while its imports from the EU were 95.7 billion Euros. The total trade volume reached 207 billion Euros, increasing by 11.9% annually (European Commission, 2023). Within the framework of the Customs Union Agreement, tariff barriers in Türkiye's trade with the EU have been removed. However, the EU's environmental regulations and standards are among the important factors that may affect Türkiye's access to the EU market. Therefore, it is of great importance for Turkish companies, including those operating in the textile and ready-to-wear sectors to comply with the EU's environmental regulations.

The effects of the Green Deal on Türkiye cannot be ignored. In order for Türkiye to maintain and strengthen its role as a key trade partner of the European Union (EU), aligning with the regulatory framework of the European Green Deal is essential. The Green Deal introduces a range of environmental and sustainability standards that affect cross-border trade, particularly concerning carbon emissions, circular economy practices, and supply chain transparency. Türkiye's ability to adapt to these evolving requirements holds substantial implications for both manufacturers of final goods and upstream suppliers. One of the most critical elements in this transition is the level of awareness and readiness among Small and Medium-sized Enterprises (SMEs), which constitute a large portion of the Turkish industrial landscape. As these businesses are often resource-constrained, their capacity to integrate sustainable practices and meet EU environmental standards will significantly influence the overall success of Türkiye's alignment with the Green Deal objectives.

As a country with intense trade relations with the European Union, Türkiye published the Green Deal Action Plan in 2021 in order to comply with these

regulations. This action plan includes the necessary transformation processes and compliance mechanisms for Türkiye to maintain its competitive power in exports. In particular, the steps to be taken in areas such as sustainable logistics, low-carbon transportation and circular economy have been determined. It is of critical importance for companies to comply with these new regulations, minimize their environmental impacts and gain competitive advantage in the international market.

The main scopes of the Green Deal Action Plan prepared by Türkiye are as follows;

- Border carbon regulations
- A green and circular economy
- Green financing
- Clean, economical and secure energy supply
- Sustainable agriculture
- Sustainable smart transportation
- Fighting climate change
- Diplomacy
- European Green Deal information and awareness activities

The steps taken by Türkiye within the scope of the Green Deal directly affect not only traditional production and export-oriented sectors but also the rapidly growing digital economy. Especially for companies with intense trade relations with the European Union, complying with sustainability-oriented regulations has become a strategic necessity in order to maintain competitive advantage. In this context, the e-commerce sector, which has gained momentum with the opportunities offered by digitalization, has become more visible and auditable in terms of compliance with environmental standards and supply chain transparency.

The e-commerce sector has grown rapidly in recent years and has become one of the most important building blocks of global trade. E-commerce companies, especially those operating in the textile, shoe and bag sectors, are directly affected by the regulations brought by the Green Deal due to their extensive supply chains and intensive logistics activities. Effects of the related regulations are expected to continue in increasing amounts in the coming periods. New logistics models aimed at reducing carbon footprints, increasing the use of environmentally friendly packaging and sustainable production are among the factors that determine the future competitive advantages of these companies. However, the awareness level of companies about the Green Deal regulations and their readiness level for this transformation are important areas of research.

Türkiye has become an important market by taking its share from the global development of e-commerce. As of 2023, the e-commerce volume in Türkiye has reached nearly 400 billion TL, and this figure is increasing significantly every year (TÜİK, 2023). Turkish companies also aim to grow their companies through their own online sites and various platforms. Türkiye's e-commerce sector has become an important player not only in the local market but also in international markets. With the rise of e-commerce, it has been seen that businesses have more opportunities to sell products on digital platforms. This transformation facilitates the access of small and medium-sized enterprises (SMEs) to global markets, while providing the opportunity to reach a wider customer base for large-scale companies.

This study aims to assess the awareness and readiness levels of textile, shoe and bag companies operating in the e-commerce sector regarding the Green Deal. The study investigates the extent of companies' awareness about sustainability policies and regulations along with their readiness levels on environment friendly

practices in supply chain management and logistics processes. At the same time, the difficulties and potential opportunities faced by companies in this process are examined. Related academic studies in the literature are examined while developing the methodology and the related survey.

The survey designed within the scope of the research helps e-commerce companies operating in Türkiye in raising the awareness, understanding and the adaptation process related to the Green Deal. The survey study analyzes the current status of the companies under three main headings. These three main headings are the demographic structure of the companies, their awareness of the Green Deal and similar sustainability concepts; and finally their readiness. The findings will be a guide for companies in the sector, shed light to policy makers and fill the related gap in the academic field.

As a result, e-commerce companies in Türkiye are entering a major transformation process within the framework of the EU's Green Deal and Türkiye's Green Deal Action Plan. This study aims to examine the level of awareness and readiness of e-commerce companies in the Turkish textile and footwear sector to adapt to the Green Deal. Adoption of companies to these new environmental regulations is of great importance both in terms of Türkiye's economic relations and their position in global trade. The findings obtained will guide both sector representatives and policy makers and aim to help pave the way for sustainable trade. This study provides an original contribution to the literature as it is one of the limited numbers of academic studies in Türkiye focusing on the impacts of the European Green Deal on firms. Measuring the awareness and readiness levels of sustainability policies, especially in footwear and textile firms operating within the scope of e-commerce, fills the gap in sector-based analyses and provides guiding information to

policy makers. This study is also a guide for e-commerce platforms, which are important actors in digital commerce. Platforms need to analyze the sustainability awareness and regulatory readiness levels of their sellers and provide guidance in these areas. In this way, platforms can adapt to the green transformation more quickly and strengthen supply chain sustainability.



CHAPTER 2

SUSTAINABILITY AND THE BUSINESS ENVIRONMENT

Sustainability has become more important in the business world in the last few years. Due to the rising global issues like climate change, resource depletion, and social injustice, businesses have to consider these critical aspects along with making money. They also have to think about their social and environmental responsibilities and align their processes accordingly. Policies like the European Green Deal require businesses to cut their carbon emissions, switch to a circular economy, and make their supply chains more sustainable (European Commission, 2020). These changes are transforming the business world as a whole, including small and medium-sized businesses (SMEs), as well as big companies. Porter and Kramer (2011) state that businesses that use strategies that focus on sustainability will not only help solve social problems, but they will also make money in the long run. Also, Eccles et al. (2014) find that companies that start using sustainable practices early on tend to do better financially in the long run. This shows that being environmentally friendly is not only the right thing to do, but also a smart business move. In this situation, businesses that create sustainable business models gain the trust of their stakeholders and a competitive edge. Several important reasons have made sustainability more important in today's business world. One of the main reasons is that more investors and customers are aware of social and environmental issues. As climate change and resource depletion become more and more urgent issues (Dangelico & Vocalelli, 2017), businesses are under a lot of pressure to adopt sustainable practices because of new regulations and stakeholders' expectations. Also, social media and technology have made businesses more transparent, making it easier for customers and the

public to see and rate how well they do socially and environmentally. The internet has given customers the power to change the reputations of brands, which has made businesses more accountable (Dangelico & Vocalelli, 2017). Also, more and more people agree that making sustainability a part of business strategy is an important part of managing risk. Ignoring social and environmental issues can seriously hurt an organization's long-term success because it puts it at risk of financial, legal, and reputational problems (Sullivan & Mackenzie, 2017). In a world economy that is changing quickly, businesses need to be sustainable not just because it is the right thing to do, but also because it is a strategic need.

Sustainability is a long-term development approach that combines the principles of using natural resources in a protected manner, ensuring economic development, and ensuring social equality. This approach aims to sustain economic growth while limiting environmental damage and to transfer the welfare of societies to future generations (Brundtland, 1987). The European Union defines sustainability not as a concept limited to reducing environmental impacts, but as a holistic policy framework that requires economic growth, social inclusiveness and ecological balance to progress together. In line with this understanding, sustainability includes multidimensional goals such as efficient use of resources, combating climate change, transitioning to circular production systems and reducing social inequalities (European Commission, 2020). Sustainability is not just about the environment under the European Green Deal; it is also a strategic transformation that aims to restructure all economic and social systems, from infrastructure to governance, from production to consumption (European Environment Agency, 2021).

In this study, the concept of sustainability is addressed within a multidimensional structure that encompasses the efforts of businesses to fulfill their

environmental and economic in a balanced manner. In this context, sustainability is positioned as a structure integrated into the strategic decision-making processes of companies in many areas, from production and supply processes to logistics operations, from digital transformation applications to foreign trade activities. In this context, the concept of sustainability is addressed in this research in line with the policies determined by the European Green Deal and especially in connection with current application areas such as supply chain management, logistics infrastructure transformation and digital product tracking.



CHAPTER 3

EU REGULATORY FRAMEWORK FOR SUSTAINABILITY

In order to integrate sustainability with the objectives of economic growth, environmental preservation, and social welfare, the European Union has taken a multi-layered policy approach. To this end, it has created a number of legislative laws and implementation mechanisms. This section covers the European Green Deal as well as international environmental accords that govern sustainability globally, such the Paris Agreement and the Kyoto Protocol. This approach is important in terms of showing how the EU's climate targets are associated not only with regional but also with global commitments. In addition, the German Supply Chain Due Diligence Act, which shapes Germany's supply chain-focused sustainability policies, is evaluated in this section as an exemplary regulation implemented at the national level. Thus, this section aims to demonstrate that the general framework governing sustainability is not limited to the Green Deal alone; that the EU operates within a multi-dimensional and multi-actor system.

Sustainability has ceased to be a voluntary social responsibility approach in today's business world; it has become a fundamental requirement in strategic, operational and financial terms. The European Union, one of the leaders of this change, is creating extensive environmental, social, and governance (ESG) rules and regulations. The European Union enacted the European Green Deal in 2019 with the goal of making the continent carbon neutral by 2050 (European Commission, 2019). Along with lowering carbon emissions, the EU also wants to safeguard biodiversity, transition to a circular economy model, and increase the use of sustainable farming methods. For instance, it is now legally required to cut greenhouse gas emissions by

at least 55% by 2030 compared to 1990 levels under the European Climate Law (European Parliament, 2021). Furthermore, as part of the "Fit for 55" package, rules have been put in place requiring businesses to adjust to sustainability through a variety of channels spanning the energy, transportation, and industrial sectors (European Commission, 2021). Sustainability in business is not just a competitive advantage but also a regulatory requirement that must be met, as demonstrated by the EU's leadership in this field (Hörisch et.al, 2020).

The regulatory strategy of the European Union has created new mechanisms that have a direct impact on enterprises' sustainability performance. Companies are specifically required to disclose their ESG data in a transparent manner under the Corporate Sustainability Reporting Directive (CSRD) (European Financial Reporting Advisory Group [EFRAG], 2022). Compared to the 2014 NFRD (Non-Financial Reporting Directive), this regulation's scope has been further enlarged to encompass small and medium-sized businesses. In its 2023 integrated report, for instance, the French energy firm TotalEnergies outlined its plans to reduce carbon emissions and investments in renewable energy under the new CSRD (TotalEnergies, 2023). Furthermore, by imposing carbon pricing on EU manufacturers through programs like the Carbon Border Adjustment Mechanism (CBAM), the EU hopes to stop carbon emissions and maintain fair competition (European Commission, 2021). Accordingly, starting in 2026, businesses that export steel and cement to the EU from Türkiye will have to submit carbon statements and progressively pay taxes on carbon (İKV, 2023). Moreover, within the scope of the EU's "Action Plan for Sustainable Products", it is planned to implement the "Digital Product Passport" application in order to reduce the environmental impact of products throughout their life cycle and offer consumers more sustainable product options (European Commission, 2022).

Especially in the textile sector, companies such as H&M have launched pilot applications and are transparently presenting the production process and recycling potential of products to customers (H&M Group, 2023). All these actions show that the EU is putting pressure on the business world to transform towards sustainability, not only within its own borders but also on a global scale (Pisani & Stucchi, 2022). As a result, companies that do business in the European market today must follow rules that require them to be sustainable and make it a top strategic priority for long-term competitiveness.

The European Union's rules on sustainability are meant to do more than just protect the environment. They also aim to make sure that economic growth and social welfare are in harmony with nature. The EU wants to do more than just cut down on greenhouse gas emissions. It also wants to make the best use of resources by following the principles of a circular economy, making energy use more efficient, and supporting production systems that are good for people's health (European Commission, 2019; UNEP, 2021). The Sustainable Finance Taxonomy (EU Taxonomy) is another example of an initiative that has made it easier for investors to define "green" economic activities. This was created to change the way financial markets work (European Commission, 2020). These rules are meant to make sure that businesses can not only change quickly, but also deal with climate risks over the long term (OECD, 2022). The EU's plans for sustainability are meant to make companies more competitive while also making the world a better place and taking steps to stop the climate crisis (Potting et al., 2017).

The European Union has developed larger goals for sustainability. The EU wants to be carbon-neutral by 2050, and to help with that, it has set goals for reducing emissions and protecting biodiversity by 2030 (European Environment

Agency, 2021). All mechanisms introduced under the Green Deal – such as the Corporate Sustainability Reporting Directive (CSRD), the Border Carbon Adjustment Mechanism (CBAM) and the Ecodesign Regulation – are designed to serve these general goals (European Commission, 2021; 2022). To enhance energy security and expedite the shift to sustainable energy systems, the EU has established a multi-layered framework for sustainable development that encompasses environmental, economic, and social aspects, such as the REPowerEU plan, which aims to decrease reliance on fossil fuels (European Commission, 2022b).

The main regulations that have been enacted include the European Climate Law, CSRD, CBAM, Sustainable Finance Taxonomy and Sustainable Products Regulation for Ecodesign. The European Climate Law makes the EU's carbon neutrality goal a legal obligation (European Parliament, 2021), while CSRD reports companies' sustainability performance according to standardized criteria (EFRAG, 2022). CBAM provides a state-of-the-art trading mechanism to prevent carbon leakage, whereas Ecodesign programs incorporate environmental needs across a product's life cycle into product design processes (European Commission, 2021). These regulations are positioned as essential tools in Europe's efforts to develop a climate-neutral economy.

3.1 The European Green Deal

The European Union created the European Green Deal as an extensive plan package to fight climate change, safeguard the environment, and provide a model for sustainable economic growth. By separating economic growth from resource usage, the accord aims to adopt a sustainable development model and make the European continent the first carbon-neutral region by 2050 (European Commission, 2019).

Within this framework, policy transformations are envisaged in a wide range of areas such as energy, industry, transport, agriculture and finance; themes such as circular economy, biodiversity protection and just transition process come to the fore (von der Leyen, 2019). The European Green Deal is not just an environmental project; it is also a long-term plan to make Europe more competitive on the world stage and create a more inclusive society.

The European Green Deal has also similarities to the Sustainable Development Goals (SDGs), which the UN adopted in 2015. The 17 goals of the SDGs are meant to protect the environment, fight inequality, and improve people's health and happiness (United Nations, 2015). The European Green Deal is a strategic policy framework that makes sure the SDGs are carried out at the regional level (European Commission, 2019). The Deal is directly linked to SDG 13, which is about fighting climate change; SDG 7, which is about switching to clean energy; and SDG 9, which is about building and running businesses and infrastructure in a way that is good for the environment (Sachs et al., 2019). In addition, through policies such as circular economy practices, resource efficiency, and reducing carbon emissions, the Green Deal supports the practical implementation of the SDGs (Kroll, Warchold & Pradhan, 2019). It is also stated that they provide an important framework for increasing the impact of the private sector in the field of sustainability, transforming business models and directing investment decisions in this direction (Scheyvens et.al, 2016). The details of The European Green Deal will be provided in the following sections.

3.2 Circular economy and the Green Deal Action Plan

A sustainable economic strategy known as the "circular economy" seeks to reduce waste in the processes of production and consumption while extending the life of resources in the system. By reusing, repairing, recycling, and renewing items, components, and materials, this methodology reduces environmental consequences while maintaining economic value (Ellen MacArthur Foundation, 2013). The European Union defines the circular economy as a strategic transition that aims to decouple resource use from economic growth. In this context, the EU's Circular Economy Action Plan sets out a transformation vision that prioritizes sustainability in all value chains, from product design to waste management (European Commission, 2020). According to Özdemir and Gür, circular economy is an economic concept in which production and distribution proceed with the use-then-reuse method and the same resources are used over and over again (Özdemir & Gür, 2024).

As part of its reaction to the European Green Deal, the European Union developed the Circular Economy Action Plan, which aims to make the EU more competitive and ecologically benign by converting it into a circular economy. People who want to make a circular economy must deal with the problem of garbage generation (Reins & Wijns, 2025) because it means making products that are good for the environment and cutting down on waste. To make products that last a long time and are good for the environment, and to set up a circular economy in the EU, innovation is very important. For these reasons, it is important to come up with new ideas for making products, materials, and industrial processes (Schilling and S. Weiss, 2021). Using a circular economy can help use resources more efficiently and cut down on pollution at every stage of a product's life cycle, from making it to using

it (Bigdeloo et al., 2021).

The European Green Deal has placed the circular economy at the centre of its vision of structural transformation that integrates economic growth with environmental sustainability. This approach focuses on extending the life of products, encouraging reuse and closing the material cycle, aiming to minimise waste production and natural resource use (European Commission, 2020). In addition to being an environmental strategy, the circular economy is positioned as a crucial strategic instrument that will help Europe reach its carbon neutrality target (Ellen MacArthur Foundation, 2024). In this regard, the European Union's Circular Economy Action Plan, which includes regulations requiring sustainable manufacturing, particularly in resource-intensive industries like energy, building, and textiles, has emerged as one of the Green Deal's application mechanisms.

As a country affected by existing problems, Türkiye has started taking actions and developing solutions. In this context, the necessity of environmentally sensitive approaches has come to the fore. Türkiye has taken steps towards the circular economy process in order to both comply with the EU and leave a livable environment for future generations. Türkiye's transition to a circular economy began in 2015 with the European Union's acceptance of the Circular Economy Package. This was followed by a zero waste project and sustainability-based studies since 2019 (Balbay, et.al, 2021, s. 564; Döngüsel Ekonomi Rehberi, 2020, s. 51).

3.3 Paris agreement

The Paris Agreement was signed within the scope of the United Nations Framework Convention on Climate Change and is an international agreement that aims to reduce the effects of the climate crisis and regulate financial mechanisms in this process

(Köseoğlu & Erten, 2022). The Paris Agreement aims to keep global temperature increases below 2°C compared to pre-industrial levels. In order to achieve this goal, fossil fuel use must be reduced and renewable energy sources must be used. The difference between the agreement and previous climate agreements is that all developed and developing countries are obliged to submit a Nationally Determined Contribution to determine their emission reduction targets. Türkiye accepted the Paris Agreement in 2015 and signed the agreement in 2016, defining itself as a "developing country" (Hızarcıoğlu & Çobanoğlu, 2024). The Paris Climate Agreement has imposed various obligations on states regarding issues such as reducing CO₂ emissions, restricting fossil fuel use and protecting carbon sink areas. Within this framework, Türkiye has committed to limiting fossil fuel consumption by 2030, shifting to renewable energy sources and taking measures to reduce carbon emissions. It has also announced that it has set a "zero emissions" target for 2053 (Demir, 2022). Decreasing human greenhouse gases can be achieved through the phase-out of conventional fossil-based energy and the rapid deployment of environmentally friendly and negative-emission solutions is necessary to meet the Paris Agreement's aim of keeping global warming under 2 °C. The rate of energy innovation and technological diffusion must be greatly accelerated in order to accomplish such a quick shift. (Aleluia et al, 2023). The agreement also plays a transformative role in that it encourages countries to continuously update their climate policies through national contribution declarations that are non-binding but based on the principles of transparency and accountability (Bodansky, 2016). The accord has been a significant achievement considering the complexity of the discussions and the ongoing deadlock that plagued many attempts to reach a cooperative agreement during this period. Its design is the most perplexing feature. It

has similarities to other accords such as the Kyoto Protocol, the 1992 UN Framework Convention on Climate Change (UNFCCC), and most notably the Copenhagen Accord (Allan, et al., 2023).

3.4 The Kyoto protocol

The Kyoto Protocol was signed by 38 countries, including the European Union and most of its members, Canada, Japan, China, and a number of developing nations. The Kyoto Protocol was signed quickly during an extension of the Kyoto meeting beyond its December 10 deadline, into the early hours of December 11. The Protocol opened for signature on March 16, 1998, and came into force when 55 nations have ratified it, provided that these ratifications include Annex I Parties that were responsible for more than 55% of total greenhouse gas emissions in 1990 (Fletcher, 1999). The Protocol includes three market-based mechanisms—Joint Implementation, Clean Development Mechanism, and Emission Trading—that promote flexibility and ease parties' compliance with their respective emission reduction commitments while assisting Annex I Parties in reaching their emission reduction targets in the most economical and efficient manner (de Chazournes, 1998). With the conclusion of the Kyoto Protocol agreements at the end of 1997, legally binding, obligatory emission cuts for each of the six major greenhouse gases were established. Annex I countries have to decrease their aggregate greenhouse gas emissions by 5% beneath the levels of 1990. (the baseline year for methane, carbon dioxide, and nitrous oxide is 1990; the baseline year for the other three gases is 1995). This reduction must be averaged during the "commitment period" of 2008 to 2012, with every nation being assigned individually settled on goals that varied depending on their circumstances (Fletcher & Parker, 2007).

3.5 German supply chain due diligence act

The Supply Chain Due Diligence Act went into effect in Germany in 2023. Its goal is to make it easier to stop human rights abuses and environmental damage in international supply chains. This law makes businesses responsible for their actions by requiring big companies to respect human rights and keep an eye on how their actions affect the environment all the way down the supply chain (BMAS, 2021). Companies with more than 3,000 employees are required to conduct risk analysis, take preventive measures and provide transparent reporting in their relations with both direct and indirect suppliers (European Commission, 2022). This legal step is an indication that voluntary approaches are giving way to binding regulations across Europe (Smit et al., 2021).

The scope of the law requires companies to reassess not only their ethical obligations but also their competitive strategies. In this new era, where sustainability reporting directly affects corporate reputation, companies must switch to a risk-based supply chain management (Wettstein, Baumann-Pauly & Eugster, 2022). However, some scholarly works also question the law's practicality. According to some, the law may not have as much of an impact because it lacks effective enforcement mechanisms and does not monitor indirect suppliers (Oehri & Michel, 2022).

CHAPTER 4

EUROPEAN UNION INITIATIVES & THE GREEN DEAL

The European Union is founded on a set of social and economic foundations. Social and environmental sustainability are among these principles, together with supply chain limitations. Members of the EU appear to favor goods and services produced outside of the EU that meet these standards. It is required of European Union member states to have suitable structures set up for this kind of interaction (Felbermayr et al., 2024). The European Green Deal (EGD), introduced by the European Commission in 12.2019, aligns with Ursula von der Leyen's commitment to the European Parliament to prioritize sustainability during her tenure as Commission President. With the aim of becoming carbon neutral by 2050, the system serves as a comprehensive policy roadmap. In a variety of fields, including industry, transportation, infrastructure, energy, agriculture, and finance, it emphasizes the necessity of the combined methods. Important concepts like global cooperation to assist global sustainability initiatives, coordinated action, and an equitable shift that guarantees social fairness are also highlighted in the strategy (European Commission, 2019). In comparison to earlier pledges, such as the 2009 European Council's aim to cut emissions by 80–95% by 2050, the European Union's goal of being climate neutral by that year is a more ambitious one. This net-zero goal is in line with the Paris Agreement's goal of keeping the increase in global temperatures to less than 2°C, with subsequent attempts to keep it to 1.5°C over pre-industrial levels. Notably, the European Union has made this pledge legally obligatory by reinforcing it with the European Climate Law (Rosamond & Dupont, 2021). By 2050, carbon neutrality and resource-independent economic development

are the goals of the European Green Deal (EGD). It functions as a strategic policy framework that establishes goals across several sectors, even though it is not a legally enforceable legislation. Its implementation requires revising existing regulations and introducing new laws and directives. The EGD focuses on eight key areas: climate ambition, clean energy, circular economy, energy-efficient infrastructure, pollution reduction, biodiversity preservation, sustainable food systems, and smart mobility (Fetting, 2020). The European Green Deal (EGD) is anticipated to play a crucial role in transforming the logistics industry by prioritizing sustainable solutions aimed at reducing its environmental impact. Concepts such as green supply chain management and green logistics are expected to shape the future of freight transportation across European borders. Various policy initiatives have been introduced to encourage European cities to adopt environment conscious practices. For example, expanding rail transport could contribute to lower energy consumption while simultaneously enhancing the safety of both passengers and goods over long distances (Taş & Aylak, 2022).

The European Union presented the Fit for 55 package in 2021, which aims to reduce greenhouse gas emissions by 55% by 2030 in line with the climate neutrality target. This set of policies includes regulations covering many sectors such as energy, transport, industry and land use (European Commission, 2021a). The practices at the heart of the package include expanding the scope of the Emissions Trading System, implementing the Carbon Border Adjustment Mechanism (CBAM) and restructuring the energy taxation system (Delbeke & Vis, 2021). In addition, banning internal combustion engine vehicles by 2035 and increasing energy efficiency in buildings are among the main targets of the package (Scarlat et al., 2022). The aim of these policies is not only to support environmental sustainability,

but also to protect Europe's economic competitiveness and strengthen social cohesion (Tagliapietra & Wolff, 2021).

The regulations foreseen within the scope of Fit for 55 also have important consequences for business and international trade. In particular, the CBAM mechanism puts carbon pricing into effect on imports of emission-intensive products from outside Europe (European Commission, 2021b). This practice encourages producers in third countries to invest in lower-carbon production technologies (Berghmans, Sartor & Colombier, 2022). The Social Climate Fund included in the package offers support mechanisms for low-income groups and small businesses in order to reduce the social impacts of carbon pricing (Bayer & Schäfer, 2022).

4.1 Literature review on Green Deal awareness

Since the European Green Deal is an important issue on the world agenda, many academic studies have been conducted on it. The scope of the Green Deal is very diverse and concerns both the countries in the European Union and the countries that have commercial and political relations with the countries in the European Union. The developments here have been closely followed and have become a topic of discussion for many areas from the economy to the sociocultural field. With the announcement of the Green Deal in December 2019, the research conducted by Szpilko and Ejdyś (2022) stated that the number of academic articles published about the "European Green Deal" increased very rapidly until January 2022. In 2020, there were 123 publications in Scopus and 127 in Web of Science related to the Green Deal, while in 2021 there were 405 publications in Scopus and 310 in Web of Science.

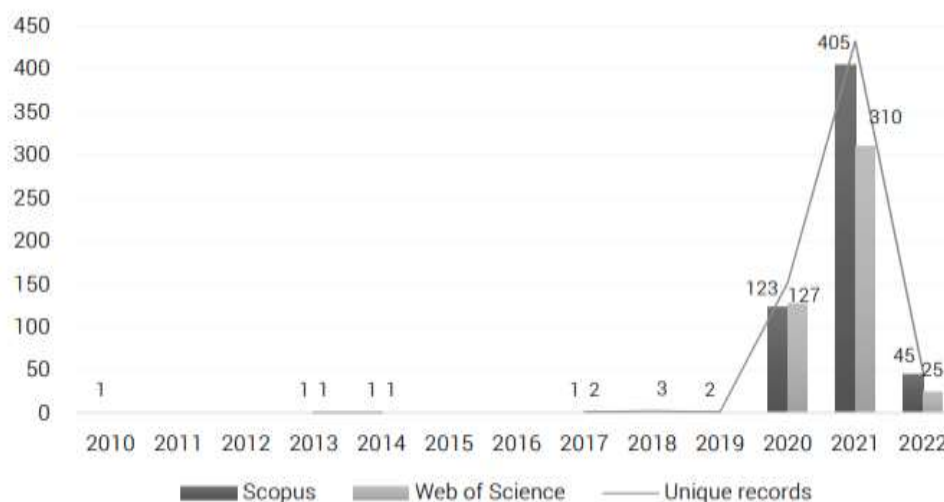


Figure 1. Number of publication in the field of European Green Deal in Scopus and Web of Science databases (Szpilko & Ejdys, 2022).

Many awareness studies have been conducted examining different sectors and topics related to the Green Deal. For example, the agricultural status of countries and its relationship with the Green Deal is one of these topics. In the study of Penov, et. al. (2025) the awareness status of Bulgaria in the agricultural field was revealed through a survey. It was concluded that the participants in the survey had little knowledge of the Green Deal, but they were aware of environmental, sustainability and related concepts. In another study conducted in 2022, Dan and Jitea analyzed the Organic Product issue in Romania's agricultural sector from an environmental and Green Deal perspective. Awareness levels were measured with a survey study in which 833 people participated. Descriptive statistics analysis was used to analyze the results. In the study conducted by Dan and Jitea (2024), the current status of organic agricultural products in Romania, one of the European Union countries, and the difficulties that stakeholders face in this sector were examined. Results revealed that the increasing tendency towards organic agricultural products is not only related to the health of individuals, but also that citizens prefer such products because they

think that they are more sustainable for the environment. However, higher prices and trust in the sector are factors that negatively affect the sector. In developing EU countries such as Romania, it is suggested that in order for sustainable agricultural policies to be successfully implemented, consumer awareness should be increased and market access should be facilitated for customers. One of the results presented in the study draws attention to the fact that in order for the Green Deal to achieve its goals, not only production but also consumer awareness should be strengthened.

In another study conducted in 2022 (Krajnc et. al., 2022), the awareness level of young people about the circular economy was measured in order to achieve the Green Deal goals. To this purpose, a survey was conducted with 286 young people in five different countries within the European Union. The results were evaluated with descriptive and exploratory factor analysis. This research seeks to assess how aware young people are of the circular economy and to determine how this awareness impacts the objectives of the European Green Deal. Based on the results of the research, a large number of young individuals have a positive view of the circular economy. However, on the other hand, it was concluded that young people are still not at a sufficient level to put this issue into action. It was stated that although basic circular principles such as recycling, reuse and sustainable consumption are known, young people are weak in integrating these principles into their daily lives. The research draws attention to the fact that in order to achieve the Green Deal goals, awareness studies should not only remain at the level of information, but should also be structured in a way that supports behavioral transformation.

Another study aiming to evaluate the effects of the Green Deal on companies was conducted by Lamenta and Grzybowska (2023). The study analyzed the level of readiness of businesses operating in different sectors in Europe for the sustainability

targets within the scope of the Green Deal and the obstacles to comply with these targets. Within the scope of the study, a survey was conducted with more than 100 company representatives in countries such as Poland, Germany, the Netherlands and Italy. The surveys questioned the level of awareness of companies regarding environmental strategies, the implementation steps related to these strategies and the structural or financial obstacles encountered. The authors state that in order to promote sustainability, it is not enough to simply increase awareness, but also steps should be taken to provide technical training, ease of financing and eliminate regulatory uncertainties. In addition, the study revealed that public support plays a decisive role in cases where companies' internal resources are limited in the process of compliance with regulations (Lamenta & Grzybowska, 2023).

The study conducted by Uyduranoğlu, Gevrek and Acar (2023) aims to analyze the factors behind the support given to the Emission Trading System by companies operating in energy-intensive sectors in Türkiye within the framework of the European Green Deal. Survey data collected from 404 companies were used in the study and an analysis was made regarding green practices. The analysis shows that companies with green practices tend to give higher support to the Emission Trading System. In particular, significant relationships were found between sustainability actions such as energy saving and waste management and positive attitudes towards the Emission Trading System. In addition, the fact that companies see the Emission Trading System as an effective tool for fighting with climate change issue. In contrast, green practices are at a lower level in the majority of small-scale companies without an environmental department. The study provides a valuable framework regarding the current perceptions and practices of companies in Türkiye's transition to the carbon pricing system.

In the study conducted by Atsan (2023), the effects of the European Union's Green Deal process on Turkish agriculture and the awareness levels of stakeholders in the agricultural sector, especially in the province of Izmir, regarding this process are examined. The main goal of the study is to look at the agricultural strategies that have been put in place in Türkiye as part of the Green Deal and to look at the current status. Surveys with different people who work in the agricultural sector in Izmir were used to gather data for the study. The findings obtained reveal that the level of awareness regarding the Green Deal in the agricultural sector is generally limited. A large portion of the participants stated that they did not have sufficient information about the effects of the Green Deal on agricultural policies. The research emphasizes that the Green Deal is a cyclical transformation process that aims for sustainable growth in the agricultural sector. In this context, it is suggested that Türkiye's agricultural policies should be aligned with the goals of the Green Deal and that the active participation of stakeholders in the sector in this process should be ensured.

"The EU Green Deal: How Ready is Business?" is a report from PwC that came out in 2020. It looks at how ready businesses are for the European Green Deal. The study involved a detailed survey of executives from over 300 companies in a wide range of fields. The majority of the participants were selected from sectors such as manufacturing, energy, finance, retail and automotive, thus focusing on industries that will be most affected by environmental regulations. The research methodology was based on structured survey questions and sector-based comparisons. The extent to which companies comply with the main regulations within the scope of the Green Deal, such as "border carbon regulation, sustainable product design, energy efficiency and circular economy", was assessed. According to the results of the study, although the vast majority of companies stated that the Green Deal was a

strategic priority, significant deficiencies were identified at the implementation level. When evaluated on a sectoral basis, it was stated that the energy and automotive sectors were relatively more prepared, while the level of readiness remained low in sectors such as retail and textiles. PwC's study emphasizes that awareness alone is not enough for companies to comply with regulations; this process must also be supported by operational transformation, digital integration and financial capacity.

4.2 Carbon borderline adjustment mechanism (CBAM)

It is a scientifically proven fact that renewable energy sources cause much less damage to the environment than fossil fuels. For this reason, countries are turning to renewable energy in line with sustainable development goals in order to prevent environmental pollution and combat climate change. Various prohibitive and encouraging regulations are being implemented to support this process. While interest in renewable energy is increasing worldwide, European Union countries are playing an important role in this area. Scandinavian countries in particular are among the countries that are at the forefront of renewable energy use (Artun, 2024). In line with its carbon neutrality goal, the European Union has implemented a border carbon adjustment mechanism to prevent production from shifting to countries without carbon capping policies. The transition period is set for 2023-2025, and the mechanism will be fully implemented at the beginning of 2026. Carbon pricing mechanisms play a critical role in combating climate change by aiming to reduce greenhouse gas emissions and promote the transition to a low-carbon economy. Rising economic costs and the severe consequences of the climate crisis have reinforced the understanding that products and services that do not include the cost of carbon emissions do not fully reflect their true economic value (Özdemir & Köse,

2024). Border carbon regulation stands out as a concrete and rule-based implementation of the various initiatives carried out by the European Union in the fight against climate change. Since it is planned to enter into force as a regulation, all member states of the European Union will be obliged to comply with this regulation (Gültekin, 2022). The Border Carbon Adjustment Mechanism is a way to set carbon prices that keeps prices from being too high or too low between countries that have taken steps to cut carbon emissions and those that haven't. The mechanism is meant to work not just in EU member states but also on some goods that come into the EU from outside the EU (Artun, 2024). In line with the increased targets in the fight against climate change in the world, an increasing number of countries are implementing national carbon pricing mechanisms. There are currently 61 national carbon pricing mechanisms in place or planned to be implemented in the world, 31 of which are emissions trading systems and 30 are carbon taxes (World Bank Group, 2020).

In 2018, the transport sector, which includes aviation, was responsible for 25% of all emissions in the EU27. To reach the goal of net-zero emissions by 2050, this sector's emissions must be cut by 90%. The European Commission introduced the Sustainable and Smart Mobility Strategy in December 2020. It is based on three main ideas: making all forms of transport more sustainable, combining sustainable alternatives into a multi-modal system, and creating incentives to make the change happen. The plan lists goals for 2030, 2035, and 2050 in the short, medium, and long term. There should be 30 million zero-emission cars, 100 cities that don't affect the climate, and the high-speed rail network should be twice as big by 2030. The first passenger plane that doesn't hurt the environment is expected to be built by 2035.

According to the European Commission (2019), all types of transportation, even heavy-duty vehicles, should use zero-emission technology by 2050.

4.3 Corporate sustainability reporting directive (CSRD)

The European Union passed the Corporate Sustainability Reporting Directive (CSRD) to make people more aware of sustainability and make sure that businesses report on their environmental, social, and governance (ESG) performance more accurately. The CSRD was made to fix the problems with the Non-Financial Reporting Directive (NFRD), which went into effect in 2014. It has added small and medium-sized businesses (SMEs) that meet certain criteria to the list of companies that must report, in addition to large corporations (European Commission, 2021). The CSRD says that companies must report their sustainability data with the same level of accuracy and ability to be audited as their financial reports (EFRAG, 2022). Also, businesses must tell people about the risks to human rights and the environment in their supply chains (KPMG, 2023).

One of the most important new things about CSRD is that it makes it mandatory to report in line with European Sustainability Reporting Standards (ESRS). These standards call for full disclosures in areas like environmental effects, social responsibility, and governance practices (EFRAG, 2022). Companies will have to report not only their own operations but also indirect effects, especially Scope 3 emissions, that happen along the supply chain (KPMG, 2023). Because of this, companies need to be more careful and thorough when they set up their sustainability governance processes. It is expected that about 50,000 businesses in Europe will have to report in this area after the CSRD is put into place (European

Commission, 2021). The EU hopes that this will help them reach the goals of the European Green Deal and speed up the green transition of banks and other financial institutions.

4.4 Ecodesign for sustainable products regulation (ESPR)

The European Union's Ecodesign for Sustainable Products Regulation (ESPR) tries to make products less harmful to the environment over their whole life. The new rule updates the Ecodesign Directive from 2009. It now covers all types of products, not just those that run on electricity (European Commission, 2022a). The ESPR says that things that can be used again, are good for the environment, can be fixed, and last a long time must meet their standards (European Parliament, 2022). Also, manufacturers have to make a Digital Product Passport to make sure they share information about how their products affect the environment with the public (European Commission, 2022b). The circular economy says that this law should help Europe use fewer resources and get rid of waste (European Environment Agency, 2022).

The Ecodesign for Sustainable Products Regulation encourages not only product design but also the environmentally friendly management of all processes from raw materials to recycling throughout the supply chain. Traceability of materials used in the production phase of products, carbon footprint measurement and environmental performance reporting fall within the responsibility of manufacturers (McKinsey & Company, 2022). In this context, the ESPR requires companies to make their supply chain management strategies more sustainable. According to the European Commission, this regulation will both enable consumers to make more conscious choices and increase the competitiveness of EU industry on

the path to green transformation (European Commission, 2022a). Thus, the ESPR is positioned as a key tool in achieving the circular economy goals of the European Green Deal.

4.4.1 The digital product passport (DPP)

The purpose of the Digital Product Passport (DPP) is to support circular economy initiatives like remanufacturing and predictive maintenance by offering crucial information on the origin, composition, and recycling potential of products.

Additionally, it provides information on the sustainable characteristics of materials, and improved data transparency facilitates reporting and auditing by enabling the tracking of greenhouse gas emission levels and approvals. Additionally, by enhancing product traceability across the supply chain, the DPP raises transparency and accountability. Verifying environmental pledges not only builds consumer trust but also ensures compliance with environmental regulations. The Digital Product Passport (DPP), a crucial part of the EU's legal framework, seeks to enhance value chain efficiency, advance sustainability, and raise data transparency (Carvalho et al., 2025). The Digital Product Passport (DPP) will make it possible to follow the production process from raw materials to retail. It will give useful information that could make people choose items that are more durable and better for the environment. The DPP can also get more people involved in sustainability projects by giving them information about how clothes are used. It could also help show that a product is real, make the second-hand market stronger, and make products last longer, which would all be good for a circular fashion business model (Domskienė & Gaidule, 2024). The Digital Product Passport (DPP) is a key tool for collecting information about the environment. With the introduction of European rules, it is

even more important for product information to be clear. The European Green Deal, which came out in 2019, says that the EU wants to be carbon neutral by 2050 to make the economy more competitive and better for the environment. The Circular Economy Action Plan (2020) is a big project that encourages people to recycle and reuse things. It includes the proposed Ecodesign for Sustainable Products Regulation (ESPR), which will go into effect in 2024. The EU's plan for eco-friendly materials in 2022 will also include new labelling rules that will make it easier to tell how sustainable and circular textiles are (Legardeur & Ospital, 2024).

4.5 Renewable energy directive (RED II/III)

The European Union has implemented the Renewable Energy Directive (RED) to accelerate decarbonization in the energy sector. The first version, published in 2009, was updated with RED II in 2018, and finally the RED III revision was carried out in 2023 (European Commission, 2023a). The European Union has committed to raising the proportion of sources of clean energy in overall energy consumption to at least 42.5% by 2030 as part of RED III (European Parliament and Council, 2023).

According to this instruction, more renewable resources must be used in transportation, climate control, and energy generating. In particular, the promotion of biofuels, green hydrogen and electric vehicle technologies accelerates the transformation in the transportation sector (Scarlat et.al, 2018). In addition, RED regulations encourage member states to prioritize more diverse and local renewable resources when creating national energy strategies, and thus have an impact on energy security and supply diversity (Resch et.al, 2021).

The effects of the RED directive are not limited to energy production alone, but also have significant consequences on sustainable supply chain management. The

increased use of renewable energy supports efforts to reduce the carbon footprint of industrial and logistics operations (European Environment Agency, 2022). In particular, manufacturing and transportation companies are forced to invest in renewable energy projects and low-emission technologies in order to comply with the targets within the scope of RED (Scarlat et al., 2018; Resch et al., 2021). The integration of new generation energy solutions such as green hydrogen offers strategic advantages in terms of both flexibility and environmental sustainability in supply chains (IRENA, 2022). In this context, RED stands out as one of the fundamental regulations that guide not only Europe's energy system but also its production and logistics processes towards a sustainable framework.

4.6 Energy efficiency directive (EED)

In order to reduce energy usage and help meet climate objectives, the European Union established the Energy Efficiency Directive (EED). First put into effect in 2012, this rule underwent major revisions in 2023 (European Commission, 2023). According to the updated EED, member states must fulfill their yearly energy-saving goals and cut their overall energy use by at least 11.7% by 2030 (European Parliament and Council, 2023). In addition, the new obligations include improving the energy efficiency of public buildings by 3% each year and subjecting large-scale companies to regular energy audits (European Environment Agency, 2022). The directive considers energy efficiency not only as an environmental responsibility, but also as one of the main tools for increasing Europe's energy security and supporting its economic resilience (Ürge-Vorsatz et al., 2020). This approach is part of a holistic strategy that aims to balance sustainable development with economic growth (Neves & Leal, 2018).

The EED's requirements have a direct impact on supply chains, logistics, and the energy industry. The energy efficiency obligations stipulated by the directive require the reorganization of all operational processes from production facilities to distribution centers (Ürge-Vorsatz et al., 2020). In the logistics sector in particular, the use of transport vehicles with lower energy consumption, smart route planning and the adoption of practices such as energy-efficient warehouse management are encouraged by these regulations (Neves & Leal, 2018). At the same time, the risk of suppliers with low energy efficiency losing their competitiveness in the market directs companies to choose more sustainable business partners (European Commission, 2023). As a result, the EED not only reduces the energy consumption of businesses, but also leads to the creation of a low-carbon and energy-efficient supply and logistics network (European Environment Agency, 2022).

4.7 AFIR (Alternative Fuels Infrastructure Regulation)

The European Union has developed the Alternative Fuels Infrastructure Regulation (AFIR) to accelerate the decarbonization of the transport sector and encourage the use of alternative fuels. This regulation, presented in 2021, made it mandatory to expand electric vehicle charging stations, hydrogen filling facilities and other alternative fuel infrastructures throughout Europe (European Commission, 2021). Within the scope of AFIR, it is envisaged to establish charging and refueling points at certain intervals, especially along the main transport corridors (TEN-T network). For example, fast charging stations are required to be located every 60 kilometers (European Parliament and Council, 2023). Furthermore, the rule mandates that the facilities be freely accessible, clearly priced, and easy to use (Transport & Environment, 2022). By facilitating access to renewable energy transportation

options, AFIR seeks to help Europe meet its 2050 carbon neutrality goal (Pavlenko, 2022).

The regulations introduced by AFIR create significant structural impacts on logistics and supply chains. Companies operating in the field of land transportation are forced to renew their fleets with electric or hydrogen-powered vehicles and integrate into new refueling infrastructures (Plötz et al., 2020). Additionally, this shift has introduced new logistics criteria to the transportation agenda, including charging schedules, range management, and station accessibility (Pavlenko, 2022). The extensive use of alternative fuels helps businesses meet sustainability targets and directly lowers transportation-related carbon emissions (European Environment Agency, 2022). From this perspective, AFIR is considered a critical regulation that supports not only the change of transportation vehicles but also the green transformation of logistics planning, supply chains and operational strategies. Even though large trucks are necessary for the transportation of goods, the majority of studies on new energy vehicles focuses on small and medium-sized vehicles. Significant amounts of nitrogen oxides and particulate matter are released by diesel engines, which power the majority of heavy vehicles. These emissions can lead to air pollution, health risks, and environmental issues like ecological degradation and global warming. Given that heavy-duty electric trucks offer a competitive alternative to conventional diesel-powered freight vehicles, it is imperative to increase research on the sustainability of cargo transport in order to solve these issues (Lu & Shuang, 2023).

CHAPTER 5

TÜRKİYE & THE EUROPEAN UNION

Relations between Türkiye and the European Union began with the Ankara Agreement signed in 1963 and reached a higher level of economic integration with the Customs Union that entered into force in 1995 (European Commission, 2023). Türkiye's gaining candidate country status in 1999 and the start of full membership negotiations in 2005 heralded a new era in relations with the EU; however, the negotiation process showed limited progress due to various political and structural obstacles (Aydın-Düzgit & Tocci, 2015). The present dynamics of cooperation are a result of the Customs Union's development in recent years and its adaptation to the EU's new strategic orientations, such as the Green Deal (Evin et al., 2021). These relationships are seen as one of the key foreign policy instruments influencing Türkiye's change process in the areas of democratization, rule of law, and energy security in addition to commerce and candidacy (Yılmaz & Soyaltın, 2021).

5.1 Trade between Türkiye and the European Union

With the establishment of the Customs Union on December 31, 1995, the trade volume between Türkiye and the EU gained great momentum and was realized as 196.4 billion dollars in 2022. As before the EU continued to be our country's most important trade partner. Türkiye ranked 5th with a 3.9% share in total exports of the EU in 2022. The EU ranked first in our total exports with a 40.6% share in our exports with 103.1 billion dollars in 2022. Our country ranked 6th in the total imports of the EU with a 3.3% share in 2022 (excluding trade between EU countries). In addition, the EU ranked first in our imports as well as in our exports.

According to 2022 figures; Türkiye realized 93 billion dollars of its total imports of goods (25.6% share) from the EU. In our country's trade with the EU, the export-import coverage ratio was 110.5% in 2022. It is assessed that the importance of the EU, which is a giant market right next to us, will increase even more if the Customs Union, which currently only covers industrial and processed agricultural products, is updated by expanding and deepening its scope in the coming period (T.C. Ticaret Bakanlığı, 2023). The EU, which has created action plans to achieve the 2050 goals and has taken consistent steps to achieve the goal, continues its actions without slowing down. In order to continue its trade relations with the EU, which has implemented its transformation goals and has the most intensive trade relations, both the state and the business world in Türkiye need to update their policies and practices according to the circular economy. The implementation of parallel regulations with the EU Circular Economy Action Plan will prevent trade with the EU from being negatively affected. Otherwise, it is inevitable that economic relations with the EU will be negatively affected by this entire process (Ecer et.al, 2021). The change in the share of the European Union in Türkiye's total foreign trade over the years is shown in Table 1.

Table 1. EU's Share in Türkiye's Total Foreign Trade After 1980 (Billion \$)
(Özdemir & Aytekin, 2016)

Years	EU Export Value	EU Import Value	EU Total Trade Volume	Total Export Value	Total Import Value	Total Trade Volume	EU Share in Total Trade (%)
1981-1985	12.800	18.742	31.542	31.265	49.110	80.375	39%
1986-1990	27.818	36.066	63.886	53.891	77.690	131.581	49%
1991-1995	46.126	66.769	112.895	83.394	132.325	215.719	52%
1996-2000	72.040	126.864	198.904	133.821	233.280	367.101	54%
2001-2005	102.254	181.600	283.862	251.299	376.607	627.906	45%
2006-2010	272.604	331.440	604.044	540.860	838.075	1.378.935	44%
2011-2015	317.261	439.506	756.767	854.732	1.363.981	2.218.713	34%

5.2 European Union and Türkiye customs agreement

The Customs Union (CU) is one of the cornerstones of Türkiye's partnership relationship with the European Community, which dates back to the 1960s. The framework of the Customs Union was drawn with the Ankara Agreement, which entered into force in 1963, and its details were determined by the Additional Protocol. The transition period, which lasted 22 years, was completed with the Association Council Decision dated 6 March 1995, and the parties decided that the necessary conditions for the establishment of the Customs Union had been met, and thus the CU between Türkiye and the EU was completed as of 1 January 1996 (Uyar, 2001). This process, which started with the Ankara Agreement and continued with full membership in the Customs Union in 1996 and has continued until today, has affected the Turkish economy in many ways, both positively and negatively. The free circulation of industrial and agricultural products has made Türkiye an open and

more competitive economy in this regard. Turkish manufacturers, who have innovated technologically, have thus increased their productivity and profitability (Özdemir & Aytekin, 2016).

A customs union is a type of integration in which goods circulate freely between member countries and all members apply a common customs tariff against third countries. Therefore, the customs union process has caused changes in Türkiye's foreign trade policy measures against both EU member countries and non-EU countries (Kalaycı & Artan, 2010). According to the CU agreement that has been put into effect, Türkiye has started to implement the necessary adaptation laws in order to ensure that its own trade policies are in harmony with the EU trade policies. Although these laws may have challenging effects on Türkiye, the benefits of Türkiye entering the European market more extensively and expanding its international trade network are considered too important to ignore. Since EU member states are in the position of being Türkiye's largest trade partners, it is necessary to mention many holistic effects of the CU on the Turkish economy (Kurter & Şahin, 2024). The Turkish economy grew at a high rate of 8% on the average in 1996 and 1997 after the Customs Union. With the Customs Union, industry in Türkiye was exposed to foreign competition to a large extent. Thus, productivity and quality were increased in various industrial sectors and competitive power was gained in international markets. In particular, the automotive main and sub-industry sector has adapted to the increasing competition conditions created by the Customs Union and increased its quality and efficiency (Özdemir & Aytekin, 2016).

5.3 Türkiye's perspective and action plan on the Green Deal

The official work that Türkiye has initiated in response to the EU Green Deal has been carried out under the coordination of the Ministry of Trade for the last year and a half. As a result of a working group formed by relevant ministries and meetings with the business world, the “Green Deal Action Plan” came before us on July 16, 2021 as the most concrete output of these efforts (Ministry of Trade of the Republic of Türkiye, 2021). The Action Plan aims to facilitate Türkiye’s transition to a sustainable and resource-efficient economy while ensuring alignment with the European Green Deal and strengthening Türkiye-EU Customs Union integration. The plan is structured around nine key areas, including carbon border adjustments, green economy, sustainable finance, energy supply, agriculture, transportation, climate action, diplomacy, and awareness initiatives. It outlines 32 strategic objectives and 81 specific actions to achieve these goals.(Ministry of Trade of the Republic of Türkiye, 2021)

With changing balances, countries that have not achieved the necessary harmony with nature and climate will be left behind. The moves they will take to adapt without wasting time will have a positive impact on the country's interests and the welfare level of the people. In line with the 2050 goals, the European Union is pushing for green transformation in the countries with which it has bilateral relations. It is an evident fact that this transformation has substantial cost for Türkiye (Aşıcı, 2021). In July 2021, the Turkish Ministry of Trade introduced its Green Deal Action Plan, aiming to align national policies with global sustainability efforts. This comprehensive plan outlines strategic measures across multiple sectors, including climate change adaptation, sustainable financial systems, carbon border adjustments in line with EU regulations, the promotion of a green and circular economy, ensuring

access to clean and efficient energy, advancing sustainable agricultural practices, fostering environmentally friendly and intelligent transportation systems, and integrating green policies into international diplomatic efforts (Fatih and Sercan, 2022). Taking part in economic transformation is not only limited to the process of compliance with EU criteria, but also serves the goal of increasing competitiveness in the international market. The European Green Deal aims to stop climate change, regulate the use of resources and transition to a circular economy approach. It is also clear that the circular economy can contribute to Türkiye's economic development level. The transformation in Türkiye's leading sectors, especially textiles and construction, will also result in increased efficiency, expanded production and increased employment. Projects that will be created in accordance with energy efficiency and sustainability criteria will also have a high probability of accelerating EU-Türkiye trade (Ecer et.al, 2021).

CHAPTER 6

E-COMMERCE

E-commerce is a way to buy and sell digital goods online instead of in person at stores, markets, or stalls. Because of this change, businesses need to find new ways to keep customers interested and advertise their goods well in the digital marketplace (Maulana et al., 2023). E-commerce has grown even faster because of the pandemic. Many people chose to stay home and shop online instead of going to stores when they closed during the COVID-19 pandemic. In 2020, this caused online sales to go up by 34% (Bounie et al., 2021).

The global economic impact of e-commerce has not only increased the speed of trade but has also reshaped factors such as logistics, supply chain management, and environmental impacts. E-commerce companies have been forced to adopt sustainable logistics and environmentally friendly transportation methods, increasing the importance of regulations such as the Green Deal (Laudon & Traver, 2020). The future of e-commerce will be shaped by the development of digital payment systems, the increase of mobile commerce, and the integration of technologies such as artificial intelligence. In addition, the prominence of sustainability and environmental impacts will direct e-commerce companies to environment friendly practices. In this regard, laws like the Green Deal are some of the key elements influencing how e-commerce will develop in the future (European Commission, 2021).

E-commerce is essential for cutting expenses for businesses and increasing output. Its widely used applications have a significant economic impact due to its ease of usage. This digital commerce model makes it possible to trade goods, services, and information over the internet and other online platforms. E-commerce

is a broad term that includes many online economic activities, such as buying and selling goods and services (Mubarak, 2021). Also, by 2027, the total amount of e-commerce around the world is expected to be more than \$8 trillion. This shows how much more important it is becoming in the retail world (Statista, 2024). This rapid expansion brings not only economic advantages but also challenges in data privacy, digital taxation, and cross-border trade compliance. As e-commerce evolves, governments and international bodies are increasingly developing frameworks to address these areas. Furthermore, consumer behavior is increasingly shaped by real-time personalization, trust in digital platforms, and fast delivery expectations, prompting firms to invest in big data analytics and last-mile logistics (UNCTAD, 2023).

6.1 E-Commerce in Türkiye

Although Türkiye's e-commerce sector has experienced rapid growth in recent years, its share within the total retail industry remains below the desired level. Despite having a similar infrastructural development to emerging economies like China and India, a 2016 Euromonitor report indicated that Türkiye's e-commerce share in total retail sales had yet to reach the global average recorded in 2012. Share of retail e-commerce in total retail volume in selected countries is shown in Figure 2.

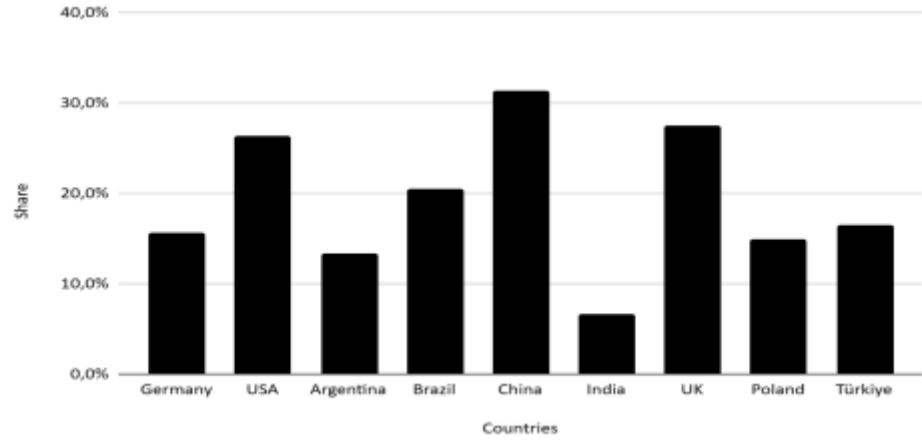


Figure 2. Share of retail e-commerce in total retail volume in selected countries (%) (Irmak, 2023)

Türkiye still has a long way to go before it can catch up with countries like China and the UK (TUSIAD, 2017). Recent data shows that Türkiye's e-commerce market volume reached about 1.85 trillion TL in 2023, which is a 115% increase from the year before (Ticaret Bakanlığı, 2024). However, a large part of this growth has happened in the domestic market, and cross-border e-commerce, or e-exports, is still behind. The digital infrastructure in Türkiye has come a long way, with more people using the internet and mobile payment systems, but there is still a need for more training in logistics and cross-border integration. Türkiye's e-commerce volume over the years is shown in Figure 3.

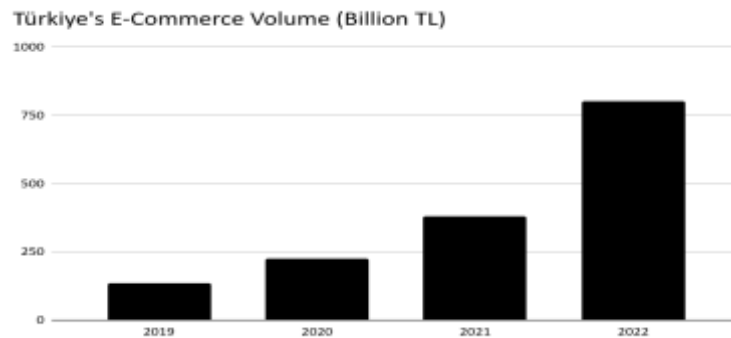


Figure 3. Türkiye's e-commerce volume by year (Billion TL) (<https://www.eticaret.gov.tr/>)

Regulatory measures and government incentives for e-export practices play a crucial role in the development of e-commerce in Türkiye and in enhancing its global competitiveness. The percentage of e-exports in Türkiye's total exports is still lower than the global average. Türkiye needs to make regulatory changes to deal with logistical and customs issues that make things more expensive and difficult to do business online. It also needs to give businesses that do e-export activities more government support (Aslan & Manavgat, 2021).

In addition, the 2021 publication of the "E-commerce Ecosystem Report" by the Ministry of Trade outlined Türkiye's strategic objectives to boost digital trade. These objectives include reducing bureaucratic barriers for online sellers, offering financial incentives for digitalization, and increasing SMEs' awareness of international e-commerce platforms (Ticaret Bakanlığı, 2021). Such initiatives demonstrate the country's effort to align with the broader goals of the European Green Deal and digital single market principles. Furthermore, the emphasis on sustainable e-commerce has become increasingly important in Türkiye's digital economy. Consumers are becoming more conscious of carbon footprints, packaging waste, and delivery emissions, leading local e-commerce firms to invest in green logistics and environmentally friendly operations.

CHAPTER 7

METHODOLOGY

With the rapid increase in technology and industrialization, the negative impact on the environment has made sustainability an important part of the world agenda in recent years. Over the years, many agreements and regulations have been published between countries regarding the environment and sustainability issues. The Green Deal has also become one of the most current and critical agreements for countries including EU's close trade partners such as Türkiye. There has been attempts to investigate the related regulations, sanctions and the compliance means as well as the awareness and readiness levels at country and sector levels. The topic has also drawn attention academically and there are several studies assessing the related issues.

7.1 Scope of the study

This study aims to evaluate two main issues regarding the compliance of e-commerce companies in Türkiye with the Green Deal regulations. The first is the level of awareness of companies on the Green Deal. This includes awareness of important sustainability concepts and The Green Deal related regulations such as the Carbon Border Adjustment Mechanism (CBAM), the Corporate Sustainability Reporting Directive (CSRD), the Digital Product Passport (DPP), the circular economy and the EU's climate targets, as well as the regulations related to the Green Deal. The second issue concerns the readiness level of e-commerce companies regarding Green Deal regulations. Awareness and readiness are critical indicators for understanding how firms position themselves against policy and regulatory changes. Research questions of the study are defined as follows:

- How knowledgeable are companies on issues related to sustainability and The Green Deal regulations?
- How ready are companies on issues related to sustainability and The Green Deal regulations?
- How does demographic characteristic of companies such as company age, employee number and export share in revenue affect the awareness level on The Green Deal?
- How does demographic characteristic of companies such as company age, employee number and export share in revenue affect readiness level on Green Deal?

The study is conducted using primary data generated via a survey applied to e-commerce companies operating in footwear and textile sector. The trade order introduced by the EU Green Deal in 2019 has begun to affect the e-commerce sector, which keeps growing both in the world and in Türkiye. Regarding the clothing, footwear and accessory categories, e-commerce volume in Türkiye increased by 137% compared to the previous year in 2024, reaching 301 billion TL (Republic of Türkiye Ministry of Trade, 2023). The textile and footwear sector are experiencing high growth, high trade volume along with high level of exports to the European Union. Therefore, the survey of the study is conducted with e-commerce companies operating in this field.

7.2 Survey design

To assess the awareness and readiness level of e-commerce companies in Türkiye, a field survey is conducted. To this purpose, a questionnaire is developed after a rigorous literature survey. The questionnaire is applied to e-commerce companies operating in the footwear and textile sector in Türkiye.

The population covers the e-commerce companies in the footwear and textile sector in Türkiye. The sample is selected using convenience sampling. Convenience sampling is a sample technique that saves both time and resources by choosing sampling units that are convenient and easily accessible for the researcher. In determining the participants, priority was given to companies that could be reached in line with their accessibility and the sectoral focus of the research. In this way, the data collection process progressed more quickly. The sample consists of 122 e-commerce companies of different sizes.

The questionnaire is initially implemented face-to-face with five companies as a preliminary stage. Based on the feedbacks, minor revisions are made on the questionnaire.

Consequently, the survey is conducted online. The questionnaire is delivered to the participants in the sample through e-mail, phone calls and WhatsApp messages. 82 participants have responded to the survey. The response rate is 67.2%.

After the survey has been completed, results are evaluated by referring to statistical analyses.

7.3 The questionnaire

The questionnaire consists of three main sections. Each section aims to obtain different information related to the foot wear and textile industry and the e-commerce companies operating in it. The first section covers “Company Information” such as information about the demographic structure, fields of activity and various operational processes of the companies. This section includes questions such as the, company age, number of employees, activity and supply markets, e-commerce channels, logistics infrastructure, transportation modes. This information serves to understand the sectoral positions of the companies and to provide a reference for interpreting their awareness and readiness levels. This section consists of 10 multiple-choice questions.

The second section consists of 19 questions and aims to assess the awareness levels of companies regarding the Green Deal and its effects. Some of the questions in the second section of the survey (Questions 1–4 and 19) aim to reveal whether the participating companies are aware of the fundamental goals of the European Green Deal, policies to combat climate change, and the EU’s long-term strategic vision.

While Question 1 measures general awareness of the European Union’s sustainability-oriented decision-making mechanisms, questions 2 and 3 inquire knowledge regarding the EU’s targets of carbon neutrality by 2050 and a 55% reduction in greenhouse gas emissions by 2030. Question 4 measures the level of knowledge about the general goal of the Green Deal, while question 19 analyzes the perception that environmental regulations can provide a competitive advantage in logistics and supply chain processes in the long term. These questions are directly related to the titles “The European Green Deal” and “EU Regulatory Framework for Sustainability”.

Questions 5, 6 and 8 measure the knowledge of firms regarding carbon-based foreign trade policies and the European Union's border carbon regulations. In particular, questions 5 and 6 reveal the awareness of firms exporting to the European Union that they are subject to assessment based on their carbon emissions; while question 8 assesses the level of awareness that carbon taxes may be reflected in logistics processes. The questions in this section are directly related to the Carbon Border Adjustment Mechanism (CBAM).

Awareness of the integration of logistics processes with sustainability principles is assessed through questions 7, 9, 14 and 18. Question 7 measures the level of knowledge regarding the mandatory measurement of carbon footprint in logistics. Question 9 analyzes the awareness of the EU's sustainable supply chain policies; while question 14 investigates the level of knowledge regarding low-carbon transportation solutions (electric vehicles, biofuels, rail transportation). Question 18 measures firms' predictions about the potential impacts of the Green Deal on logistics costs. These questions are related to the Green Deal's transportation-related regulations, namely AFIR, RED and EED.

Questions 10–13 analyze the level of knowledge regarding Türkiye's position vis-à-vis the European Green Deal and the strategies it has developed for this process. Question 10 asks whether the EU's regulations will directly affect firms in Türkiye, while questions 11 and 12 reveal the level of awareness regarding Türkiye's Green Deal Action Plan and related financial support programs. Question 13 assesses the knowledge level about current national policy instruments such as the “Border Carbon Tax Compliance Fund” announced in 2023. This section directly overlaps with the title “Türkiye's Perspective and Action Plan on the Green Deal.”

Questions 15–17 analyze the level of knowledge regarding circular economy principles and digital product passport applications. Question 15 measures awareness related the mandatory Digital Product Passport (DPP); question 16 questions the level of knowledge about environmental compliance documents. Question 17 assesses the level of knowledge about the integration of circular economy principles into supply chain practices.

The second section aims to measure not only companies' general knowledge about regulations, but also their awareness about which environmental policies may affect them in a sectoral context. This part of the survey will enable a detailed analysis of how regulations addressed in the theoretical literature are reflected at the field level. This part consists of 20 questions in total, three Likert Scale questions, one open-ended, two multiple and fourteen yes/no questions.

The third section of the survey titled Green Deal and EU Regulation Readiness is structured to assess the strategic preparations and operational competences of the firms towards sustainability policies.

Questions 1 and 2 in this third part are directly related to The European Green Deal. The firms' general level of knowledge within the scope of the Green Deal and their perceptions about the impact of non-compliance with these regulations on their competitiveness reflect their awareness and strategic risk management capacities at the policy level.

The following questions, 3, 4 and 5, are related to both “CBAM” and “Renewable Energy Directive (RED II/III)” and question whether the firms have strategies to reduce carbon emissions and their internal awareness of the need for logistics transformation in this direction. The financial resource adequacy addressed in question 3 in particular also overlaps with the headings of sustainable finance.

Questions 6, 7 and 17, which assess the level of preparation focused on transportation, are aimed to be related to the headings “Alternative Fuels Infrastructure Regulation (AFIR)”. Other applications related to logistics are assessed in questions 8, 9 and 10. These questions reveal whether energy efficiency applications, audit mechanisms and working with suppliers with high environmental performance have been internalized in relation to the headings “Energy Efficiency Directive (EED)” and “CSRD”.

The topic of “Digital Product Passport” in question 11 is directly related to the heading “3.3.1 The Digital Product Passport (DPP)”. This question assesses the extent to which companies are ready for digital product tracking and environmental information transparency. Question 12 examines the level of knowledge and tendency regarding the financial supports developed by Türkiye within the framework of Green Deal compliance strategies. Questions 13, 14 and 15 regarding institutional preparation processes aim to measure situations such as personnel training, procurement of consultancy services and previous training activities.

Finally, questions 18, 19 and 20 aim to identify the main obstacles that firms face in terms of sustainability and compliance with environmental regulations (e.g. financial inadequacy, lack of information) and the types of support they request to overcome these obstacles (consulting, training, financing). In addition, the actors from which the support expectations come (public institutions, marketplaces, private financial institutions, etc.) are analyzed in this section.

Third section consists of 20 questions in total, three Likert Scale questions, one open-ended, two multiple and fourteen yes/no questions. Survey questions are available at the Appendix section.

CHAPTER 8

DATA ANALYSIS, FINDINGS AND DISCUSSION

This section includes the findings regarding the survey data collected within the scope of the research. The aim is to evaluate the impact of the European Green Deal on e-commerce companies operating in Türkiye. The population of the study consists of the e-commerce companies in footwear and textile industry in Türkiye and the sample consists of 82 companies of different sizes operating in this sector.

Data are collected from e-commerce companies using google forms via a questionnaire designed for this purpose as explained in detail in scope of study section.

The findings begin with descriptive analyses defining the demographic characteristics of the participating companies. Consequently, the awareness and readiness levels of the companies regarding the environmental regulations originating from the European Union are examined. Following the descriptive analyses, the relationships between the basic structural variables such as company age, number of employees and export share in revenue and the sustainability-oriented attitudes of the participants are statistically tested. For this purpose, methods such as chi-square test and one-way analysis of variance (ANOVA) are used; the results are interpreted in a way that would reveal the strategic and operational approaches of the companies towards the Green Deal. Effect size will be determined using Eta Square (η^2) values. Values will be interpreted based on the intervals defined by Cohen in 1988.

- $0.01 \leq \eta^2 < 0.06 \rightarrow$ Small effect
- $0.06 \leq \eta^2 < 0.14 \rightarrow$ Medium effect

- $\eta^2 \geq 0.14 \rightarrow$ Big effect

Analyses are conducted using the Statistical Package for the Social Sciences (SPSS) 26.0 statistics package program.

8.1 Descriptive analyses

The characteristics of the companies participating in the research, including sectoral focus, firm age, workforce size, export ratios, operational structure, and logistics preferences, are presented in Table 2.

Based on the descriptive analysis of the survey data, 74.4% (f=61) of the firms reported operating in the footwear sector, 17.1% (f=14) in the textile sector, and 8.5% (f=7) in both sectors. The findings indicate that the majority of respondents are engaged in footwear-related activities.

Regarding the age of firms, 35.4% (f=29) is established within the last two years, while 50.0% (f=41) operates for 3 to 5 years. Additionally, 9.8% (f=8) has been in business for 6 to 8 years, 2.4% (f=2) for 9 to 11 years, and 1.2% (f=1) for 12 years or more. This result reflects a respondent pool primarily composed of relatively new businesses.

In terms of employee numbers, 46.3% (f=38) has between 11 and 25 employees, 25.6% (f=21) employ 26 to 50 people, 19.5% (f=16) has 1 to 10, 7.3% (f=6) has 51 to 75, and 1.2% (f=1) reports over 76 employees. Most of the participating firms are thus classified as small or micro-sized enterprises.

In terms of e-commerce channels, 98.8% (f=81) uses Trendyol, 40.2% (f=33) Hepsiburada, 7.3% (f=6) Amazon, 6.1% (f=5) Flo, and 37.8% (f=31) operate their own websites. In this question, survey respondents can choose more than one option.

Most firms prefer mainstream online marketplaces, particularly Trendyol and Hepsiburada.

Regarding export share in revenue, 45.1% (f=37) derives between 6% and 10% of their turnover from exports, 34.1% (f=28) between 1% and 5%, 12.2% (f=10) between 11% and 15%, 3.7% (f=3) between 16% and 20%, and 2.4% (f=2) earns more than 21%, while 2.4% (f=2) state they do not export. The results show that a significant proportion of firms has modest levels of export activity.

Concerning market presence, 67.9% (f=55) sells to the European Union, 74.1% (f=60) to the Asia-Pacific region, 100% (f=81) to the Türkiye, and 3.7% (f=3) to North America. In this question, survey respondents can choose more than one option. The data reveal that a considerable number of respondents are already involved in international trade, particularly with the EU.

The results of the following questions are shown in the Appendix C. With respect to supply markets, 77.9% (f=81) sources products from Türkiye, followed by 7.7% (f=8) from the EU, 2.9% (f=3) sources products from Africa and 10.6% (f=11) from Asia-Pacific. This finding confirms that local sourcing remains a dominant strategy among the firms. In terms of operational structure, 78% (f=64) operates as wholesalers, 61% (f=50) as manufacturers, 3.7% (f=3) as retailers. In this question, survey respondents can choose more than one option. These findings suggest that most participants are either producing or distributing goods at a wholesale level. Regarding logistics management, 79.3% (f=65) work with third-party logistics (3PL) providers, 7.3% (f=6) manage their own infrastructure, and 13.4% (f=11) uses a hybrid model. Most firms, therefore opt to outsource their logistics operations. Lastly, 97.5% (f=79) reports using road transport, and 2.5% (f=2) applies multimodal solutions Road transportation is by far the most utilized shipping method.

Table 2. Distribution of Firms' Responses to Question 1-10

Question	Variables	Category	Frequency (f)	Percentage (%)
1	Sector	Footwear	61	74,4
		Textile	14	17,1
		Both	7	8,5
2	Firm Age	0-2 years	29	35,4
		3-5 years	41	50,0
		6-8 years	8	9,8
		9-11 years	2	2,4
		12 years and above	1	1,2
3	Number of Employees	1-10 employees	16	19,5
		11-25 employees	38	46,3
		26-50 employees	21	25,6
		51-75 employees	6	7,3
		76 employees and above	1	1,2
4	E-commerce Channels	Trendyol	81	51,3
		Hepsiburada	33	20,9
		Own Website	31	19,6
		Amazon	6	3,8
		Flo	5	3,2
		Çiçeksepet	1	0,6
		n11	1	0,6
5	Export Revenue Share	No Export	2	2,4
		1%-5%	28	34,1
		6%-10%	37	45,1
		11%-15%	10	12,2
		16%-20%	3	3,7
		21% and above	2	2,4
6	Markets Operated In	Türkiye	81	39,7
		EU	55	27,0
		North America	3	1,5
		Asia - Pacific	60	29,4
		Africa	4	2,0
		Others	1	0,5

This section includes descriptive analyses of the responses to the questions that form the second part of the study and aim to measure the awareness levels of firms regarding the European Green Deal.

Below, the frequency and percentage distributions of the statements prepared in relation to Green Deal awareness, ranging from questions 11 to 27, are presented. These analyses aim to reveal the knowledge levels of firms regarding sustainability in general terms.

The question “Are you aware that the European Union has taken action on sustainability and environmental issues through policies such as the Green Deal?” was responded by a total of 82 participants. The distribution of their answers is presented in Table 3. 53.7% (f: 44) of responses are “no”, and 46.3% (f: 38) of responses are “yes”. The results show that participants are relatively divided in their awareness of the EU's regulatory initiatives in sustainability.

Table 3. Distribution of Firms' Responses to Question 11

Question	Question Text	Answer	Frequency (f)	Percentage (%)
11	Are you aware that the European Union has taken action on sustainability and environmental issues through policies such as the Green Deal?	Yes	38	46,3
		No	44	53,7
		Total	82	100

The question “Are you aware that the European Union aims to become carbon-neutral by 2050?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their answers is presented in Table 4.

68.3% (f: 56) respond as no, and 31.7% (f: 26) respond as yes. A significant portion of firms lack awareness regarding the EU's long-term net-zero emissions goal.

Table 4. Distribution of Firms' Responses to Question 12

Question	Question Text	Answer	Frequency (f)	Percentage (%)
12	Are you aware that the European Union aims to become carbon-neutral by 2050?	Yes	26	31,7
		No	56	68,3
		Total	82	100

The question “Are you aware that the EU intends to reduce carbon emissions by 55% by 2030?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their answers is presented in Table 5. 81.7% (f: 67) respond as no, and 18.3% (f: 15) respond as yes. The data shows limited knowledge among respondents about the EU's medium-term climate goals.

Table 5. Distribution of Firms' Responses to Question 13

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
13	Are you aware that the EU intends to reduce carbon emissions by 55% by 2030?	Yes	15	18,3
		No	67	81,7
		Total	82	100

The question “14 – Do you have knowledge of the general objective of the European Green Deal?” was asked to the participants. A total of 82 participants responded to this question. 65.9% (f: 54) responded as no, and 34.1% (f: 28) respond

as yes. The distribution of their answers is presented in Table 6. Awareness of the Green Deal's overall vision appears to be relatively low among participants.

Table 6. Distribution of Firms' Responses to Question 14

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
14	Do you have knowledge of the general objective of the European Green Deal?	Yes	28	34,1
		No	54	65,9
		Total	82	100

The question "Are you aware that the Green Deal introduces carbon regulations for companies exporting to the EU?" was asked to the participants. A total of 82 participants responded to this question. 76.8% (f: 63) responded as no, and 23.2% (f: 19) responded as yes. The distribution of their answers is presented in Table 7. This indicates that many exporting firms may not yet be fully informed about regulatory risks tied to EU environmental policies.

Table 7. Distribution of Firms' Responses to Question 15

Question	Question Text	Answer	Frequency (f)	Percentage (%)
15	Are you aware that the Green Deal introduces carbon regulations for companies exporting to the EU?	Yes	19	23,2
		No	63	76,8
		Total	82	100

The question "Are you familiar with the role of the Carbon Border Adjustment Mechanism (CBAM) in import-export processes?" was asked to the participants. A total of 82 participants responded to this question. 92.7% (f: 76)

responded as no, and 7.3% (f: 6) responded as yes. The distribution of their answers is presented in Table 8. The majority of firms lack specific awareness of the CBAM framework, which may affect their future competitiveness.

Table 8. Distribution of Firms' Responses to Question 16

Question	Question Text	Answer	Frequency (f)	Percentage (%)
16	Are you familiar with the role of the Carbon Border Adjustment Mechanism (CBAM) in import-export processes?	Yes	6	7,3
		No	76	92,7
		Total	82	100

The question “Are you aware that the Green Deal mandates carbon footprint measurement and reporting in logistics operations?” was asked to the participants. A total of 82 participants responded to this question. 92.7% (f: 76) responded as no, and 7.3% (f: 6) responded as yes. The distribution of their answers is presented in Table 9. This result suggests that logistics-related sustainability requirements are still not widely recognized.

Table 9. Distribution of Firms' Responses to Question 17

Question	Question Text	Answer	Frequency (f)	Percentage (%)
17	Are you aware that the Green Deal mandates carbon footprint measurement and reporting in logistics operations?	Yes	6	7,3
		No	76	92,7
		Total	82	100

The question “Are you aware that the EU is beginning to implement carbon taxes in logistics and transport systems?” was asked to the participants. A total of 82

participants responded to this question. 76.8% (f: 63) responded as no, and 23.2% (f: 19) responded as yes. The distribution of their answers is presented in Table 10. The data indicates limited familiarity with the financial aspects of carbon pricing in transportation.

Table 10. Distribution of Firms' Responses to Question 18

Question	Question Text	Answer	Frequency (f)	Percentage (%)
18	Are you aware that the EU is beginning to implement carbon taxes in logistics and transport systems?	Yes	19	23,2
		No	63	76,8
		Total	82	100

The question “Are you aware that the EU promotes sustainable logistics and supply chain practices?” was asked to the participants. A total of 82 participants responded to this question. 65.9% (f: 54) responded as no, and 34.1% (f: 28) responded as yes. The distribution of their answers is presented in Table 11.

Awareness of EU efforts to encourage green supply chains appears to be relatively limited.

Table 11. Distribution of Firms' Responses to Question 19

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
19	Are you aware that the EU promotes sustainable logistics and supply chain practices?	Yes	28	34,1
		No	54	65,9
		Total	82	100

The question “Do you think the Green Deal will have a direct impact on companies operating in Türkiye?” was asked to the participants. A total of 82

participants responded to this question. 32.9% (f: 27) responded as yes and 67.1% (f: 55) as not sure. Most of the firms are not sure whether the Green Deal would directly affect their operations or not.

Table 12. Distribution of Firms' Responses to Question 20

Question	Question Text	Answer	Frequency (f)	Percentage (%)
20	Do you think the Green Deal will have a direct impact on companies operating in Türkiye?	Yes	27	32,9
		No	0	0
		Not Sure	55	67,1
		Total	82	100

The question “Are you aware that Türkiye has developed an action plan in response to the European Green Deal?” was asked to the participants. A total of 82 participants responded to this question. 72% (f: 59) responded as no, and 28% (f: 23) responded as yes. The distribution of their answers is presented in Table 13. This result highlights a knowledge gap concerning Türkiye's strategic alignment with EU policies.

Table 13. Distribution of Firms' Responses to Question 21

Question	Question Text	Answer	Frequency (f)	Percentage (%)
21	Are you aware that Türkiye has developed an action plan in response to the European Green Deal?	Yes	23	28
		No	59	72
		Total	82	100

The question “Are you aware of any financial support programs (e.g., Responsible Program) for exporting firms under the Green Deal action plan?” was asked to the participants. A total of 82 participants responded to this question. 90.2%

(f: 74) responded as no, and 9.8% (f: 8) responded as yes. The distribution of their answers is presented in Table 14. Financial assistance programs under the Green Deal appear to be underpublicized or not well understood by firms.

Table 14. Distribution of Firms' Responses to Question 22

Question	Question Text	Answer	Frequency (f)	Percentage (%)
22	Are you aware of any financial support programs (e.g., Responsible Program) for exporting firms under the Green Deal action plan?	Yes	8	9,8
		No	74	90,2
		Total	82	100

The question “Are you aware of the Carbon Border Adjustment Compliance Fund announced in 2023?” was asked to the participants. A total of 82 participants responded to this question. 95.1% (f: 78) responded as no, and 4.9% (f: 4) responded as yes. The distribution of their answers is presented in Table 15. This result suggests that new national-level financial mechanisms have not yet reached sufficient visibility in the business sector.

Table 15. Distribution of Firms' Responses to Question 23

Question	Question Text	Answer	Frequency (f)	Percentage (%)
23	Are you aware of the Carbon Border Adjustment Compliance Fund announced in 2023?	Yes	4	4,9
		No	78	95,1
		Total	82	100

The question “Do you have knowledge about low-carbon transport alternatives (e.g., electric vehicles, biofuels, rail transport)?” was asked to the participants. A total of 82 participants responded to this question. 63.4% (f: 52)

responded as no, and 36.6% (f: 30) responded as yes. The distribution of their answers is presented in Table 16. These findings imply moderate awareness of sustainable transportation solutions.

Table 16. Distribution of Firms' Responses to Question 24

Question	Question Text	Answer	Frequency (f)	Percentage (%)
24	Do you have knowledge about low-carbon transport alternatives (e.g., electric vehicles, biofuels, rail transport)?	Yes	30	36,6
		No	52	63,4
		Total	82	100

The question “Are you aware that the Digital Product Passport will be required for exports to the EU?” was asked to the participants. A total of 82 participants responded to this question. 73.2% (f: 60) responded as no, and 26.8% (f: 22) responded as yes. The distribution of their answers is presented in Table 17. The concept of digital traceability in compliance remains unfamiliar to most firms.

Table 17. Distribution of Firms' Responses to Question 25

Question	Question Text	Answer	Frequency (f)	Percentage (%)
25	Are you aware that the Digital Product Passport will be required for exports to the EU?	Yes	22	26,8
		No	60	73,2
		Total	82	100

The question “Are you aware of the need for environmental compliance documents in exports to EU countries?” was asked to the participants. A total of 82 participants responded to this question. 91.5% (f: 75) responded as no, and 8.5% (f: 7) responded as yes. The distribution of their answers is presented in Table 18. A

large portion of firms may be at risk of non-compliance in documentation if awareness level is not improved.

Table 18. Distribution of Firms' Responses to Question 26

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
26	Are you aware of the need for environmental compliance documents in exports to EU countries?	Yes	7	8,5
		No	75	91,5
		Total	82	100

The question “Are you aware that circular economy principles are promoted within sustainable logistics and supply chains?” was asked to the participants. A total of 82 participants responded to this question. 84.1% (f: 69) responded as no, and 15.9% (f: 13) responded as yes. The distribution of their answers is presented in Table 19. Although the concept is gaining attraction globally, it is still at emerging stages among exporters in Türkiye.

Table 19. Distribution of Firms' Responses to Question 27

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
27	Are you aware that circular economy principles are promoted within sustainable logistics and supply chains?	Yes	13	15,9
		No	69	84,1
		Total	82	100

The question “Do you have an opinion on how the Green Deal might affect your logistics costs?” was asked to the participants. A total of 82 participants responded to this question. 4.9% (f: 4) responded as no, 14.6% (f: 12) as yes, and 80.5% (f: 66) as not sure. The distribution of their answers is presented in Table 20.

Table 20. Distribution of Firms' Responses to Question 28

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
28	Do you have an opinion on how the Green Deal might affect your logistics costs?	Yes	12	14,6
		No	4	4,9
		Not Sure	66	80,5
		Total	82	100

The question “Do you believe that EU environmental regulations may provide a long-term competitive advantage in logistics and supply chain management?” was asked to the participants. A total of 82 participants responded to this question. 9.8% (f: 8) responded as no, 14.6% (f: 12) as yes, and 75.6% (f: 62) as not sure. The distribution of their answers is presented in Table 21. The result suggests that the strategic value of sustainability practices has not yet been fully recognized by many firms.

Table 21. Distribution of Firm's Responses to Question 29

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
29	Do you believe that EU environmental regulations may provide a long-term competitive advantage in logistics and supply chain management?	Yes	12	14,6
		No	8	9,8
		Not Sure	62	75,6
		Total	82	100

The third section of the study includes statements aimed at assessing the readiness of companies towards the European Green Deal and related regulations. Below, the descriptive analysis results of questions 30 to 49, which aim to assess the companies' attitudes towards compliance, strategic planning, operational transformation and sustainable logistics practices, are presented. The data in this

section provide a general view of the extent to which companies are prepared for the obligations under the Green Deal.

The statement “I have sufficient knowledge and resources to implement the requirements of the Green Deal.” was responded by a total of 82 participants. The distribution of their responses is as follows: 1.2% (f: 1) responded as strongly agree, 6.1% (f: 5) responded as agree, 45.1% (f: 37) responded as neutral, 35.4% (f: 29) responded as disagree, 12.2% (f: 10) responded as strongly disagree (Table 22). The majority of participants were undecided on this issue, indicating that companies have not yet made a clear assessment of the scope and requirements of the Green Deal.

Table 22. Distribution of Firms’ Responses to Question 30

Question	Question Text	Answer	Frequency (f)	Percentage (%)
30	I have sufficient knowledge and resources to implement the requirements of the Green Deal.	Strongly Agree	1	1,2
		Agree	5	6,1
		Neutral	37	45,1
		Disagree	29	35,4
		Strongly Disagree	10	12,2
		Total	82	100

The statement “I believe failure to comply with the Green Deal may cause competitive disadvantage for our company.” was responded by a total of 82 participants. The distribution of their responses is as follows: 2.4% (f: 2) responded as strongly agree, 40.2% (f: 33) responded as agree, 53.7% (f: 44) responded as neutral, 3.7% (f: 3) responded as strongly disagree (Table 23). A large majority of participants did not express a definitive opinion on this issue, indicating that the potential competitive effects have not yet been concretely perceived by companies.

Table 23. Distribution of Firms' Responses to Question 31

Question	Question Text	Answer	Frequency (f)	Percentage (%)
31	I believe failure to comply with the Green Deal may cause competitive disadvantage for our company.	Strongly Agree	2	2,4
		Agree	33	40,2
		Neutral	44	53,7
		Disagree	0	0
		Strongly Disagree	3	3,7
		Total	82	100

The statement "I have the financial resources to switch to green logistics practices." was responded by a total of 82 participants. The distribution of their responses is as follows: 6.1% (f: 5) responded as strongly agree, 12.2% (f: 10) responded as agree, 42.7% (f: 35) responded as neutral, 35.4% (f: 29) responded as disagree, 3.7% (f: 3) responded as strongly disagree (Table 24). The majority of firms state that they were undecided on this issue and revealed that there was uncertainty in their perception of financial adequacy.

Table 24. Distribution of Firms' Responses to Question 32

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
32	I have the financial resources to switch to green logistics practices.	Strongly Agree	5	6,1
		Agree	10	12,2
		Neutral	35	42,7
		Disagree	29	35,4
		Strongly Disagree	3	3,7
		Total	82	100

The question “Do you have a strategy to reduce carbon emissions in your supply chain?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 4.9% (f: 4) responded as yes, 89.0% (f: 73) responded as no, 6.1% (f: 5) responded as planning. Most of the participants state that they do not have such a strategy, which reveals that a planned roadmap for environmental performance has not yet been formed in the companies. The distribution of their answers is presented in Table 25.

Table 25. Distribution of Firms’ Responses to Question 33

Question	Question Text	Answer	Frequency (f)	Percentage (%)
33	Do you have a strategy to reduce carbon emissions in your supply chain?	Yes	4	4,9
		No	73	89
		Planning	5	6,1
		Total	82	100

The question “Do you think your logistics processes need transformation to reduce carbon emissions?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 23.2% (f: 19) responded as yes, 30.5% (f: 25) responded as no, 46.3% (f: 38) responded as not sure. A significant portion of the responses are "not sure", indicating that companies do not have sufficient knowledge about evaluating their operational processes in terms of carbon. The distribution of their answers is presented in Table 26.

Table 26. Distribution of Firms' Responses to Question 34

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
34	Do you think your logistics processes need transformation to reduce carbon emissions?	Yes	19	23,2
		No	25	30,5
		Not Sure	38	46,3
		Total	82	100

The question “Do you currently use low-carbon transportation methods in your logistics processes?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 7.3% (f: 6) responded as yes, 87.8% (f: 72) responded as no, 4.9% (f: 4) responded as planning. A significant portion of companies have stated that they have not yet implemented such applications. The distribution of their answers is presented in Table 27.

Table 27. Distribution of Firms' Responses to Question 35

Question	Question Text	Answer	Frequenc y (f)	Percentag e (%)
35	Do you currently use low-carbon transportation methods in your logistics processes?	Yes	6	7,3
		No	72	87,8
		Planning	4	4,9
		Total	82	100

The question “Are you planning to invest in green logistics or sustainable supply chain practices?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 11.0% (f: 9) responded as yes, 78.0% (f: 64) responded as no, 11.0% (f: 9) responded as planning. Most participants state that they have not yet planned such investments,

revealing that companies do not prioritize sustainability investments in the short term. The distribution of their answers is presented in Table 28.

Table 28. Distribution of Firms' Responses to Question 36

Question	Question Text	Answer	Frequency (f)	Percentage (%)
36	Are you planning to invest in green logistics or sustainable supply chain practices?	Yes	9	11
		No	64	78
		Planning	9	11
		Total	82	100

The question “Do you have an audit mechanism in your supply chain that includes sustainability criteria?” was asked to the participants. A total of 81 participants responded to this question. The distribution of their responses is as follows: 4.9% (f: 4) responded as yes, 92.6% (f: 75) responded as no, 2.5% (f: 2) responded as planning. The distribution of their answers is presented in Table 29.

Table 29. Distribution of Firms' Responses to Question 37

Question	Question Text	Answer	Frequency (f)	Percentage (%)
37	Do you have an audit mechanism in your supply chain that includes sustainability criteria?	Yes	4	4,9
		No	75	92,6
		Planning	2	2,5
		Total	81	100

The question “Do you prioritize working with suppliers that promote sustainable transport solutions?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 8.5% (f: 7) responded as yes, 86.6% (f: 71) responded as no, 4.9% (f: 4)

responded as planning. A significant number of companies state that they do not prioritize such collaborations, which shows that supplier selection criteria have not yet been structured with a sustainability focus. The distribution of their answers is presented in Table 30.

Table 30. Distribution of Firms' Responses to Question 38

Question	Question Text	Answer	Frequency (f)	Percentage (%)
38	Do you prioritize working with suppliers that promote sustainable transport solutions?	Yes	7	8,5
		No	71	86,6
		Planning	4	4,9
		Total	82	100

The question "Do you implement new methods to increase energy efficiency in your warehouses and logistics centers?" was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 9.8% (f: 8) responded as yes, 80.5% (f: 66) responded as no, 9.8% (f: 8) responded as planning. Most responses indicate that such practices have not yet been put into practice, suggesting that awareness of energy efficiency has not yet become widespread. The distribution of their answers is presented in Table 31.

Table 31. Distribution of Firms' Responses to Question 39

Question	Question Text	Answer	Frequency (f)	Percentage (%)
39	Do you implement new methods to increase energy efficiency in your warehouses and logistics centers?	Yes	8	9,8
		No	66	80,5
		Planning	8	9,8
		Total	82	100

The question “40 – Are you working to ensure that your products comply with Digital Product Passport requirements?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 6.2% (f: 5) responded as yes, 77.5% (f: 62) responded as no, 16.2% (f: 13) responded as planning. The distribution of their answers is presented in Table 32.

Table 32. Distribution of Firms’ Responses to Question 40

Question	Question Text	Answer	Frequency (f)	Percentage (%)
40	Are you working to ensure that your products comply with Digital Product Passport requirements?	Yes	5	6,2
		No	62	77,5
		Planning	13	16,2
		Total	80	100

A total of 82 participants responded to question 41. The distribution of their responses is as follows: 11.2% (f: 9) responded as yes, 78.8% (f: 63) responded as no, 10.0% (f: 8) responded as planning. A large portion of the participants stated that they did not have any plans in this regard; this suggests that existing incentive mechanisms are not sufficiently known by companies. The distribution of their answers is presented in Table 33.

Table 33. Distribution of Firms’ Responses to Question 41

Question	Question Text	Answer	Frequency (f)	Percentage (%)
41	Do you plan to benefit from government incentives to reduce carbon emissions in your logistics processes?	Yes	9	11,2
		No	63	78,8
		Planning	8	10
		Total	80	100

The question “42 – Do you provide training to your employees about Green Deal compliance?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 3.7% (f: 3) responded as yes, 92.6% (f: 75) responded as no, 3.7% (f: 3) responded as planning. The majority of participants stated that they have not yet initiated such a training process. This reveals that either their knowledge about the Green Deal is insufficient or they do not attach the necessary importance to this issue. The distribution of their answers is presented in Table 34.

Table 34. Distribution of Firms’ Responses to Question 42

Question	Question Text	Answer	Frequency (f)	Percentage (%)
42	Do you provide training to your employees about Green Deal compliance?	Yes	3	3,7
		No	75	92,6
		Planning	3	3,7
		Total	81	100

The question “Does your company receive consultancy from any organization about Green Deal compliance?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 4.9% (f: 4) responded as yes, 93.8% (f: 76) responded as no, 1.2% (f: 1) responded as planning. The distribution of their answers is presented in Table 35.

Table 35. Distribution of Firms' Responses to Question 43

Question	Question Text	Answer	Frequency (f)	Percentage (%)
43	Does your company receive consultancy from any organization about Green Deal compliance?	Yes	4	4,9
		No	76	93,8
		Planning	1	1,2
		Total	81	100

The question “Has your company ever received training on Green Deal or sustainable logistics?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 6.1% (f: 5) responded as yes, 92.7% (f: 76) responded as no, 1.2% (f: 1) responded as planning. The distribution of their answers is presented in Table 36.

Table 36. Distribution of Firms' Responses to Question 44

Question	Question Text	Answer	Frequency (f)	Percentage (%)
44	Has your company ever received training on Green Deal or sustainable logistics?	Yes	5	6,1
		No	76	92,7
		Planning	1	1,2
		Total	82	100

The question “Do you plan to develop strategic partnerships to comply with the Green Deal?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 6.2% (f: 5) responded as yes, 86.4% (f: 70) responded as no, 7.4% (f: 6) responded as planning. The majority of responses indicate that no such planning has been made, suggesting that the awareness of joint action has not yet developed at the firm level. The distribution of their answers is presented in Table 37.

Table 37. Distribution of Firms' Responses to Question 45

Question	Question Text	Answer	Frequency (f)	Percentage (%)
45	Do you plan to develop strategic partnerships to comply with the Green Deal?	Yes	5	6,2
		No	70	86,4
		Planning	6	7,4
		Total	81	100

The question “Are you taking steps to switch to alternative fuel-based transportation methods?” was asked to the participants. A total of 82 participants responded to this question. The distribution of their responses is as follows: 6.2% (f: 5) responded as yes, 82.5% (f: 66) responded as no, 11.2% (f: 9) responded as planning. Most of the participants stated that they have not taken any concrete steps in this regard, which shows that sustainable transportation investments are still in their early stages. The distribution of their answers is presented in Table 38.

Table 38. Distribution of Firms' Responses to Question 46

Question	Question Text	Answer	Frequency (f)	Percentage (%)
46	Are you taking steps to switch to alternative fuel-based transportation methods?	Yes	5	6,2
		No	66	82,5
		Planning	9	11,2
		Total	80	100

The question “What are your biggest challenges in complying with sustainability and environmental regulations?” was asked to the participants. The distribution of their responses is as follows: 57.3% (f: 47) responded as economic, 68.3% (f: 56) responded as lack of information, 40.2.3% (f: 33) responded as

operational difficulty and 26.8% (f: 22) responded as lack of information .The distribution of their answers is presented in Table 39.

Table 39. Distribution of Firms' Responses to Question 47

Question	Question Text	Answer	Frequency (f)	Percentage (%)
47	What are your biggest challenges in complying with sustainability and environmental regulations?	Economic	47	57,3
		Lack of Information	56	68,3
		Operational Difficulty	33	40,2
		Falling Behind in Competition	22	26,8
		Total	82	192,7**

**In this question, survey respondents can choose more than one option.

The question 48 was asked to the participants. The distribution is as follows: 31.7% (f: 26) responded as technological support, 69.5% (f: 57) responded as consulting support, 31.7% (f: 26) responded as education support and 53.7% (f: 44) responded as education support. The distribution of their answers is presented in Table 40.

Table 40. Distribution of Firms' Responses to Question 48

Question	Question Text	Answer	Frequency (f)	Percentage (%)
48	What kind of support would you need to manage these challenges?	Technological Support	26	31,7
		Consulting Support	57	69,5
		Education Support	26	31,7
		Financial Support	44	53,7
		Total	82	186,6**

**In this question, survey respondents can choose more than one option.

8.2 Chi-Square analysis

This section includes cross-tabulation and chi-square test analyses to test the hypotheses by examining the relationship between the demographic characteristics of the participating firms and their awareness and readiness levels within the scope of the European Green Deal. Within the scope of the analysis, it is investigated whether there was a significant relationship between the characteristics of the firm such as the number of employees, firm age, export share in revenue and their awareness and readiness levels. By applying these tests to categorical data, it is statistically evaluated whether firm characteristics are related to environmental sustainability-oriented attitudes and knowledge levels.

Table 41. Chi-Square Test Between Question 3 and 22

		Number of employees					Total
		1-10 people	11-25 people	26-50 people	51-75 people	76 people and above	
Did you know that Türkiye has programs that provide financial support to exporting companies in line with the Green Deal Action Plan?	Yes	3	2	0	2	1	8
	No	13	36	21	4	0	74
Total		16	38	21	6	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17,65	4	0,001

Chi-square test is applied to determine the relationship between the number of employees and the level of awareness of the financial support programs provided to exporting companies within the scope of Türkiye's Green Deal Action Plan (Table

41). As a result of the analysis, a statistically significant relationship is found between these two variables ($\chi^2(4) = 17.65$, $p = 0.001$). The findings show that there are differences in the awareness levels of companies regarding environmental support mechanisms as the number of employees increases. This finding reveals that the knowledge levels of firms about government supports vary according to employee numbers in a statistically significant way.

Table 42. Chi-Square Test Between Question 3 and 11

		Number of employees					
		1-10 people	11-25 people	26-50 people	51-75 people	76 people and above	Total
Did you know that the European Union takes actions with regulations and decisions such as the Green Deal for sustainability and environmental issues?	Yes	9	14	8	6	1	38
	No	7	24	13	0	0	44
Total		16	38	21	6	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10,690	4	0,030

In order to evaluate the relationship between the number of employees and the company's awareness of the actions taken by the European Union on sustainability and environmental issues through regulations and policies such as the Green Deal, the Chi-square (χ^2) test is applied (Table 42). As a result of the analysis, it is determined that there was a statistically significant relationship between these two variables ($\chi^2(4) = 10.69$, $p = 0.03$). This finding shows that there is a significant

difference in the awareness levels of the companies regarding the environmental policies and strategies of the European Union as the number of employees increases. It can be said that especially the companies with more employees follow the current developments in the field of sustainability more closely due to their institutional structures and their knowledge levels are higher in this direction.

Table 43. Chi-Square Test Between Question 3 and 16

		Number of employees					Total
		1-10 people	11-25 people	26-50 people	51-75 people	76 people and above	
Do you know the role of the Carbon Border Adjustment Mechanism (CBAM) in import and export processes?	Yes	4	0	1	1	0	6
	No	12	38	20	5	1	76
Total		16	38	21	6	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11,432	4	0,022

In order to reveal the relationship between the number of employees and the level of knowledge about the Carbon Border Adjustment Mechanism (CBAM), the Chi-square test is applied (Table 43). As a result of the analysis, statistically significant relationship is determined between these two variables ($\chi^2(4) = 11.432$, $p = 0.022$). The findings reveal that as the number of employees increases, the awareness levels of the companies regarding the carbon-based trade policies of the European Union differ. This result shows that firms with more employees are more

knowledgeable about the subject because they encounter CBAM application more frequently in their foreign trade processes.

Table 44. Chi-Square Test Between Question 3 and 23

		Number of employees					Total
		1-10 people	11-25 people	26-50 people	51-75 people	76 people and above	
Did you know that Türkiye provides financial support to exporters with the "Border Carbon Tax Compliance Fund" announced in 2023?	Yes	2	1	0	0	1	4
	No	14	37	21	6	0	78
Total		16	38	21	6	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	23,301	4	0,001

Chi-square test is applied to determine the relationship between the number of employees and the level of knowledge of firms about the Border Carbon Tax Compliance Fund announced by Türkiye in 2023 (Table 44). Results depict a statistically significant relationship between these two variables ($\chi^2(4) = 23.301$, $p = 0.001$). This finding shows that as the number of employees increases, the level of knowledge of firms about the fund in question changes significantly. It can be said that firms with more employees in particular are more knowledge about such public supports due to their closer relationship with export processes and carbon regulations.

Table 45. Chi-Square Test Between Question 3 and 26

		Number of employees					Total
		1-10 people	11-25 people	26-50 people	51-75 people	76 people and above	
Are you aware of the need for environmental compliance documents for exports to EU countries?	Yes	2	2	1	1	1	7
	No	14	36	20	5	0	75
Total		16	38	21	6	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12,449	4	0,014

Chi-square test is applied to determine the relationship between the number of employees of the companies and the level of knowledge about the necessity of environmental compliance documents in exports to European Union countries (Table 45). As a result of the analysis, it is determined that there is a statistically significant relationship between these two variables ($\chi^2(4) = 12.449$, $p = 0.014$). This finding shows that there are significant differences in the level of knowledge of companies of different sizes regarding the environmental regulations they encounter when exporting to the European Union market. It is evaluated that companies with more employees in particular may have higher awareness of such regulations due to their institutional awareness of operational requirements and export documents.

Table 46. Chi-Square Test Between Question 2 and 40

		Firm Age						
		No Answer	0-2	3-5	6-8	9-11	12 and above	Total
Are you working to ensure that your products comply with the Digital Product Passport requirements?	Yes	1	3	0	0	0	1	5
	No	0	22	32	7	1	0	62
	Planning	0	3	8	1	1	0	13
	No Answer	0	1	1	0	0	0	2
Total		1	29	41	8	2	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	37,917	15	<0,001

In order to reveal the relationship between the company age and the compliance status of the Digital Product Passport (DPP) requirements, the Chi-square test is applied (Table 46). The analysis is conducted by including the responses with missing data and a statistically significant relationship is determined between these two variables ($\chi^2(15) = 37.917$, $p = <0.001$). This finding reveals that the readiness levels of companies with different age ranges for the European Union's digital sustainability policies differ. It is observed that especially the companies that have been operating for a longer time are more proactive in complying with the regulations and are more prepared for new applications such as the Digital Product Passport.

Table 47. Chi-Square Test Between Question 2 and 38

		Firm Age						Total
		No Answer	0-2	3-5	6-8	9-11	12 and above	
Do you prioritize working with suppliers that promote sustainable transportation solutions?	Yes	0	5	2	0	0	0	7
	No	1	24	36	8	2	0	71
	Planning	0	0	3	0	0	1	4
Total		1	29	41	8	2	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	26,392	10	0,003

Chi-square test is applied to examine the relationship between the firm age and the tendency to work with suppliers that promote sustainable transportation solutions (Table 47). As a result of the analysis carried out by including missing answers, a statistically significant relationship is found between these two variables ($\chi^2(10) = 26.392$, $p = 0.003$). This result reveals that firms with different age ranges show significant differences in terms of supplier preferences for sustainable transportation solutions. It is observed that especially firms that have been operating for a long time prioritize suppliers that meet sustainable transportation criteria more in line with their environmental responsibility awareness and strategic partnership experience.

Table 48. Chi-Square Test Between Question 2 and 26

		Firm Age						Total
		No Answer	0-2	3-5	6-8	9-11	12 and above	
Are you aware of the need for environmental compliance documents for exports to EU countries?	Yes	1	2	3	0	0	1	7
	No	0	27	38	8	2	0	75
Total		1	29	41	8	2	1	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	22,540	5	<0,001

Chi-square test is applied to examine the relationship between the firm age and the level of knowledge about the necessity of environmental compliance documents in exports to European Union countries (Table 48). As a result of the analysis carried out by including the missing answers, it is determined that a statistically significant relationship exists between these two variables ($\chi^2(5) = 22.540$, $p = <0.001$). The results obtained show that there are significant differences in the level of knowledge of firms operating in different age ranges regarding the environmental regulations they encounter when entering the European Union market. It is evaluated that especially the firms that have been operating for a longer period of time may have higher awareness of environmental documents and compliance requirements due to being more familiar with export procedures.

Table 49. Chi-Square Test Between Question 2 and 22

		Firm Age						Total
		No Answer	0-2	3-5	6-8	9-11	12 and above	
Did you know that Türkiye has programs that provide financial support to exporting companies in line with the Green Deal Action Plan?	Yes	0	5	1	1	0	1	8
	No	1	24	0	40	8	1	74
Total		1	29	1	41	8	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18,241	5	0,003

In order to evaluate the relationship between the firm age and the level of knowledge about financial support programs for firms exporting in line with Türkiye's Green Deal Action Plan, a Chi-square test is applied (Table 49). The analysis is carried out by including missing answers and a statistically significant relationship is found between these two variables ($\chi^2(5) = 18.241$, $p = 0.003$). This finding shows that as the duration of the firms' operations increases, their level of knowledge about public support and sustainability-oriented state incentives also differs. The fact that firms that have been operating for a long time are more sensitive to policy developments and tend to adapt to such support programs earlier can be considered as a factor that increases their awareness levels.

Table 50. Chi-Square Test Between Question 2 and 23

		Firm Age						Total
		No Answer	0-2	3-5	6-8	9-11	12 and above	
Did you know that Türkiye provides financial support to exporters with the "Border Carbon Tax Compliance Fund" announced in 2023?	Yes	0	3	1	0	0	0	4
	No	1	26	0	41	8	2	78
Total		1	29	1	41	8	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24,034	5	<0,001

Chi-square test is applied to evaluate the relationship between firm age and the level of knowledge of firms about the Border Carbon Tax Compliance Fund announced by Türkiye in 2023 (Table 50). As a result of the analysis carried out by including missing answers, a statistically significant relationship is found between these two variables ($\chi^2(5) = 24.034$, $p = <0.001$). This finding shows that firm age can be a determining factor in the awareness levels of public policies. It is evaluated that firms that have been operating for a longer period in particular may have higher levels of knowledge about the financial support fund, as they have more experience in compliance with regulations and follow official support mechanisms more closely.

Table 51. Chi-Square Test Between Question 5 and 12

		Export Share in Revenue						
		%1-%5	%6-%10	%11-%15	%16-%20	%21 and above	Do Not Export	Total
Did you know that the European Union aims to be carbon neutral by 2050?	Yes	5	11	4	2	2	2	26
	No	23	26	6	1	0	0	56
Total		28	37	10	3	2	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13,173	5	0,022

Chi-square test is applied to examine the relationship between the ratio of firms' export revenues to total turnover and the level of knowledge about the European Union's carbon neutrality target by 2050 (Table 51). As a result of the analysis carried out by including missing answers, it is determined that a statistically significant relationship exists between these two variables ($\chi^2(5) = 13.173$, $p = 0.022$). These findings show that there are significant differences in firms' awareness levels about the EU's long-term climate strategies as the export share in revenue increase. It is understood that firms with high export share in revenue, in particular, have more knowledge about strategic environmental policies such as the carbon neutrality target due to their greater exposure to regulations in the European market.

Table 52. Chi-Square Test Between Question 5 and 14

		Export Share in Revenue						Total
		%1- %5	%6- %10	%11- %15	%16- %20	%21 and above	Do Not Export	
Do you have any information about the general purpose of the Green Deal?	Yes	8	9	5	2	2	2	28
	No	20	28	5	1	0	0	54
Total		28	37	10	3	2	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12,217	5	0,032

The Chi-square test is applied to determine the relationship between the share of export revenues in total turnover and the level of knowledge of the companies about the general purpose of the European Union's Green Deal policy (Table 52). As a result of the analysis carried out by including missing answers, a statistically significant relationship is found between these two variables ($\chi^2(5) = 12.217$, $p = 0.032$). This finding reveals that companies with high export share in revenue tend to be more aware of the main goals of the Green Deal due to their closer trade relations with the European Union. Companies that are exposed to environmental regulations in the process of accessing the EU market are more conscious in understanding the purpose of these regulations and adapting their business processes accordingly.

Table 53. Chi-Square Test Between Question 5 and 18

		Export Share in Revenue						Total
		%1- %5	%6- %10	%11- %15	%16- %20	%21 and above	Do Not Export	
Did you know that the European Union is implementing a carbon tax in logistics?	Yes	6	7	1	1	2	2	19
	No	22	30	9	2	0	0	63
Total		28	37	10	3	2	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14,835	5	0,011

Chi-square test is applied to examine the relationship between the ratio of firms' export revenues to total turnover and their level of knowledge that the European Union is implementing carbon tax practices in logistics (Table 53). As a result of the analysis carried out by including missing answers, it is determined that a statistically significant relationship exists between these two variables ($\chi^2(5) = 14.835$, $p = 0.011$). This finding shows that firms with high export share in revenue tend to have more knowledge about the EU's carbon-focused logistics policies. Considering that firms with high exports are more directly affected by the regulations in the European market, it is expected that they are more knowledgeable and have higher awareness levels about such policies.

Table 54. Table 52. Chi-Square Test Between Question 5 and 22

		Export Share in Revenue						Total
		%1- %5	%6- %10	%11- %15	%16- %20	%21 and above	Do Not Export	
Did you know that Türkiye has programs that provide financial support to exporting companies in line with the Green Deal Action Plan?	Yes	3	1	1	0	1	2	8
	No	25	36	9	3	1	0	74
Total		28	37	10	3	2	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24,624	5	<0,001

Chi-square test is applied to examine the relationship between the ratio of export revenues of companies to total turnover and the level of knowledge about the financial support programs offered to companies exporting within the framework of Türkiye's Green Deal Action Plan (Table 54). The analysis is conducted by including missing answers and it is determined that a statistically significant relationship exists between these two variables ($\chi^2(5) = 24.624$, $p = <0.001$). This finding shows that companies with high export share in revenue has more knowledge about national policies and incentive mechanisms supporting environmentally friendly transformation. It can be said that companies with high export share in revenue show more interest in such financial supports in order to comply with sustainability targets and their awareness about the practices is higher.

Table 55. Table 52. Chi-Square Test Between Question 5 and 23

		Export Share in Revenue						Total
		%1- %5	%6- %10	%11- %15	%16- %20	%21 and above	Do Not Export	
Did you know that Türkiye provides financial support to exporters with the "Border Carbon Tax Compliance Fund" announced in 2023?	Yes	1	1	0	0	1	1	4
	No	27	36	10	3	1	1	78
Total		28	37	10	3	2	2	82

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18,698	5	0,002

Chi-square test is applied to examine the relationship between the ratio of export revenues to total turnover and the level of knowledge about the Border Carbon Tax Compliance Fund announced by Türkiye in 2023 (Table 55). As a result of the analysis carried out by including missing answers, a statistically significant relationship is determined between these two variables ($\chi^2(5) = 18.698$, $p = 0.002$). This finding shows that firms with high export share in revenue has more knowledge about the financial support mechanisms established within the scope of carbon regulations. These firms, which encounter environmental liabilities more frequently during the integration process to the European Union market, follow developments regarding state support more closely and develop awareness about the compliance process.

8.3 ANOVA

This section includes analyses to determine whether firms' attitudes and perceptions towards various sustainability issues within the scope of the European Green Deal differ according to their export share in revenue. For this purpose, Likert-type questions in the study are considered as dependent variables, while firms' declared export share in revenue is used as independent variables. In these analyses, which are conducted using the One-Way ANOVA method, the means between the groups are compared to test whether there is a statistically significant difference. The findings reveal whether significant changes are observed in firms' attitudes towards the Green Deal in certain areas as the export level increases.

Table 56. ANOVA Analysis Between Question 5 and 31

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Firms Competitiveness	Between Groups	11,854	5	2,371	6,123	<0,001
	Within Groups	29,426	76	0,387		
	Total	41,28	81			

Within the scope of the study, it was analyzed whether the export share in revenue of the firms within their total turnover had a statistically significant effect on their perceptions of the impact of failure to comply with the Green Deal on their competitiveness. For this purpose, the responses to the statement "I think that failure to comply with the Green Deal may cause a loss of competitiveness for our firm." were compared with one-way analysis of variance (One-Way ANOVA) according to export share in revenue groups (Table 56).

According to the analysis results, as the firms' export share in revenue increase, the perception that failure to comply with the Green Deal may negatively affect their competitiveness also increases significantly ($F(5) = 6.123$, $p = <0.001$). This situation shows that firms that are more dependent on foreign markets are more aware of the risk of failure to comply with the environmental regulations of the European Union posing a threat to commercial sustainability. The findings reveal that firms with high export capacity attach more strategic importance to the measures taken within the scope of the Green Deal and therefore their competitiveness concerns become more evident.

In the calculation made to evaluate the effect size, the value of $\eta^2 = 0.2872$ was obtained. This result shows that the export share in revenue has a high level of impact on the perception of firms' losing competitiveness.

Table 57. ANOVA Analysis Between Question 5 and 32

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Financial Adequacy	Between Groups	12,045	5	2,409	3,257	0,010
	Within Groups	56,211	76	0,740		
	Total	68,256	81			

In another dimension of the research, the effect of firms' export share in revenue on their perceptions of whether they have the necessary financial resources for the transition to green logistics practices was analyzed. In this context, the responses to the statement "I have the necessary financial resources for the transition to green logistics practices" were compared according to the firms' export share in

revenue. The analysis was carried out with one-way analysis of variance (One-Way ANOVA) in order to determine whether there were differences between independent groups (Table 57).

As a result of the analysis, a statistically significant difference was found between the firms' export share in revenue and their perceptions on this issue ($F(5) = 3.257$, $p = 0.0102$). This finding shows that firms with high export capacity have a relatively more positive perception regarding access to financial resources for the green transformation process. It can be said that firms adopting an export-based business model prioritize their financial preparations in order to comply with environmental regulations during the integration process with the EU market and carry out their corporate resource planning more effectively in this context.

In addition, the effect size calculated to evaluate the magnitude of this difference was found to be $\eta^2 = 0.1764$. This value shows that the effect of the export share in revenue on the financial resource adequacy of firms is at a moderate level.

Table 58. ANOVA Analysis Between Question 5 and 30

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Firm Knowledge and Resources Level on Green Deal	Between Groups	6,464	5	1,293	1,964	0,094
	Within Groups	50,024	76	0,658		
	Total	56,488	81			

Within the scope of the research, it was analyzed whether the export share in revenue of the firms had a significant effect on their self-assessment of having sufficient knowledge and resources to implement the requirements of the Green Deal. In this context, the responses given to the statement “I have sufficient

knowledge and resources to implement the requirements of the Green Deal” were compared according to the export income levels of the firms and the evaluation process was carried out with one-way analysis of variance (One-Way ANOVA) (Table 58). As a result of the analysis, no statistically significant difference was found between the groups according to export share in revenue ($F(5) = 1.041$, $p = 0.398$). This result shows that the firms’ perceptions of knowledge and resource adequacy regarding the Green Deal are shaped independently of the turnover rate they obtain from exports. In other words, no significant difference was observed in this regard between firms that export more to foreign markets and firms with more limited export capacity. This situation indicates that sustainability awareness may be more strongly related to other variables such as intra-firm strategic orientation, level of access to information or intra-sector guidance rather than export intensity.

The effect size was calculated as $\eta^2 = 0.1144$ and this result revealed that the effect of the export share in revenue on the perception of firms' knowledge and resource adequacy was at a moderate level.

Anova analysis was also conducted for firm ages and employee numbers . no significant results were found with these variables. The only significant relationship was detected between the number of employees and financial capability with the effect being at medium level. In general, the findings show that the number of employees is effective on certain issues on the sustainability perceptions and strategic awareness levels of companies. It reveals that it can create significant differences in awareness, especially regarding the economic capability of companies. ANOVA analyses are summarized in Table 59 and Table 60.

Table 59. ANOVA Analysis Between Employee Number and Questions 30, 31,32

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Firm Knowledge and Resources Level on Green Deal	Between Groups	2,038	4	0,509	0,720	0,581
	Within Groups	54,45	77	0,707		
	Total	56,488	81			
Firms Competitiveness	Between Groups	1,552	4	0,388	0,752	0,56
	Within Groups	39,728	77	0,516		
	Total	41,28	81			
Financial Adequacy	Between Groups	8,102	4	2,025	2,593	0,043
	Within Groups	60,154	77	0,781		
	Total	68,256	81			

Question	F	p	Eta Squared
Firm Knowledge and Resources Level on Green Deal	0,720	0,581	0,036
Firms Competitiveness	0,752	0,560	0,038
Financial Adequacy	2,593	0,043	0,119

Table 60. ANOVA Analysis Between Firm Age and Questions 30, 31,32

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Firm Knowledge and Resources Level on Green Deal	Between Groups	1,118	4	0,279	0,385	0,818
	Within Groups	55,105	76	0,725		
	Total	56,222	80			
Firms Competitiveness	Between Groups	1,352	4	0,338	0,650	0,629
	Within Groups	39,537	76	0,52		
	Total	40,889	80			
Financial Adequacy	Between Groups	6,218	4	1,555	1,949	0,111
	Within Groups	60,621	76	0,798		
	Total	66,84	80			

Question	F	p	Eta Squared
Firm Knowledge and Resources Level on Green Deal	0,385	0,818	0,020
Firms Competitiveness	0,650	0,629	0,033
Financial Adequacy	1,949	0,111	0,093

8.4 Findings and discussion

The descriptive analyses conducted revealed that the awareness level of e-commerce companies operating in the footwear and textile sectors in Türkiye regarding sustainability issues within the scope of the European Green Deal is generally limited. While most of the participating companies have basic knowledge, it was observed that their knowledge level about some technical regulations such as the digital product passport application, the border carbon tax compliance fund or sustainable transportation solutions is quite low. At the same time, a large portion of

the companies stated that they do not have sufficient capacity in areas such as access to financial resources, strategic planning, training and consultancy in terms of preparation for the Green Deal. This situation shows that especially small and medium-sized enterprises experience significant difficulties in the integration process of sustainability transformation. Therefore, findings of the descriptive analyses support the need for policies to improve the awareness of companies in Türkiye regarding environmental regulations and to strengthen practical compliance mechanisms.

As a result of the chi-square analyses conducted within the scope of the research, statistically significant relationships are found between the number of employees and the awareness and readiness levels of the firms regarding the Green Deal and various EU regulations focused on environmental sustainability. In particular, questions such as awareness of the European Union's target to reduce carbon emissions by 55%, the level of knowledge about financial support programs for firms exporting in line with Türkiye's Green Deal Action Plan, awareness of the digital product passport application, the tendency to work with suppliers that promote sustainable transportation solutions and the intention to benefit from government incentives for carbon emissions are significantly related to the number of employees. These results show that firms with larger structures both follow sustainability regulations more closely and are in a more advanced position in terms of implementation preparation. Delmas and Toffel (2008) emphasized the effect of business size on environmental performance and stated that businesses with more resources are more successful in terms of sustainability reporting, legislative monitoring and environmental compliance. The fact that firms with advanced institutional capacity have advantages in terms of access to information, expert

resources, digital infrastructure and strategic planning increases their ability to respond more quickly and effectively to regulations requiring environmental transformation. These findings indicate that guidance, training and financial support mechanisms, especially for small-scale firms, should be increased in the sustainable transformation process in Türkiye. Otherwise, these firms may fall behind in compliance with environmental regulations and face the risk of losing their competitive advantage.

The findings obtained within the scope of the research reveal that there is a significant relationship between the age of the company and the level of awareness of environmental regulations. In particular, the level of knowledge regarding digital product passport applications, sustainable transportation methods and environmental document requirements is higher in companies that have been operating for a longer time. This situation shows that the age of the company is directly related not only to sectoral experience but also to economic and organizational accumulation.

Businesses with a longer corporate lifespan generally have a more stable financial structure, a more developed management system and a wider business network.

These factors provide the company with both technical and strategic advantages in following and complying with environmental regulations. As a result, it is observed that companies that have been operating for a longer time are more prepared and conscious in their approach to environmental sustainability processes. This situation points to the need for young companies to be supported in terms of compliance with environmental policies and the importance of creating equal competition conditions in the field of sustainability.

ANOVA analyses conducted within the scope of the research reveal that there are significant differences between the firms' export rate and their level of readiness for environmental sustainability issues in certain areas. In particular, statistically significant differences are observed in the perception levels regarding access to financial resources and the risk of losing competitive advantage within the scope of the Green Deal compliance process, according to the firms' export rates. This finding shows that firms with high export volumes are more exposed to environmental regulations in foreign markets and therefore have higher levels of awareness and readiness for the compliance process. It can be said that firms that export to markets with strict environmental standards, such as the European Union, feel financial requirements and competitive pressures more closely. However, the results regarding the statement "Having the necessary financial resources for the green logistics transition", another question in the analysis, are not statistically significant. This situation indicates that firms may experience similar difficulties in terms of financial capacity even if the export rate is high. The issue of financial access can be affected not only by the level of exports, but also by various factors such as sector dynamics, access to public support mechanisms and firm scale. As a result, while the export rate creates a significant difference in some environmental readiness indicators, it does not stand out as a determining variable in all areas. This situation reveals that export performance is an effective element in sustainable transformation, but it is not sufficient on its own.

CHAPTER 9

CONCLUSION

The European Union's Green Deal strategy, which aims to make EU a climate neutral economy, has been transforming the way trade works around the globe. This development is driven not only by environmental concerns but also by the need for structural transformation that directly affects economic stability and trade relations. New regulations, especially in areas such as carbon emissions, resource efficiency and circular economy, require companies in countries trading with the EU to restructure their operations and supply chains. Türkiye, one of the countries directly affected by this process, has put the “Green Deal Action Plan” into effect in 2021 in order to both maintain its export potential and increase its global competitiveness. Within the scope of this plan, various strategic targets have been determined under headings such as border carbon regulations, green and circular economy, sustainable agriculture and transportation, clean energy transformation and awareness-raising activities. Therefore, evaluating the extent to which companies operating in Türkiye are ready for these changing trade and environmental policies has gained importance for sectors, companies and policy makers.

This research aims to assess the awareness and readiness levels of e-commerce companies operating in the footwear and textile sectors in Türkiye with regard to the sustainability-focused policies and regulations put into effect by the European Union within the scope of the Green Deal. The empirical analyses were based on a structured survey for which a questionnaire was developed. The questionnaire consisted of three main sections; the basic characteristics of the companies, their awareness of the Green Deal and their readiness levels for these

regulations are evaluated under separate headings. 82 companies participated in the survey study and the data were used to conduct descriptive analyses along with chi-square and ANOVA.

The findings obtained revealed that almost half of the companies were aware of the existence of the environmental regulations put forward by the European Union, but companies lacked the regulatory comprehension and implementation capacity required to take concrete action. Concepts such as digital product passport, carbon tax applications and sustainable supply chain management stand out as new and insufficiently understood areas for many participating companies. This situation shows that companies in Türkiye experience information and resource-based limitations in their transformation processes towards sustainability policies. Statistical analyses revealed that structural variables such as company age, number of employees and export rate significantly affect the awareness and readiness levels related to environmental regulations. It has been observed that larger and more experienced companies are more prepared for both environmental strategies and regulatory compliance. On the other hand, it has been understood that small-scale companies are at a disadvantage in terms of access to information, financial adequacy and organizational planning.

This study constitutes an important example both sectorally and methodologically in terms of assessing the awareness and readiness levels of e-commerce companies operating in Türkiye regarding sustainability regulations within the framework of the European Green Deal. The findings are instructive for both practitioners and policy makers in developing sector-based support strategies. The findings obtained from the research also offer important implications for e-commerce platforms. In particular, platforms need to take on a more supportive role

in order to eliminate deficiencies in sellers' awareness and readiness levels. Being an active guide in this process with informative tools, educational content or incentive mechanisms will both increase their own competitiveness and contribute to sustainable trade goals.

As a result, this research provides an original and up-to-date framework regarding the position of footwear and textile companies operating in the e-commerce sector in Türkiye in relation to the European Green Deal process. This study offers a different perspective by focusing on textile and footwear companies operating in a less-studied sector where digitalization is a determining factor, such as e-commerce. In addition, this study examines in detail the relationship between awareness levels towards Green Deal regulations such as CBAM, CSRD and DPP and variables such as firm scale, export rate and experience; thus, a sectoral and contextual contribution is made to the existing literature. This study also lays the groundwork for more research on the Green Deal by showing how firm-specific factors like age, number of employees, and export share in revenue are linked to levels of awareness and readiness. The observed patterns suggest that these variables play a significant role in shaping how companies respond to new sustainability obligations. Future studies can examine other sectors or collect data over a longer time period to better understand these relationships. Studies measuring awareness and readiness levels in the literature generally focus on energy-intensive sectors, manufacturing industry or traditional production areas. In the future, more research should be done that looks at sectoral and regional differences in more depth, uses qualitative analyses to look at in-house strategies, and uses longitudinal designs to see how awareness and readiness change over time.

9.1 Limitations of the study

This research has been conducted under some limitations. First limitation has to do with the sample size. Out of a total of 122 companies 82 gave valid answers. A larger sample size may make it possible to obtain results with higher accuracy. The geographical coverage of the research is limited to Türkiye. This may hinder the generalizability of the findings for European countries and others. Especially when the international context of the Green Deal is taken into account, this situation restricts making general inferences.

Since the data collection process is based on quantitative methods, qualitative data sources were not included in the study. Although interviews were conducted with five different companies at the preliminary stage of the survey and the questionnaire was revised in line with the suggestions of these companies; the lack of qualitative data during the implementation phase limited the opportunity to dive further into the strategic perspectives or detailed justifications of the participants.

APPENDIX A
QUESTIONNAIRE IN TURKISH

Part 1. Firma Bilgileri

1. Firmanızın faaliyet gösterdiği sektör:
 - a. Ayakkabı
 - b. Tekstil
 - c. Her ikisi
 - d. Diğer
2. Firmanızın yaşı:
 - a. 0-2
 - b. 3-5
 - c. 6-8
 - d. 9-11
 - e. 12 ve üzeri
3. Çalışan sayınız:
 - a. 1-10 kişi
 - b. 11-25 kişi
 - c. 26-50 kişi
 - d. 51-75 kişi
 - e. 76 kişi ve üzeri
4. Hangi e-ticaret kanallarını kullanıyorsunuz:
 - a. Trendyol
 - b. Hepsiburada
 - c. Amazon
 - d. Flo
 - e. Kendi Sitemiz
 - f. Diğer
5. Cironuzun yaklaşık ne kadarını ihracattan elde ediyorsunuz:
 - a. İhracat Yapmıyoruz
 - b. %1-%5
 - c. %6-%10

- d. %11-%15
 - e. %16-%20
 - f. %21 ve daha yüksek
6. Firmanızın faaliyet gösterdiği pazarlar:
- a. Türkiye
 - b. Avrupa Birliği ülkeleri
 - c. Kuzey Amerika
 - d. Asya- Pasifik
 - e. Afrika
 - f. Diğer
7. Firmanızın faaliyet yapısı:
- a. Üretici (Kendi üretimini yapıyor)
 - b. Toptancı (Üreticiden alıp satıyor)
 - c. Perakendeci (Son tüketiciye satış yapıyor)
 - d. Dropshipping (Stoksuz satış modeli)
 - e. Diğer
8. Ürün tedarik ettiğiniz başlıca pazarlar:
- a. Türkiye
 - b. Avrupa Birliği ülkeleri
 - c. Kuzey Amerika
 - d. Asya- Pasifik
 - e. Afrika
 - f. Diğer
9. Lojistik süreçleriniz nasıl yönetiliyor:
- a. Kendi lojistik altyapımız var
 - b. Üçüncü taraf lojistik firmaları (3PL) ile çalışıyoruz
 - c. Hibrit model (Kendi lojistik + 3PL)
 - d. Diğer
10. Kullanılan ana taşıma modları:
- a. Kara yolu
 - b. Hava yolu
 - c. Deniz yolu
 - d. Çok modlu taşıma (Birden fazla mod kullanılıyor)

Part 2. Yeşil Mutabakat ve Etkilerine Farkındalık

11. Avrupa Birliğinin sürdürülebilirlik ve çevre konuları için Yeşil Mutabakat gibi regülasyonlar ve kararlar ile aksiyonlar aldığını biliyor musunuz?
 - a. Evet
 - b. Hayır
12. Avrupa Birliğinin 2050 yılına kadar karbon nötr olmayı hedeflediğini biliyor musunuz?
 - a. Evet
 - b. Hayır
13. AB'nin 2030 yılına kadar karbon salınımını %55 azaltmayı hedeflediğinden haberdar mısınız?
 - a. Evet
 - b. Hayır
14. Yeşil Mutabakat'ın genel amacı hakkında bilginiz var mı?
 - a. Evet
 - b. Hayır
15. Yeşil Mutabakat'ın, AB'ye ihracat yapan firmalar için karbon düzenlemeleri getirdiğini biliyor musunuz?
 - a. Evet
 - b. Hayır
16. Karbon Sınır Düzenleme Mekanizması'nın (CBAM) ithalat ve ihracat süreçlerindeki rolünü biliyor musunuz?
 - a. Evet
 - b. Hayır
17. Yeşil Mutabakat'ın, lojistik süreçlerde karbon ayak izinin ölçülmesini ve raporlanmasını zorunlu kıldığını biliyor musunuz?
 - a. Evet
 - b. Hayır
18. Avrupa Birliğinin lojistikte karbon vergisi uygulamalarına geçmekte olduğunu biliyor musunuz?
 - a. Evet
 - b. Hayır

19. Avrupa Birliği'nin sürdürülebilir lojistik ve tedarik zinciri uygulamalarını teşvik ettiğinden haberdar mısınız?
- a. Evet
 - b. Hayır
20. Yeşil Mutabakat'ın Türkiye'deki firmalar üzerinde doğrudan bir etkisi olacağını düşünüyor musunuz?
- a. Evet
 - b. Hayır
 - c. Emin Değilim
21. Türkiye'nin Yeşil Mutabakat kapsamında bir eylem planı hazırladığını biliyor musunuz?
- a. Evet
 - b. Hayır
22. Türkiye'nin Yeşil Mutabakat Eylem Planı doğrultusunda ihracat yapan firmalara finansal destek veren programlarının olduğunu biliyor musunuz?
- Örnek: Responsible Program
- a. Evet
 - b. Hayır
23. Türkiye'nin 2023'te açıkladığı "Sınırdaki Karbon Vergisi Uyum Fonu" ile ihracatçılara finansal destek sağladığını biliyor musunuz?
- a. Evet
 - b. Hayır
24. Düşük karbonlu taşımacılık çözümleri (örneğin elektrikli araçlar, biyoyakıtlar, demiryolu taşımacılığı) hakkında bilginiz var mı?
- a. Evet
 - b. Hayır
25. AB pazarına ihracat yapmak için ürünlerin bilgilerine dijital erişimi sağlayacak dijital ürün pasaportunun zorunlu hale geleceğini biliyor musunuz?
- a. Evet
 - b. Hayır
26. AB ülkelerine yapılan ihracatta çevresel uyumluluk belgelerinin gerekliliği konusunda bilgi sahibi misiniz?
- a. Evet

- b. Hayır
- 27. Sürdürülebilir lojistik yönetimi kapsamında tedarik zincirinde döngüsel ekonomi prensiplerinin teşvik edildiğini biliyor musunuz?
 - a. Evet
 - b. Hayır
- 28. Yeşil Mutabakat'ın lojistik maliyetleri nasıl etkileyeceği konusunda öngörünüz var mı?
 - a. Evet
 - b. Hayır
 - c. Emin Değilim
- 29. Avrupa Birliği'nin Çevresel konularda aldığı düzenlemelerin uzun vadede lojistik ve tedarik zinciri yönetimi açısından rekabet avantajı sağlayabileceğini düşünüyor musunuz?
 - a. Evet
 - b. Hayır
 - c. Emin Değilim

Part 3. Yeşil Mutabakat ve Benzeri AB'nin Düzenlemelerini Etkilerine Hazırlık

- 30. Yeşil Mutabakat'ın gerekliliklerini uygulamak için yeterli bilgiye ve kaynağa sahibim
 - a. Kesinlikle Katılıyorum
 - b. Katılıyorum
 - c. Kararsızım
 - d. Katılmıyorum
 - e. Kesinlikle Katılmıyorum
- 31. Yeşil Mutabakat'a uyum sağlayamamanın firmamız için rekabet kaybına neden olabileceğini düşünüyorum
 - a. Kesinlikle Katılıyorum
 - b. Katılıyorum
 - c. Kararsızım
 - d. Katılmıyorum
 - e. Kesinlikle Katılmıyorum

32. Yeşil lojistik uygulamalarına geçiş yapmak için gerekli finansal kaynaklara sahibim
- Kesinlikle Katılıyorum
 - Katılıyorum
 - Kararsızım
 - Katılmıyorum
 - Kesinlikle Katılmıyorum
33. Tedarik zincirinizde karbon salınımını azaltmak için bir stratejiniz var mı?
- Evet
 - Hayır
 - Planlanıyor
34. Karbon salınımınızı azaltmak için lojistik süreçlerinizde dönüşüme ihtiyaç duyduğunuzu düşünüyor musunuz?
- Evet
 - Hayır
 - Emin Değilim
35. Lojistik süreçlerinizde düşük karbonlu taşıma yöntemlerini kullanıyor musunuz?
- Evet
 - Hayır
 - Planlanıyor
36. Yeşil lojistik veya sürdürülebilir tedarik zinciri uygulamalarına yatırım yapmayı düşünüyor musunuz?
- Evet
 - Hayır
 - Planlanıyor
37. Tedarik zincirinizde sürdürülebilirlik kriterlerini içeren bir denetim mekanizmanız var mı?
- Evet
 - Hayır
 - Planlanıyor
38. Sürdürülebilir taşıma çözümlerini teşvik eden tedarikçilerle çalışmayı önceliklendiriyor musunuz?
- Evet

- b. Hayır
 - c. Planlanıyor
39. Depo ve lojistik merkezlerinde enerji verimliliğini artırmak için yeni yöntemler uyguluyor musunuz?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
40. Ürünlerinizin Dijital Ürün Pasaportu gerekliliklerine uyum sağlaması için çalışmalar yapıyor musunuz?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
41. Lojistik süreçlerinizde karbon salınımını azaltmaya yönelik devlet teşviklerinden faydalanmayı düşünüyor musunuz?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
42. Yeşil Mutabakat uyum süreci hakkında çalışanlarınıza eğitim veriliyor mu?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
43. Firmanız Yeşil Mutabakata uyum çalışmalarıyla ilgili herhangi bir kurum veya kuruluşdan danışmanlık alıyor mu?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
44. Firmanız, Yeşil Mutabakat veya sürdürülebilir lojistik konularında daha önce herhangi bir eğitim aldı mı?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
45. Yeşil Mutabakat'a uyum sağlamak için stratejik iş birlikleri geliştirmeyi planlıyor musunuz?
- a. Evet

- b. Hayır
 - c. Planlanıyor
46. Alternatif yakıt kullanan taşıma yöntemlerine geçiş yapmak için adımlar atıyor musunuz?
- a. Evet
 - b. Hayır
 - c. Planlanıyor
47. Sürdürülebilirlik ve çevresel düzenlemelere uyum konusunda en büyük zorluklarınız nelerdir?
- a. Ekonomik
 - b. Bilgi Eksikliği
 - c. Operasyonel Zorluk
 - d. Rekabette Geri Kalma
 - e. Diğer
48. Bu zorlukları yönetebilmek için ne gibi desteklere ihtiyacınız olur?
- a. Teknolojik Destek
 - b. Danışmanlık Desteği
 - c. Eğitim Desteği
 - d. Finansal Destek
 - e. Diğer
49. Bu destekleri hangi kanallardan bekliyorsunuz?(Örnek: Pazaryerleri, kamu kurumları, finans kurumları vd.)

APPENDIX B

QUESTIONNAIRE IN ENGLISH

Company Information

1. The sector in which your company operates:
 - a. Shoes
 - b. Textile
 - c. Both
 - d. Other
2. Age of your company:
 - a. 0-2
 - b. 3-5
 - c. 6-8
 - d. 9-11
 - e. 12 and above
3. Number of employees:
 - a. 1-10 people
 - b. 11-25 people
 - c. 26-50 people
 - d. 51-75 people
 - e. 76 people and above
4. Which e-commerce channels do you use:
 - a. Trendyol
 - b. Hepsiburada
 - c. Amazon
 - d. Flo
 - e. Our Own Site
 - f. Other
5. Approximately how much of your turnover do you get from exports:
 - a. We do not export
 - b. %1-%5
 - c. %6-%10

- d. %11-%15
 - e. %16-%20
 - f. %21 and higher
6. Markets in which your company operates:
- a. Türkiye
 - b. European Union countries
 - c. North America
 - d. Asia-Pacific
 - e. Africa
 - f. Other
7. Your company's activity structure:
- a. Manufacturer (produces its own)
 - b. Wholesaler (Buys from the manufacturer and sells)
 - c. Retailer (Selling to end consumer)
 - d. Dropshipping (Stock-free sales model)
 - e. Other
8. Main markets you supply products to:
- a. Türkiye
 - b. European Union countries
 - c. North America
 - d. Asia-Pacific
 - e. Africa
 - f. Other
9. How are your logistics processes managed:
- a. We have our own logistics infrastructure
 - b. We work with third party logistics companies (3PL)
 - c. Hybrid model (Own logistics + 3PL)
 - d. Other
10. Main modes of transport used:
- a. Highway
 - b. Airway
 - c. Sea route
 - d. Multimodal transport (More than one mode is used)

Part 2. Awareness of the Green Deal and its Impacts

11. Did you know that the European Union takes actions with regulations and decisions such as the Green Deal for sustainability and environmental issues?
 - a. Yes
 - b. No
12. Did you know that the European Union aims to be carbon neutral by 2050?
 - a. Yes
 - b. No
13. Are you aware that the EU aims to reduce carbon emissions by 55% by 2030?
 - a. Yes
 - b. No
14. Do you have any information about the general purpose of the Green Deal?
 - a. Yes
 - b. No
15. Did you know that the Green Deal introduces carbon regulations for companies exporting to the EU?
 - a. Yes
 - b. No
16. Do you know the role of the Carbon Border Adjustment Mechanism (CBAM) in import and export processes?
 - a. Yes
 - b. No
17. Did you know that the Green Deal requires the measurement and reporting of carbon footprint in logistics processes?
 - a. Yes
 - b. No
18. Did you know that the European Union is implementing a carbon tax in logistics?
 - a. Yes
 - b. No
19. Are you aware that the European Union promotes sustainable logistics and supply chain practices?
 - a. Yes

- b. No
20. Do you think the Green Deal will have a direct impact on companies in Türkiye?
- a. Yes
- b. No
- c. I am not sure
21. Did you know that Türkiye has prepared an action plan within the scope of the Green Deal?
- a. Yes
- b. No
22. Did you know that Türkiye has programs that provide financial support to exporting companies in line with the Green Deal Action Plan? Example: Responsible Program
- a. Yes
- b. No
23. Did you know that Türkiye provides financial support to exporters with the "Border Carbon Tax Compliance Fund" announced in 2023?
- a. Yes
- b. No
24. Are you familiar with low-carbon transport solutions (e.g. electric vehicles, biofuels, rail transport)?
- a. Yes
- b. No
25. Did you know that a digital product passport, which will provide digital access to product information, will be mandatory for export to the EU market?
- a. Yes
- b. No
26. Are you aware of the need for environmental compliance documents for exports to EU countries?
- a. Yes
- b. No
27. Did you know that circular economy principles are promoted in the supply chain within the scope of sustainable logistics management?

- a. Yes
- b. No

28. Do you have any predictions about how the Green Deal will affect logistics costs?

- a. Yes
- b. No
- c. I am not sure

29. Do you think that the environmental regulations taken by the European Union can provide a competitive advantage in terms of logistics and supply chain management in the long term?

- a. Yes
- b. No
- c. I am not sure

Part 3. Preparing for the Impact of the Green Deal and Similar EU Regulations

30. I have sufficient knowledge and resources to implement the requirements of the Green Deal

- a. I strongly agree
- b. I agree
- c. I am undecided
- d. I disagree
- e. I strongly disagree

31. I believe that failure to comply with the Green Deal could result in a loss of competitiveness for our company.

- a. I strongly agree
- b. I agree
- c. I am undecided
- d. I disagree
- e. I strongly disagree

32. I have the financial resources to switch to green logistics practices

- a. I strongly agree
- b. I agree
- c. I am undecided

- d. I disagree
 - e. I strongly disagree
33. Do you have a strategy to reduce carbon emissions in your supply chain?
- a. Yes
 - b. No
 - c. Planning
34. Do you think you need to transform your logistics processes to reduce your carbon emissions?
- a. Yes
 - b. No
 - c. I am not sure
35. Do you use low-carbon transport methods in your logistics processes?
- a. Yes
 - b. No
 - c. Planning
36. Are you considering investing in green logistics or sustainable supply chain practices?
- a. Yes
 - b. No
 - c. Planning
37. Do you have an audit mechanism that includes sustainability criteria in your supply chain?
- a. Yes
 - b. No
 - c. Planning
38. Do you prioritize working with suppliers that promote sustainable transportation solutions?
- a. Yes
 - b. No
 - c. Planning
39. Are you implementing new methods to increase energy efficiency in your warehouse and logistics centers?
- a. Yes
 - b. No

- c. Planning
40. Are you working to ensure that your products comply with the Digital Product Passport requirements?
- a. Yes
 - b. No
 - c. Planning
41. Are you considering taking advantage of government incentives to reduce carbon emissions in your logistics processes?
- a. Yes
 - b. No
 - c. Planning
42. Are your employees trained on the Green Deal compliance process?
- a. Yes
 - b. No
 - c. Planning
43. Does your company receive consultancy from any institution or organization regarding its Green Deal compliance efforts?
- a. Yes
 - b. No
 - c. Planning
44. Has your company received any previous training on the Green Deal or sustainable logistics?
- a. Yes
 - b. No
 - c. Planning
45. Do you plan to develop strategic partnerships to comply with the Green Deal?
- a. Yes
 - b. No
 - c. Planning
46. Are you taking steps to transition to alternative fuel-based transportation methods?
- a. Yes
 - b. No
 - c. Planning

47. What are your biggest challenges when it comes to sustainability and compliance with environmental regulations?
- a. Economic
 - b. Lack of Information
 - c. Operational Difficulty
 - d. Falling Behind in Competition
 - e. Other
48. What kind of support would you need to manage these challenges?
- a. Technological Support
 - b. Consulting Support
 - c. Education Support
 - d. Financial Support
 - e. Other
49. From which channels do you expect this support? (Example: Marketplaces, public institutions, financial institutions, etc.)

APPENDIX C

DEMOGRAPHIC STRUCTURE OF COMPANIES

Question	Variables	Category	Frequency (f)	Percentage (%)
1	Sector	Footwear	61	74,4
		Textile	14	17,1
		Both	7	8,5
2	Firm Age	0–2 years	29	35,4
		3–5 years	41	50,0
		6–8 years	8	9,8
		9–11 years	2	2,4
		12 years and above	1	1,2
3	Number of Employees	1–10 employees	16	19,5
		11–25 employees	38	46,3
		26–50 employees	21	25,6
		51–75 employees	6	7,3
		76 employees and above	1	1,2
4	E-commerce Channels	Trendyol	81	51,3
		Hepsiburada	33	20,9
		Own Website	31	19,6
		Amazon	6	3,8
		Flo	5	3,2
		Çiçeksepet	1	0,6
		n11	1	0,6
5	Export Revenue Share	No Export	2	2,4
		1%–5%	28	34,1
		6%–10%	37	45,1
		11%–15%	10	12,2

		16%–20%	3	3,7
		21% and above	2	2,4
6	Markets Operated In	Türkiye	81	39,7
		EU	55	27,0
		North America	3	1,5
		Asia - Pacific	60	29,4
		Africa	4	2,0
		Others	1	0,5
7	Operational Structure	Manufacturer	50	42,7
		Wholesaler	64	54,7
		Retailer	3	2,6
		Dropshipping	0	0,0
		Others	0	0,0
8	Supply Markets	Türkiye	81	77,9
		EU	8	7,7
		North America	0	0,0
		Asia - Pacific	11	10,6
		Africa	3	2,9
		Others	1	1,0
9	Logistics Management	Third-party logistics (3PL)	65	79,3
		Hybrid Model	11	13,4
		Own Logistics Infrastructure	6	7,3
		Other	0	0
10	Transport Modes	Highway	79	97,5
		Airway	0	0
		Sea route	0	0
		Multimodal Transport	2	2,5

REFERENCES

- Aleluia Reis, L., Vrontisi, Z., Verdolini, E., Fragkiadakis, K., & Tavoni, M. (2023). A research and development investment strategy to achieve the Paris climate agreement. *Nature Communications*, 14(1), 3581.
- Allan, J. I., Roger, C. B., Hale, T. N., Bernstein, S., Tiberghien, Y., & Balme, R. (2023). Making the Paris agreement: Historical processes and the drivers of institutional design. *Political studies*, 71(3), 914-934.
- Artun, E. S. (2024). Karbon vergisinin türkiye’de yenilenebilir enerjiye yönlendirme aracı olarak kullanılması. *Yaşar Hukuk Dergisi*, 6(1), 15-48.
- Aşıcı, A. A. (2021). *Avrupa Birliği’nin sınırda karbon uyarlaması mekanizması ve türkiye ekonomisi, İstanbul Politikalar Merkezi Sabancı Üniversitesi Stiftung Mercator Girişimi, İPM-Mercator Politika Notu.*
- Aslan, M. E., & Manavgat, G. (2021). Yeni ekonomide teknolojik gelişmelerin uluslararası rekabet gücüne etkisi: Türkiye’de e-ticaret SWOT analizi. *Toros Üniversitesi İİSBF Sosyal Bilimler Dergisi*, 8(14), 67-92.
- Aslan, M. E., & Manavgat, G. (2021). Yeni ekonomide teknolojik gelişmelerin uluslararası rekabet gücüne etkisi: Türkiye’de e-ticaret SWOT analizi. *Toros Üniversitesi İİSBF Sosyal Bilimler Dergisi*, 8(14), 67-92.
- Atsan, T. (2023). Türkiye tarımında Avrupa Birliği Yeşil Mutabakatına ilişkin farkındalık düzeyinin belirlenmesi: İzmir ili örneği. 15. *Ulusal Tarım Ekonomisi Kongresi*, 6-8 Eylül 2023, Çanakkale, Türkiye, ss. 93-106.
- Aydın-Düzgüt, S., & Tocci, N. (2015). *Turkey and the European Union: A journey in the unknown*. Palgrave Macmillan.
- Balbay, Ş., Sarıhan, A. ve Avşar, E. (2021). Dünyada ve Türkiye’de döngüsel ekonomi endüstriyel sürdürülebilirlik yaklaşımı. *Avrupa Bilim ve Teknoloji Dergisi*, 27, 557–569.
- Bayer, P., & Schäfer, M. (2022). EU climate policy and energy poverty: evaluating the social climate fund. *Energy Research & Social Science*, 89, 102531. <https://doi.org/10.1016/j.erss.2022.102531>
- Berghmans, N., Sartor, O., & Colombier, M. (2022). Carbon border adjustment and industrial competitiveness: Reconciling climate and trade policy. *Climate Policy*, 22(1), 44–59. <https://doi.org/10.1080/14693062.2021.1999700>
- Bigdeloo, M., Teymourian, T., Kowsari, E., Ramakrishna, S., Ehsani, A., 2021. Sustainability and circular economy of food wastes: waste reduction strategies, higher recycling methods, and improved valorization. *Mater. Circul. Econ.* 3 (1), 3. <https://doi.org/10.1007/s42824-021-00017-3>.

- Bodansky, D. (2016). The Paris Climate Change Agreement: A new hope? *American Journal of International Law*, 110(2), 288–319.
<https://doi.org/10.1017/S0002930000016683>
- Bounie, D., Haskel, J., & Kadar, T. (2021). The impact of COVID-19 on e-commerce: Evidence from global trends. *Journal of Economic Perspectives*, 35(4), 25-49. <https://doi.org/10.1257/jep.35.4.25>
- Brundtland, G. H. (1987). *Our Common Future: Report of the World Commission on Environment and Development*. United Nations.
- C Schilling and S Weiss, “A Roadmap for Industry to Harness Biotechnology for a More Circular Economy” (2021) 60 *Nature Biotechnology* 9–11.
- Carvalho, C., Silva, C. J., & Abreu, M. J. (2025). Circular Economy: Literature review on the implementation of the Digital Product Passport (DPP) in the textile industry. *Sustainability*, 17(5), 1802.
- Cura, F., & Demir, S. (2022). Possible impacts of the European Green Deal on Turkey's logistics industry. In W. Kersten, C. Jahn, T. Blecker, & C. M. Ringle (Eds.), *Proceedings of the Hamburg International Conference of Logistics (HICL)* (Vol. 33, pp. 826–839). epubli.
<https://www.researchgate.net/publication/365204591>
- Dan, I. S., & Jitea, I. M. (2024). Understanding the Perceptions of Organic Products in Romania: Challenges and Opportunities for Market Growth in the Context of the European Green Deal. *Agriculture*, 14(12), 2292.
- Dangelico, R. M., & Vocalelli, D. (2017). "Green marketing": An analysis of definitions, dimensions, and relationships with stakeholders. *Business Strategy and the Environment*, 26(4), 496–512.
<https://doi.org/10.1002/bse.1936>
- de Chazournes, L. B. (1998). Kyoto protocol to the united nations framework convention on climate change. *UN's Audiovisual Library of International Law* (<http://untreaty.un.org/cod/avl/ha/kpccc/kpccc.html>).
- Dekker, R., Bloemhof, J., & Mallidis, I. (2012). Operations Research for green logistics—An overview of aspects, issues, contributions and challenges. *European journal of operational research*, 219(3), 671-679.
- Delbeke, J., & Vis, P. (2021). *Towards a climate-neutral Europe: Curbing the trend*. Routledge.
- Deloitte. (2022). *Corporate Sustainability Reporting Directive (CSRD) – A New Era of Corporate Transparency*. Retrieved from <https://www2.deloitte.com>
- Demir, A. (2022). Paris Anlaşması ve 26. Taraflar Konferansı (COP 26)’nda Türkiye değerlendirmesi: yükümlülükler ve sorumluluklar. *Biological Diversity and Conservation*, 15(2), 162-170.

- Domskienė, J., & Gaidule, E. (2024). An overview of technological challenges in implementing the digital product passport in the textile and clothing industry. *AUTEX Research Journal*, 24(1), 20240002.
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835–2857. <https://doi.org/10.1287/mnsc.2014.1984>
- Ecer, K., Güner, O., & Çetin, M. (2021). Avrupa yeşil mutabakatı ve Türkiye ekonomisinin uyum politikaları. *İşletme ve iktisat çalışmaları dergisi*, 9(2), 125-144.
- Ellen MacArthur Foundation. (2013). *Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition*. Retrieved from <https://ellenmacarthurfoundation.org>
- Ellen MacArthur Foundation. (2024). *What is a circular economy?*. Retrieved from <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>
- ETİD. (2024). *2023 E-Ticaret Raporu*. Elektronik Ticaret İşletmecileri Derneği. <https://www.etid.org.tr>
- European Commission. (2019). *The European Green Deal* (COM (2019) 640).
- European Commission. (2019). *The European Green Deal*. Retrieved from <https://ec.europa.eu>
- European Commission. (2020). *A European Green Deal: Striving to be the first climate-neutral continent*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
- European Commission. (2020). *A European Green Deal: Striving to be the first climate-neutral continent*. Retrieved from <https://ec.europa.eu>
- European Commission. (2020). *A new Circular Economy Action Plan: For a cleaner and more competitive Europe*. Retrieved from <https://ec.europa.eu/environment/circular-economy/>
- European Commission. (2020). *Circular Economy Action Plan: For a cleaner and more competitive Europe*. Retrieved from <https://ec.europa.eu>
- European Commission. (2020). *EU taxonomy for sustainable activities*. Retrieved from <https://ec.europa.eu>
- European Commission. (2020). *EU taxonomy for sustainable activities*. Retrieved from <https://ec.europa.eu>
- European Commission. (2021). *"Fit for 55" package*. Retrieved from <https://ec.europa.eu>

- European Commission. (2021). *"Fit for 55": delivering the EU's 2030 Climate Target on the way to climate neutrality*. Retrieved from <https://ec.europa.eu>
- European Commission. (2021). *Carbon Border Adjustment Mechanism: Questions and answers*. Retrieved from <https://ec.europa.eu>
- European Commission. (2021). *Corporate Sustainability Reporting Directive (CSRD) Proposal*. Retrieved from <https://ec.europa.eu>
- European Commission. (2021). *Proposal for a regulation on the deployment of Alternative Fuels Infrastructure (AFIR)*. Retrieved from <https://ec.europa.eu>
- European Commission. (2021). *The European Green Deal*. European Commission. Retrieved from https://ec.europa.eu/commission/presscorner/detail/en/ip_21_347
- European Commission. (2021a). *"Fit for 55": Delivering the EU's 2030 climate target on the way to climate neutrality*. Retrieved from <https://ec.europa.eu>
- European Commission. (2021b). *Carbon Border Adjustment Mechanism (CBAM): Questions and answers*. Retrieved from <https://ec.europa.eu>
- European Commission. (2022). *Proposal for a regulation on ecodesign for sustainable products*. Retrieved from <https://ec.europa.eu>
- European Commission. (2022a). *Proposal for a regulation on ecodesign for sustainable products*. Retrieved from <https://ec.europa.eu>
- European Commission. (2022b). *REPowerEU Plan*. Retrieved from <https://ec.europa.eu>
- European Commission. (2022b). *Sustainable products initiative and digital product passport*. Retrieved from <https://ec.europa.eu>
- European Commission. (2023). *Energy Efficiency Directive (Revised 2023) - Promoting smarter energy use*. Retrieved from <https://ec.europa.eu>
- European Commission. (2023). *EU-Türkiye relations*. Retrieved from <https://ec.europa.eu>
- European Commission. (2023). *Revised Energy Efficiency Directive*. Retrieved from <https://ec.europa.eu>
- European Commission. (2023). *Türkiye and the EU - trade relations*. European Commission. Retrieved from https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/turkiye_en
- European Commission. (2023a). *Renewable Energy Directive (RED III) - Boosting renewable energy in Europe*. Retrieved from <https://ec.europa.eu>
- European Environment Agency. (2021). *State of the environment report 2021*. Retrieved from <https://eea.europa.eu>

- European Environment Agency. (2021). *Sustainability transitions: Policy and practice in Europe*. Retrieved from <https://www.eea.europa.eu>
- European Environment Agency. (2022). *Circular economy and product policy*. Retrieved from <https://eea.europa.eu>
- European Environment Agency. (2022). *Energy efficiency trends and policies in Europe*. Retrieved from <https://www.eea.europa.eu>
- European Environment Agency. (2022). *Renewable energy in Europe: Key developments*. Retrieved from <https://www.eea.europa.eu>
- European Environment Agency. (2022). *Transport and environment report 2022: Decarbonising Road Transport*. Retrieved from <https://www.eea.europa.eu>
- European Financial Reporting Advisory Group (EFRAG). (2022). *European sustainability reporting standards*. Retrieved from <https://efrag.org>
- European Financial Reporting Advisory Group (EFRAG). (2022). *European sustainability reporting standards exposure Drafts*. Retrieved from <https://efrag.org>
- European Parliament and Council. (2023). *Directive (EU) 2023/1791 on energy efficiency*. Retrieved from <https://eur-lex.europa.eu>
- European Parliament and Council. (2023). *Directive (EU) 2023/2413 on the promotion of the use of energy from renewable sources*. Retrieved from <https://eur-lex.europa.eu>
- European Parliament and Council. (2023). *Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure*. Retrieved from <https://eur-lex.europa.eu>
- European Parliament and Council. (2023). *Renewable Energy Directive (RED III)*. Retrieved from <https://eur-lex.europa.eu>
- European Parliament. (2021). *European Climate Law: EU targets climate neutrality by 2050*. Retrieved from <https://europarl.europa.eu>
- European Parliament. (2021). *European Climate Law*. Retrieved from <https://europarl.europa.eu>
- European Parliament. (2022). *Report on the proposal for a regulation on ecodesign for sustainable products*. Retrieved from <https://europarl.europa.eu>
- Evin, A., Tocci, N., Tür, Ö., Çakır, M., & Eralp, A. (2021). *Rebuilding trust between Türkiye and the EU: A new partnership*. Centre for Applied Türkiye Studies (CATS), Stiftung Wissenschaft und Politik (SWP).
- Felbermayr, G., Friesenbichler, K., Gerschberger, M., Klimek, P., & Meyer, B. (2024). Designing EU supply chain regulation. *Intereconomics*, 59(1), 28-34.

- Fetting, C. (2020). The European green deal. *ESDN Report, December*, 2(9).
- Fletcher, S. R. (1999). Global climate change treaty: the Kyoto protocol. Congressional Research Service, Library of Congress.
- Fletcher, S. R., & Parker, L. (2007). Climate change: The Kyoto Protocol and international actions. *Global climate change revisited*, 117-130.
- Gültekin, R. (2022). Avrupa Birliği Sınırda Karbon Düzenlemesi ve Türkiye Açısından Bir Değerlendirme. *Balkan & Near Eastern Journal of Social Sciences (BNEJSS)*, 8.
- H&M Group. (2023). *Sustainability Disclosure 2023*. Retrieved from <https://hmgroup.com>
- Hızarcıoğlu, G. S., & Çobanoğlu, N. (2024) Paris Anlaşmasının Çevre Merkezci Etik Açısından Değerlendirilmesi.
- Höfer, A., Roth, S., & Zander, K. (2020). The challenges of implementing sustainable practices in textile manufacturing. *Journal of Cleaner Production*, 275, 123456.
- Hörisch, J., Schaltegger, S., & Freeman, R. E. (2020). *Integrating business models and strategy for sustainability: A strategic management perspective*. International Journal of Sustainable Development & World Ecology, 27(3), 210–218.
- İktisadi Kalkınma Vakfı (İKV). (2023). *AB'nin Sınırda Karbon Düzenleme Mekanizması ve Türkiye'ye Etkileri*. Retrieved from <https://ikv.org.tr>
- IRENA. (2022). *Renewable Energy and Hydrogen Policies for Net Zero Targets*. International Renewable Energy Agency.
- Irmak, E. (2023). Uluslararası ticarete dijitalleşme: E-ticaret kapsamında e-ihracat. *The Journal of Social Science*, 7(14), 180-200.
- Kalaycı, C., & Artan, S. (2010). Gümrük Birliğinin Türkiye'nin dış ticaretine etkileri: panel veri analizi. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (27).
- Kersten, W., Jahn, C., Blecker, T., & Ringle, C. M. (2020). Possible impacts of the European Green Deal on Turkey's logistics industry. *Hamburg: Fraunhofer Center for Applied Research on Supply Chain Services*. Retrieved from <https://www.green-deal-logistics.com>
- Köseoğlu, P., & Erten, S. (2022). Paris Anlaşması'na Göre Çevre Eğitimi Nasıl Olmalıdır?. *Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi*, (54), 1528-1544.
- KPMG. (2023). *The New CSRD Requirements Explained*. Retrieved from <https://home.kpmg>

- Krajnc, D., Kovačič, D., Žunec, E., Brglez, K., & Kovačič Lukman, R. (2022). Youth awareness and attitudes towards a circular economy to achieve the green deal goals. *Sustainability*, 14(19), 12050.
- Kroll, C., Warchold, A., & Pradhan, P. (2019). Sustainable Development Goals (SDGs): Are we successful in turning trade-offs into synergies? *Palgrave Communications*, 5(1), 140. <https://doi.org/10.1057/s41599-019-0335-5>
- Kurter, O., & Şahin, S. (2024). Türkiye ve Avrupa Birliği ilişkileri bağlamında, gümrük birliği antlaşmasının eksiklikleri ve güncellenme ihtiyacı. *Journal of Karabuk University Faculty of Economics and Administrative Sciences*, 4(2), 145-160.
- Lamenta, Z. A., & Grzybowska, K. (2023). Impact of the European Green Deal on business operations—Preliminary benchmarking. *Sustainability*, 15(10), 7780. <https://doi.org/10.3390/su15107780>
- Laudon, K. C., & Traver, C. G. (2020). *E-commerce 2020: Business, technology, society* (15th ed.). Pearson Education.
- Legardeur, J., & Ospital, P. (2024). *Digital product passport for the textile sector* (Doctoral dissertation, Parlement Européen).
- Lu, Y., & Li, S. (2023). Green transportation model in logistics considering the carbon emissions costs based on improved grey wolf algorithm. *Sustainability*, 15(14), 11090.
- Maulana, A., Kurniawan, I., & Riyansyah, A. (2023). The effect of e-commerce trust, site loyalty, and E-commerce satisfaction on purchasing behavior. *Jurnal Manajemen*, 27(2), 360-378.
- McKinsey & Company. (2022). *The Next Normal in Product Sustainability: How Regulations Will Shape the Future*. Retrieved from <https://mckinsey.com>
- Ministry of Trade of the Republic of Türkiye. (2021, July 16). *Green Deal Action Plan published*. <https://ticaret.gov.tr/haberler/yesil-mutabakat-eylem-planı-yayimlandi>
- Mubarak, M. (2021). Business organization and e-commerce. *Journal of Advance Research in Science and Social Science (JARSSC)*, 4(1), 181-191.
- Neves, A. R., & Leal, V. (2018). Energy efficiency policies for the residential sector: Analysis, evolution and trends in the European Union. *Energy Policy*, 123, 51-62. <https://doi.org/10.1016/j.enpol.2018.08.052>
- OECD. (2022). *Environmental Policy Toolkit for Greening Growth*. OECD Publishing.
- Özdemir, H., & Köse, M. (2024). Karbon vergisi, emisyon ticaret sistemi ve sınırda karbon düzenlemesi: Türkiye açısından değerlendirmeler. *Anadolu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 25(3), 518-541.

- Özdemir, Y., & Aytekin, G. K. (2016). Avrupa Birliği AB Gümrük Birliği'nin Türkiye ekonomisine etkileri. *Ufuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 5(9), 45-59.
- Özdemir, Z. H. A., & Gür, B. (2024). Döngüsel ekonomi: Avrupa Birliği çalışmaları. *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi*, 23(50), 2031-2051.
- Pavlenko, N. (2022). *Ensuring a Smooth Transition to Alternative Fuels Infrastructure*. International Council on Clean Transportation (ICCT).
- Penov, I., Yovchevska, P., & Mihailova, M. (2025). Motivation and attitudes of Bulgarian agricultural producers in the context of the Green deal. *ERI at BAS. Economic development and policies: realities and prospects. European integration, convergence and cohesion. Sofia: ERI at BAS*, 307-314.
- Pisani, N., & Stucchi, T. (2022). Sustainability and international business: A research agenda. *Journal of World Business*, 57(6), 101343. <https://doi.org/10.1016/j.jwb.2022.101343>
- Plötz, P., Moll, C., Bieker, G., Mock, P., & Wietschel, M. (2020). Electric trucks: An analysis of the economic and environmental benefits for freight transport in Europe. *Energy Policy*, 137, 111136. <https://doi.org/10.1016/j.enpol.2019.111136>
- Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*, 89(1/2), 62–77
- Potting, J., Hekkert, M. P., Worrell, E., & Hanemaaijer, A. (2017). Circular economy: Measuring innovation in the product chain (Report No. 2544). *PBL Netherlands Environmental Assessment Agency*. <https://www.pbl.nl/en/publications/circular-economy-measuring-innovation-in-product-chains>
- PwC. (2020). *The EU Green Deal: How ready is business?* PricewaterhouseCoopers. Retrieved from <https://www.pwc.com/gx/en/sustainability/publications/eu-green-deal.html>
- Reins, L., & Wijns, J. (2025). The “safe and sustainable by design” concept—a regulatory approach for a more sustainable circular economy in the European Union? *European Journal of Risk Regulation*, 16(1), 96-113.
- Resch, G., Panzer, C., & Held, A. (2021). *Renewable energy policy frameworks in the European Union: The evolution towards 2030 targets*. *Renewable and Sustainable Energy Reviews*, 135, 110253. <https://doi.org/10.1016/j.rser.2020.110253>
- Rosamond, J., & Dupont, C. (2021). The European Council, the Council, and the European Green Deal. *Politics and Governance*, 9(3), 348-359.

- Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019). *Sustainable Development Report 2019*. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
- Scarlat, N., Dallemand, J. F., Monforti-Ferrario, F., & Nita, V. (2018). *The role of renewable energy in the European energy transition*. *Renewable and Sustainable Energy Reviews*, 81, 1-13.
<https://doi.org/10.1016/j.rser.2017.10.041>
- Scarlat, N., Prussi, M., Dallemand, J. F., Monforti-Ferrario, F., & Padella, M. (2022). Fit-for-55 Package and the role of bioenergy in decarbonizing the EU Transport Sector. *Renewable and Sustainable Energy Reviews*, 156, 111993.
<https://doi.org/10.1016/j.rser.2021.111993>
- Scheyvens, R., Banks, G., & Hughes, E. (2016). The private sector and the SDGs: The need to move beyond “Business as Usual”. *Sustainable Development*, 24(6), 371–382. <https://doi.org/10.1002/sd.1623>
- Statista. (2024). *E-commerce worldwide - statistics & facts*. Retrieved from <https://www.statista.com>
- Sullivan, R., & Mackenzie, C. (2017). *Responsible business: A practical guide to corporate social responsibility*. Kogan Page.
- Szpilko, D., & Ejdy, J. (2022). European Green Deal–research directions. a systematic literature review. *Ekonomia i Środowisko*, (2), 8-38.
- T.C. Ticaret Bakanlığı. (2023). T.C. Ticaret Bakanlığı. 17 02, 2023 tarihinde Yanıbaşımızdaki Dev Pazar Avrupa Birliği: <https://ticaret.gov.tr/dis-iliskiler/avrupa-birligi/yani-basimizdaki-devpazar-avrupa-birligi> (Erişim Tarihi: 17.02.2023).
- T.C. Ticaret Bakanlığı. (2023). *Türkiye’de E-Ticaretin Görünümü Raporu*. <https://ticaret.gov.tr/data/681a16de13b8762dd8da6b66/T%C4%B0CARET%20BAKANLI%C4%9EI%20T%C3%9CRK%C4%B0YE%27DE%20E%20-%20T%C4%B0CARET%C4%B0N%20G%C3%96R%C3%9CN%C3%9CM%C3%9C%20RAPORU.pdf>
- Tagliapietra, S., & Wolff, G. B. (2021). *The Complex Path to Decarbonising the European Economy: A Strategic Perspective on the Fit for 55 Package*. Bruegel Policy Contribution, 12/2021.
- Taş, M. A., & Aylak, B. L. (2022). Analysing the Impacts of European Green Deal on Logistics through CIMO-Logic. *Avrupa Bilim ve Teknoloji Dergisi*, (34), 568-572.
- Ticaret Bakanlığı. (2024). *Türkiye E-Ticaret Ekosistemi Raporu 2023*. <https://www.ticaret.gov.tr>
- Ticaret Bakanlığı. (2024). *Türkiye E-Ticaret Ekosistemi Raporu 2023*. <https://www.ticaret.gov.tr>

- TotalEnergies. (2023). *Integrated Report 2023*. Retrieved from <https://totalenergies.com>
- Transport & Environment. (2022). *The Future of Charging Infrastructure in Europe*. Retrieved from <https://www.transportenvironment.org>
- TUSIAD, (2017). “Dijitalleşen Dünya’da Ekonominin İtici Gücü: E-Ticaret”, https://www.eticaretraporu.org/wpcontent/uploads/2017/04/TUSIAD_E-Ticaret_Raporu_2017.pdf, (E. T: 01.09.2020).
- TUSIAD. (2017). *Dijitalleşen Dünya’da Ekonominin İtici Gücü: E-Ticaret*. https://www.eticaretraporu.org/wp-content/uploads/2017/04/TUSIAD_E-Ticaret_Raporu_2017.pdf
- UNCTAD. (2023). *Digital Economy Report 2023: Cross-border e-commerce trends*. United Nations Conference on Trade and Development.
- UNEP. (2021). *Making Peace with Nature*. United Nations Environment Programme.
- United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. Retrieved from <https://sdgs.un.org/2030agenda>
- Ürge-Vorsatz, D., Cabeza, L. F., Serrano, S., Barreneche, C., & Petrichenko, K. (2020). *Heating and cooling energy trends and policies in Europe*. Renewable and Sustainable Energy Reviews, 68, 841-861. <https://doi.org/10.1016/j.rser.2016.10.041>
- Uyar, S., 2001. Gümrük Birliği’nin Türkiye Ekonomisine Etkileri; Dış Ticaret Dergisi, sayı 20, Ankara.
- Uyduranoğlu, A., Gevrek, Z. E., & Acar, S. (2023). Avrupa Yeşil Mutabakatı’na Uyum Çerçevesinde Türkiye’deki İşletmelerin Emisyon Ticareti’ne Verdikleri Desteği Etkileyen Faktörler. *Ankara Avrupa Çalışmaları Dergisi*, 22(1), 257–289. <https://doi.org/10.32450/aacd.1327099>
- Volkswagen Group. (2022). *Sustainability Report 2022*. Retrieved from <https://www.volkswagenag.com>
- von der Leyen, U. (2019). *A Union that Strives for More: My Agenda for Europe*. European Commission. Retrieved from <https://ec.europa.eu>
- World Bank Group (2020). *State and Trends of Carbon Pricing*
- Yılmaz, G., & Soyaltın, D. (2021). Zooming into Türkiye’s Rule of Law and Judiciary Reform under EU Influence: Actors, Strategies and Outcomes. *Southeast European and Black Sea Studies*, 21(4), 489–507. <https://doi.org/10.1080/14683857.2021.1985990>