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Research Article

Determinants of Corporate Green Transformation: A Comparative Analysis of Firms in Türkiye and The EU

Kurumsal Yeşil Dönüşümün Belirleyicileri: Türkiye ve Avrupa Birliği Firmaları Üzerine Karşılaştırmalı Bir Analiz

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Abstract

This study examines the determinants of corporate green transformation through a comparative analysis of 5,871 firms in 16 EU countries and 739 firms in Türkiye, using data from the 2018–2020 Business Environment and Enterprise Performance Survey (BEEPS) conducted by the EBRD, World Bank, and EIB. A Green Transformation Index, based on firm-level environmental practices, classifies firms above the median as green-transition achievers. Logistic regression models assess the role of six conceptual categories: (i) external pressures (customer requirements, climate-related losses, and pollution), (ii) regulatory exposure (energy taxes and performance standards), (iii) perceived obstacles (environmental regulations and tax rates), (iv) organizational capacity (strategic planning, board governance, certifications, multi-establishment status, and female ownership), (v) operational conditions (power outages, informal competition, and CO_2 emissions), and (vi) financial and market access (credit availability, export share, and stock listing). Findings reveal that customer requirements, energy performance standards, and formal strategic planning consistently drive green transformation, with stronger effects in Türkiye. In the EU, voluntary commitments, such as certifications, female ownership, and exposure to environmental risks, play a larger role. Access to finance facilitates transformation in both regions, while regulatory burden deters progress in Türkiye. Policy recommendations emphasize strengthening market-based incentives, applying regulations consistently, expanding green finance, enhancing governance, and mitigating operational vulnerabilities. These steps can shift sustainability from compliance to competitive advantage, improving environmental performance and long-term resilience.

JEL Classification: *Q01, Q56, Q58, M14, O44*

Keywords: *Green transformation, sustainable business practices, environmental policy, corporate governance, environmental, social & governance, ESG.*

Öz

Bu çalışma, Avrupa İmar ve Kalkınma Bankası (EBRD), Dünya Bankası ve Avrupa Yatırım Bankası (EIB) tarafından yürütülen 2018–2020 İş Ortamı ve İşletme Performansı Anketi (BEEPS) verilerini kullanarak, 16 Avrupa Birliği ülkesinde faaliyet gösteren 5.871 firma ile Türkiye'deki 739 firmanın yeşil dönüşüm süreçlerini karşılaştırmalı olarak incelemektedir. Firma düzeyindeki çevresel uygulamalardan türetilen Yeşil Dönüşüm Endeksi, medyanın üzerinde değer alan firmaları "yeşil dönüşümü gerçekleştirmiş" olarak sınıflandırmak amacıyla kullanılmıştır. Lojistik regresyon analizinde bağımsız değişkenler altı kavramsal kategori altında değerlendirilmiştir: (i) dışsal baskılar, (ii) düzenleyici çerçeve, (iii) algılanan engeller, (iv) organizasyonel

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kapasite, (v) operasyonel koşullar ve (vi) finansal/piyasa erişimi. Bulgular, müşteri çevre taleplerinin, enerji performans standartlarının ve resmî iş stratejilerinin her iki bölgede de yeşil dönüşümün en güçlü belirleyicileri olduğunu, ancak etkinin Türkiye'de daha yüksek olduğunu göstermektedir. AB örnekleminde ise kalite sertifikaları, kadın sahipliği ve çevresel risklere doğrudan maruz kalma gibi faktörler daha belirgin rol oynamaktadır. Finansmana erişim her iki bölgede dönüşümü desteklerken, çevre düzenlemelerinin bir engel olarak algılanması yalnızca Türkiye'de olumsuz etki yaratmaktadır. Türkiye için politika önerileri arasında piyasa temelli teşviklerin güçlendirilmesi, düzenleyici araçların tutarlı uygulanması, yeşil finansman imkânlarının artırılması, kurumsal yönetişim kapasitesinin geliştirilmesi ve operasyonel kırılganlıkların azaltılması yer almaktadır. Bu adımlar, sürdürülebilirliği yalnızca bir uyum yükümlülüğü olmaktan çıkarıp stratejik bir rekabet avantajına dönüştürerek firmaların çevresel performansını ve uzun vadeli ekonomik dayanıklılığını artıracaktır.

JEL Sınıflandırması: *Q01, Q56, Q58, M14, O44*

Anahtar Kelimeler: *Yeşil dönüşüm, sürdürülebilir işletme yönetimi, çevre politikası, kurumsal yönetişim, çevresel sosyal ve yönetişim, ESG.*

1. Introduction

Global warming and climate change, persistent phenomena observed worldwide, rank among the most pressing challenges of the 21st century. Primarily driven by rising greenhouse gas emissions, these processes pose profound and potentially irreversible threats to the Earth's climate system. Their impacts extend well beyond the ecological sphere, reshaping economic structures, destabilizing social systems, and influencing political dynamics on a global scale. Given the magnitude and complexity of the crisis, responses must be comprehensive, interdisciplinary, and coordinated at both national and international levels (OECD, 2015).

In this context, climate policy has gained increasing prominence, shaping the strategic agendas of governments and international organizations. The 2015 Paris Agreement marked a pivotal turning point in global efforts to limit temperature increases, triggering an unprecedented wave of regulatory and policy initiatives. Among these, the European Green Deal (EGD), introduced in 2019, set the ambition of making Europe the first climate-neutral continent by 2050. The EGD outlines a broad set of policy instruments designed to transform production and consumption patterns toward environmental sustainability.

Moreover, the EU implemented the Carbon Border Adjustment Mechanism (CBAM) on October 1, 2023, to safeguard the competitiveness of companies operating within its borders and to prevent carbon leakage (European Commission, 2023). Currently in a transitional phase, the mechanism will, from January 1, 2026, impose additional costs on EU importers through the purchase of CBAM certificates, calculated based on the embedded emissions of aluminum, cement, iron and steel, electricity, fertilizer, and hydrogen, and is expected to be extended to all sectors (European Commission, 2024). This policy may incentivize EU importers to source from trading partners with lower greenhouse gas emissions for the covered products or reduce the pricing power of partners that fail to meet the requirements. Given that the EU is Türkiye's largest export market, the mechanism's impact on Turkish firms will likely depend on the comparative levels of firm-level emissions between the two regions. In this context, green transformation has tangible implications for Turkish companies and for Türkiye's exports to its largest trading partner (Ministry of Trade, 2024).

Realizing such ambitious objectives and achieving lower-carbon production, however, requires more than government-level commitments. A fundamental transformation of corporate behavior is indispensable, as firms remain the primary contributors to global emissions (EBRD, 2020). Green transformation policies, those aimed at aligning firms' production, investment, and governance practices with ecological imperatives, are therefore critical. Their success depends not only on the strength of regulatory frameworks but also on the capacity and willingness of the private sector to adapt to evolving environmental standards, shifting market expectations, and climate-related financial risks (EBRD, 2023).

Firms' behavior in this transformation process is influenced by a complex interplay of micro- and macro-level factors. These include customer expectations, losses from extreme weather events, firm size, female ownership, environmental taxes and regulations, corporate governance structures, competition

from the informal sector, CO_2 emission levels, and access to green finance. Understanding the relative importance of these factors is essential for developing effective and targeted policy instruments.

The green transformation process in Türkiye has gained a formal institutional and legal framework with the adoption of the Climate Law by the Grand National Assembly on 3 July 2025. This law, consisting of twenty articles and two provisional clauses, establishes the foundations for greenhouse gas mitigation, climate change adaptation, carbon pricing mechanisms, and the implementation of an Emissions Trading System (ETS). It also introduces key concepts such as "just transition," "voluntary carbon markets," and "embedded greenhouse gas emissions" into the legal framework. The law assigns responsibilities related to inter-institutional coordination, monitoring-reporting-verification (MRV) systems, local climate action plans, and the allocation of ETS allowances to the Climate Change Directorate. Within this context, Türkiye aims to advance ETS regulations and carbon market mechanisms to support its green transformation and enhance the resilience of its industrial sectors against future carbon cost burdens (Ministry of Environment, Urbanization and Climate Change, 2025).

This study investigates the determinants of green transformation at the firm level by conducting a comparative analysis of EU and Turkish enterprises using a logistic regression model. The analysis draws on data from approximately 5,871 firms in 16 EU countries and 739 firms in Türkiye, collected between 2018 and 2020 through the Business Environment and Enterprise Performance Survey (BEEPS), jointly administered by the European Bank for Reconstruction and Development (EBRD), the World Bank, and the European Investment Bank (EIB). The study examines the structural, institutional, and financial factors shaping firms' environmental adaptation, while identifying differences in firm behavior between the EU and Türkiye.

Ultimately, this research seeks to contribute to the development of evidence-based climate and sustainability policies, emphasizing the pivotal role of private sector transformation in tackling the climate crisis and offering policy recommendations for advancing the green transformation of Turkish companies. In addition, it provides cross-country evidence that market demand, regulatory measures, and internal governance jointly shape corporate green transformation, thereby extending beyond the predominantly single-country or sectoral focus of prior studies (e.g., Schaltegger & Wagner, 2011).

The remainder of the paper proceeds as follows: Section 2 reviews the relevant literature; Section 3 describes the data and methodology; Section 4 presents the empirical results; and Section 5 concludes with policy implications.

2. Literature Review

The green transition, defined by EBRD (2020) as the fundamental shift of firms toward environmentally sustainable operations, emerges from the interaction of diverse economic, institutional, and organizational forces. Firm-level adaptation to environmental imperatives depends on how these drivers align with regulatory frameworks, internal capabilities, operational realities, and access to markets and finance. Large-scale surveys such as the BEEPS demonstrate that these factors operate simultaneously, shaping both the willingness and the capacity of firms to implement green transformation strategies.

This section synthesizes the existing literature on the determinants of firm-level green transformation, integrating both foundational theoretical perspectives and recent empirical findings. For analytical clarity, the discussion is structured around six conceptual categories that collectively encompass the range of factors influencing corporate environmental adaptation. First, external pressures encompass customer environmental requirements, monetary losses resulting from extreme weather events, and pollution-related impacts. Second, regulatory exposure refers to the influence of policy instruments such as energy taxes and energy performance standards. Third, perceived obstacles include firms' assessments of the burdens imposed by environmental regulations and tax rates. Fourth, organizational capacity captures internal capabilities, including the presence of formal business strategies, active boards of directors, international certifications, multi-establishment affiliation, and female ownership. Fifth, operational conditions comprise factors such as power outages, competition from informal firms, and levels of CO_2 emissions. Finally, financial and market access covers the availability of credit, the share of exports in total sales, and stock market listing status. Together, these six dimensions provide a comprehensive framework for examining how external, institutional, and firm-specific drivers interact to shape environmental strategies and performance outcomes.

2.1. External Pressures

Customer-driven environmental requirements have emerged as a significant catalyst for firm-level green transformation. Environmentally conscious buyers can exert substantial influence over suppliers' innovation strategies. Sun et al. (2024) find that customers with strong ESG commitments significantly enhance suppliers' green innovation performance, particularly when they hold greater bargaining power and advanced green capabilities. These effects operate primarily through pressure and collaboration mechanisms. Similarly, Wang et al. (2024) report that customer-driven voluntary environmental regulation creates a positive contagion effect, diffusing sustainability commitments through supply chains to foster supplier-level green innovation. Nygaard (2023) emphasizes that the proliferation of sustainability certifications reflects growing customer and stakeholder demand for sustainable products, serving as both compliance signals and strategic tools to build trust, command price premiums, and strengthen long-term commercial relationships.

Physical environmental risks also shape corporate sustainability responses. Benincasa et al. (2023) show that firms suffering monetary losses from extreme weather events are 12 percentage points more likely to adopt green practices, while Feng and Liu (2024) document that such events cause negative financial consequences, reduced stock performance and operational disruptions, that prompt resilience and sustainability investments. Pollution-related losses have similar effects: EBRD (2020) finds that firms experiencing such losses are more likely to prioritize energy efficiency, climate-related issues, and structured green management practices.

Reputational pressures linked to emissions can also drive change. Delmas and Montes-Sancho (2011) show that combined regulatory and market pressures lead firms to adopt stricter environmental management systems, while Ye and Qi (2025) find that media coverage of carbon issues compels high-emission firms to increase green innovation, improve disclosure, and ease financing constraints.

2.2. Regulatory Exposure

Policy instruments, particularly environmental taxes and energy performance standards, are widely recognized as effective levers for corporate green transformation. Lu et al. (2025) demonstrate that environmental tax reforms, such as transitioning from pollution fees to formal environmental taxes, enhance industrial green development, especially among state-owned and highly polluting firms. These taxes reduce resource misallocation, incentivize innovation, and realign research & development and financing strategies toward sustainability.

Energy performance standards also play a critical role. EBRD (2020) reports that firms subject to such standards display stronger green management and higher rates of green investment. Liu et al. (2023) highlight the synergy between performance standards and digital transformation, enabling energy-intensive sectors to monitor consumption, optimize processes, and innovate toward low-carbon technologies.

2.3. Perceived Obstacles

While regulatory instruments can incentivize environmental improvement, firms often perceive environmental regulations and tax rates as obstacles to business performance. EBRD (2020) notes that regulatory burdens may disproportionately affect smaller firms with limited compliance capacity, potentially discouraging green investment. Similarly, excessive or unpredictable taxation is cited as a barrier to long-term planning in sustainability-oriented sectors, as it constrains financial flexibility and discourages capital-intensive environmental upgrades.

2.4. Organizational Capacity

Internal organizational capacity fundamentally determines how effectively firms respond to external and regulatory pressures. Larger, multi-establishment enterprises typically have greater resources, managerial capability, and strategic incentives to implement environmental initiatives (Gómez Martínez et al., 2024). Also strategic planning is crucial: Mehta et al. (2025) show that structured planning, covering analysis, formulation, execution, and evaluation, improves both environmental and social performance, while Marchiori (2022) emphasizes that integrating sustainability into business models can simultaneously drive transformation and competitive advantage.

Governance structures also matter. Velte (2024) finds that boards with sustainability committees, gender diversity, and sustainability-linked executive pay significantly improve environmental performance. Certifications can strengthen these effects: Ofori et al. (2023) report that ISO 14001 adoption reduces emissions and resource use by promoting systematic waste reduction and efficiency gains.

Leadership diversity is another important element. Barrachina Fernández et al. (2021) observe that women entrepreneurs integrate environmental priorities into strategic planning, while Chang et al. (2024) find that female board members enhance ESG performance by promoting stakeholder welfare, inclusive governance, and accountability.

2.5. Operational Conditions

Operational constraints and competitive dynamics can both hinder and stimulate environmental innovation. Firms facing frequent or prolonged power outages often reassess reliance on unstable grids, investing in renewable energy, storage, and efficiency technologies (World Bank, 2025). Competitive pressure from informal enterprises can incentivize formal firms to differentiate themselves through green innovation and productivity improvements (Flores et al., 2024).

CO_2 emissions levels themselves also influence strategic orientation. High-emission firms are under greater scrutiny from regulators, markets, and civil society, which can accelerate investment in emission-reducing technologies, environmental reporting, and innovation in clean processes.

2.6. Financial and Market Access

Access to finance is a critical enabler of sustainability-oriented investments. Abda (2025) shows that green microfinance fosters sustainable development in resource-dependent sectors by embedding environmental responsibility into lending criteria. Buchetti et al. (2025) find that green credit lines and loan guarantees channel funding toward environmentally beneficial projects, especially for low-emission firms.

Market access also shapes green transformation potential. Yin et al. (2023) note that listed firms are more exposed to ESG-focused investors, increasing pressure for transparency and performance, though effects vary by context. Export activity presents a mixed picture: while green innovation can facilitate market entry (Meneto & Siedschlag, 2020), higher export intensity does not necessarily indicate deeper transformation, suggesting that competitive pressures and product standards in target markets are decisive factors.

In sum, the literature indicates that firm-level green transformation is driven by a multifaceted set of determinants that operate at different but interrelated levels. External pressures, such as customer environmental requirements, exposure to extreme weather events, and pollution, often serve as initial triggers. Regulatory exposure, through energy taxes and performance standards, establishes formal compliance incentives, while perceived obstacles related to environmental regulations and tax rates can either slow or redirect the process. Organizational capacity, including governance structures, strategic planning, certifications, multi-establishment linkages, and leadership diversity, shapes how effectively firms respond to these external and institutional pressures. Operational conditions, such as power reliability, competition from informal firms, and CO_2 emission intensity, influence both the urgency and the feasibility of green measures. Finally, financial and market access, through credit availability, export participation, and stock market listing, determines the scale and sustainability of environmental investments. Taken together, the evidence underscores that no single factor alone is sufficient; rather, it is the alignment and interaction of these six dimensions that ultimately determine the depth, scope, and durability of a firm's green transformation.

3. Data and Methodology

This study draws on firm-level data from the 2018–2020 wave of the Business Environment and Enterprise Performance Survey (BEEPS), jointly administered by the European Bank for Reconstruction and Development, the World Bank, and the European Investment Bank. The survey covers approximately 28,000 firms operating in 40 countries across Europe, Central Asia, the Middle East, and North Africa. For the purposes of this analysis, the focus is restricted to two subsamples: 5,871 firms from 16 European Union (EU) member states (Table 1) and 739 firms from Türkiye. This selection

enables a direct comparison of the factors influencing green transformation in EU and Turkish enterprises.

3.1. Green transformation index

To capture the multidimensional nature of corporate environmental transition, a composite Green Transformation Index is constructed from a broad set of environmental practice indicators reported in the BEEPS (Table 2). Each indicator is first converted into a binary variable, taking the value of 1 if the firm reports adoption of the respective practice and 0 otherwise. The index is then calculated as the arithmetic mean of these binary variables, producing a continuous measure ranging from 0 (no adoption of green practices) to 1 (adoption of all practices).

For the empirical analysis, firms are classified into two categories using a median-based threshold of the Green Transformation Index. Firms with index values at or above the sample median are coded as 1 (indicating successful green transformation), while those below the median are coded as 0. This median cut-off provides a robust, data-driven criterion that balances group sizes and limits sensitivity to outliers. As part of robustness checks, a more stringent classification is also applied using the 75th percentile of the index as the threshold.

Table 1. List of 16 EU Countries

Bulgaria	Croatia
Cyprus	Czechia
Estonia	Greece
Hungary	Italy
Latvia	Lithuania
Malta	Poland
Portugal	Romania
Slovakia	Slovenia

Table 2. Indicators Used for Generating Green Transformation Index

bmgc1	Over Last 3 Years, Did This Establishment Monitor Its Energy Consumption?
bmgc11	Over Last 3 Years, Monitor CO_2 Emissions Along Its Supply Chain
bmge5	In Last Fiscal Year, Use Energy from Its Own Renewable Sources?
bmga1	In Last Fiscal Year, Strategic Objectives Mention Environmental or Climate Change Issues
bmga2	In Last Fiscal Year, Have Manager Responsible for Environmental or Climate Issues?
bmgc16	Over Last 3 Years, Did This Establishment Have Targets on Energy Consumption?
bmgc18	Over Last 3 Years, Did This Establishment Have Targets For CO_2 Emissions?
h5	During Last 3 Years, Establishment Introduced New/Significantly Improved Process
bmh1	During Last 3 Years, Establishment Spent on Acquisition of External Knowledge?
bmgc23a	Over Last 3 Years, Adopt Heating and Cooling Improvements
bmgc23b	Over Last 3 Years, Adopt More Climate-Friendly Energy Generation on Site
bmgc23c	Over Last 3 Years, Adopt Machinery Upgrades

bmgc23d	Over Last 3 Years, Adopt Energy Management
bmgc23e	Over Last 3 Years, Adopt Waste Minimization, Recycling and Waste Management
bmgc23f	Over Last 3 Years, Adopt Air Pollution Control Measures
bmgc23g	Over Last 3 Years, Adopt Water Management
bmgc23h	Over Last 3 Years, Adopt Upgrades of Vehicles, Vessels, Aircraft in the Fleet
bmgc23i	Over Last 3 Years, Adopt Improvement of Lighting Systems
bmgc23j	Over Last 3 Years, Adopt Other Pollution Control Measures
bmgc25	Over Last 3 Years, Adopt Any Measures to Enhance Energy Efficiency?

3.2. Variables and Descriptive Statistics

Table 3 reports the descriptive statistics for the variables used in the analysis for the EU-16 subsample. Overall, 59.1% of firms meet the green transformation criterion, indicating that more than half of the surveyed companies in the EU have adopted environmental practices at or above the median level of the Green Transformation Index.

In terms of external pressures, 14.2% of firms report customer requirements for environmental certifications or adherence to environmental standards, while 10.1% and 2.3% have experienced monetary losses from extreme weather events and pollution, respectively. These figures suggest that while direct environmental damages are less frequently reported, customer-driven sustainability demands represent a more prevalent driver. Regulatory exposure varies across the sample: 19.9% of firms are subject to an energy tax or levy, and 9.0% operate under an energy performance standard. Perceived obstacles also differ, with 12.0% identifying environmental regulations and 42.7% citing tax rates as constraints to their operations. Indicators of organizational capacity show that 15.9% of firms are part of multi-establishment enterprises, 46.7% have a formalized written business strategy, 35.5% maintain a board of directors or supervisory board, and 37.4% hold internationally recognized quality certifications. These attributes provide insight into the governance and strategic structures that may facilitate or hinder environmental transformation. Regarding operational challenges, 27.9% of firms report experiencing power outages, and 28.5% face competition from unregistered or informal firms. Meanwhile, 20.5% acknowledge direct CO_2 emissions over the last three years. Financial capacity and ownership structure also vary within the sample: 48.3% of firms have access to a line of credit or loan from a financial institution, 39.3% have female ownership, and 60.6% are listed on a stock market. These factors are expected to shape both the ability and the incentives for firms to engage in green transformation initiatives.

Table 3. Descriptive statistics for the variables used in the analysis for EU-16 Companies (5871 firms)

Green Transition successful?	59,07 %
Customers Require Certifications or Adherence to Some Environmental Standards? (bmga4)	14.19 %
Over Last 3 Years, Experienced Monetary Losses Due to Extreme Weather Events (bmgb1)	10.12 %
Over Last 3 Years, Experienced Monetary Losses from Pollution (bmgb2)	2.33 %
In Last Fiscal Year, Was This Establishment Subject to an Energy Tax or Levy? (bmgd6)	19.86 %
In Last Fiscal Year, Was This Establishment Subject to an Energy Performance Standard in Its Operations? (bmgd7)	9.03 %
How Much of an Obstacle: Environmental Regulations (bmj4c)	11.96 %

How Much of an Obstacle: Tax Rates (j30a)	42.67 %
Establishment Part of a Multi-Establishment Firm? (a7)	15.89 %
Does Firm Have Formalized Written Business Strategy? (bmb3)	46.72 %
Does Firm Have Board of Directors or Supervisory Board? (bmb4)	35.48 %
Does Establishment Have an Internationally-Recognized Quality Certification? (b8)	37.35 %
Over Last Fiscal Year, Did This Establishment Experience Power Outages? (c6)	27.85 %
Does This Establishment Compete Against Unregistered or Informal Firms? (e11)	28.53 %
Over Last 3 Years, Did This Establishment Emit CO_2? (bmgc7)	20.49 %
Establishment Has a Line of Credit or Loan From a Financial Institution? (k8)	48.29 %
Shares Traded on the Stock Market? (b1share)	60.64 %
Female Owner? (b4)	39.29 %
% of Sales: Direct Exports (d3c)	13.97 %

For the Türkiye subsample, the descriptive statistics in Table 4 indicate that only 29.2% of firms meet the green transformation criterion, substantially lower than the EU-16 average. Regarding external pressures, 14.2% of Turkish firms report customer requirements for environmental certifications or adherence to standards, similar to the EU share, while only 1.9% and 0.3% have experienced monetary losses from extreme weather events and pollution, respectively. This suggests that direct environmental damage is reported far less frequently among Turkish firms than in their EU counterparts. Regulatory exposure appears higher in some areas: 35.2% of firms are subject to an energy tax or levy, and 20.4% operate under an energy performance standard. In terms of perceived constraints, 29.8% view environmental regulations and 67.5% see tax rates as significant obstacles, both notably higher than the EU-16 averages. Indicators of organizational capacity show that only 6.8% of firms are part of multi-establishment enterprises, less than half the EU share, while 27.6% maintain a formalized written business strategy, 46.3% have a board of directors or supervisory board, and 34.2% possess internationally recognized quality certifications. In terms of operational challenges, 34.2% of Turkish firms report power outages, exceeding the EU-16 proportion, and 37.6% face competition from informal or unregistered firms. Direct CO_2 emissions are reported by 6.9% of firms, markedly lower than in the EU-16. With respect to financial capacity and ownership structure, 35.9% have access to a line of credit or loan, 15.4% have female ownership, and 67.3% are listed on a stock market. These structural differences highlight the distinct economic and institutional contexts in which Turkish firms pursue green transformation, providing an important backdrop for the comparative analysis that follows.

Table 4. Descriptive statistics for the variables used in the analysis for Turkish Companies (739 firms)

Green Transition successful?	29.23 %
Customers Require Certifications or Adherence to Some Environmental Standards? (bmga4)	14.21 %
Over Last 3 Years, Experienced Monetary Losses Due to Extreme Weather Events (bmgb1)	1.89 %
Over Last 3 Years, Experienced Monetary Losses from Pollution (bmgb2)	0.27 %
In Last Fiscal Year, Was This Establishment Subject to an Energy Tax or Levy? (bmgd6)	35.18 %
In Last Fiscal Year, Was This Establishment Subject to an Energy Performance Standard in Its Operations? (bmgd7)	20.43 %

How Much of an Obstacle: Environmental Regulations (bmj4c)	29.77 %
How Much of an Obstacle: Tax Rates (j30a)	67.52 %
Establishment Part of a Multi-Establishment Firm? (a7)	6.77 %
Does Firm Have Formalized Written Business Strategy? (bmb3)	27.60 %
Does Firm Have Board of Directors or Supervisory Board? (bmb4)	46.28 %
Does Establishment Have an Internationally-Recognized Quality Certification? (b8)	34.24 %
Over Last Fiscal Year, Did This Establishment Experience Power Outages? (c6)	34.24 %
Does This Establishment Compete Against Unregistered or Informal Firms? (e11)	37.62 %
Over Last 3 Years, Did This Establishment Emit CO_2? (bmgc7)	6.90 %
Establishment Has a Line of Credit or Loan From a Financial Institution? (k8)	35.86 %
Shares Traded on the Stock Market? (b1share)	67.25 %
Female Owner? (b4)	15.43 %
% of Sales: Direct Exports (d3c)	8.18 %

3.3. Methodology

The dependent variable, Green Transition, is coded as 1 if a firm's Green Transformation Index, constructed from survey questions on environmental management practices, resource efficiency measures, adoption of green technologies, and compliance with environmental standards, exceeds the sample median, and 0 otherwise. In robustness checks, a more stringent criterion is applied, setting the threshold at the 75th percentile of the index.

The explanatory variables are classified into six conceptual categories to facilitate a structured analysis. First, External Pressures capture factors such as customer requirements for environmental standards, as well as monetary losses arising from extreme weather events or pollution. Second, Regulatory Exposure encompasses variables related to energy taxes or levies and energy performance standards. Third, Perceived Obstacles include firms' assessments of environmental regulations and tax rates as constraints to their operations. Fourth, Organizational Capacity covers internal firm characteristics such as the presence of a formalized business strategy, board governance structures, internationally recognized quality certifications, multi-establishment affiliation, and female ownership. Fifth, Operational Conditions reflect factors such as direct CO_2 emissions, the frequency of power outages, and competition from informal firms. Finally, Financial and Market Access includes access to credit or loans, stock market listing, and the share of exports in total sales.

All explanatory variables are specified as binary indicators, with the exception of the percentage of sales derived from direct exports, which is treated as a continuous variable. To account for unobserved heterogeneity at the national level, country fixed effects are included in all model specifications. The likelihood of a firm achieving a green transition is estimated using a logistic regression model of the following form:

$$P(Green_i = 1) = \frac{\exp(\beta_0 + \beta' X_i)}{1 + \exp(\beta_0 + \beta' X_i)} \quad (1)$$

where $Green_i$ denotes the green transition status of firm i, X_i is the vector of explanatory variables, and β represents the parameter vector to be estimated. Results are presented as **odds ratios** to facilitate interpretation of the magnitude of each variable's effect on the likelihood of green transition. The analysis is conducted both on 5871 EU companies and on 739 Turkish companies Robustness checks include re-estimation using probit models and alternative thresholds for the Green Transformation Index. Standard errors are clustered at the country level to account for intra-country correlation.

To ensure robustness, we estimate both logistic and probit models. Both models are based on a latent variable framework linking the probability of green transition to firm characteristics, differing only in the assumed distribution of the error term (logistic for logit, standard normal for probit). Since both approaches yield similar qualitative results, we focus the discussion on the logit model while presenting probit estimates as a robustness check.

4. Results

The comparative analysis of determinants of green transformation between Turkish and EU-16 firms reveals both shared drivers and distinct contextual dynamics that shape corporate environmental upgrading. While some factors, such as customer environmental requirements, exposure to energy performance standards, formalized strategic planning, and robust governance, are influential in both regions, the relative strength and underlying mechanisms of these drivers differ. In Türkiye, market-pull mechanisms and regulatory instruments exert a comparatively stronger effect, indicating that in settings where sustainability norms and institutional enforcement are still consolidating, external market and policy signals have greater capacity to influence firm behavior. In contrast, in the EU-16, green transformation is more closely tied to voluntary commitments, leadership diversity, and direct exposure to environmental impacts, reflecting a deeper integration of sustainability within corporate strategy.

Table 5. Logistic regression estimates of green transition in EU and TR Companies

LOGIT	EU-16 FIRMS		TÜRKİYE FIRMS	
VARIABLES	Odds Ratio	P-Value	Odds Ratio	P-Value
Customers Require Certifications or Adherence to Some Environmental Standards?	4.156***	0.000	10.832***	0.000
Over Last 3 Years, Experienced Monetary Losses Due to Extreme Weather Events	1.821***	0.000	1.348	0.675
Over Last 3 Years, Experienced Monetary Losses from Pollution	1.697*	0.062	0.714	0.939
In Last Fiscal Year, Was This Establishment Subject to an Energy Tax or Levy?	1.249**	0.025	1.992**	0.025
In Last Fiscal Year, Was This Establishment Subject to an Energy Performance Standard in Its Operations?	2.679***	0.000	4.140***	0.000
How Much of An Obstacle: Environmental Regulations	1.097	0.404	0.359***	0.001
How Much of An Obstacle: Tax Rates	1.012	0.885	0.648	0.100
Establishment Part of a Multi-Establishment Firm?	1.363***	0.001	2.077*	0.074
Does Firm Have Formalized Written Business Strategy?	1.951***	0.000	1.954**	0.015
Does Firm have Board of Directors or Supervisory Board?	1.435***	0.000	2.322***	0.002
Does Establishment Have an Internationally-Recognized Quality Certification?	1.617***	0.000	0.850	0.544
Over Last Fiscal Year, Did This Establishment Experience Power Outages?	1.521***	0.000	2.113***	0.001
Does This Establishment Compete Against Unregistered or Informal Firms?	1.245***	0.003	1.733**	0.022
Over Last 3 Years, Did This Establishment Emit CO_2 ?	2.857***	0.000	0.846	0.683

Establishment Has a Line of Credit or Loan from a Financial Institution?	1.425***	0.000	1.665**	0.033
% of Sales: Direct Exports	1.005***	0.000	0.998	0.669
Shares Traded on the Stock Market?	1.046	0.623	0.697	0.161
Female Owner?	1.146**	0.037	1.341	0.312
Observations	5,871		739	
	Pseudo R^2=0.2240		Pseudo R^2 =0.3939	
Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Country dummy variables are included in the regression analysis				

4.1. External Pressures

Customer requirements for environmental certifications or adherence to standards emerge as the most influential determinant of green transformation in both regions, though their relative impact differs substantially. In Türkiye, firms facing such requirements are more than ten times more likely to undergo green transformation compared to the reference group, whereas in the EU the likelihood is approximately four times higher. This finding is consistent with Sun et al. (2024) and Wang et al. (2024), who show that environmentally committed buyers shape suppliers' strategies through both pressure and collaboration, and with Nygaard (2023), who underscores that certifications enhance market credibility, foster trust, enable price premiums, and support long-term commercial relationships. The stronger effect observed in Türkiye suggests that in emerging markets with less mature regulatory frameworks, market-driven mechanisms can play a particularly decisive role in prompting environmental upgrading.

By contrast, direct environmental impacts appear more salient in the EU than in Türkiye. Firms in the EU that reported monetary losses from extreme weather events were nearly twice as likely to adopt green transformation measures, while those experiencing pollution-related losses showed a similarly elevated likelihood. Likewise, firms disclosing CO_2 emissions were almost three times more likely to transition compared to those without such disclosures. These patterns support the findings of Benincasa et al. (2023), EBRD (2020), Delmas and Montes-Sancho (2011), and Ye and Qi (2025), and suggest that in more mature sustainability contexts, firsthand experience of environmental risks reinforces proactive corporate adaptation strategies.

4.2. Regulatory Exposure

Regulatory measures are found to be effective in both contexts, though their influence is more pronounced in Türkiye. Firms subject to energy performance standards are more than four times as likely to undergo green transformation in Türkiye and nearly three times as likely in the EU. This result is consistent with EBRD (2020) and Liu et al. (2023), who demonstrate that such standards not only strengthen environmental management but also work in synergy with digitalization to improve both environmental and financial outcomes. Similarly, energy taxes or levies increase the probability of green transition in both regions, though the effect is stronger in Türkiye, where firms subject to such taxes are about twice as likely to adopt green practices compared to a modest increase of around one-quarter in the EU. These findings align with Lu et al. (2025), who show that environmental taxation enhances green total factor productivity, particularly in high-pollution industries, by incentivizing firms to reallocate resources and invest in innovation.

4.3. Perceived Obstacles

A noteworthy divergence emerges in perceptions of environmental regulations. In Türkiye, firms that perceive environmental rules as a major operational obstacle are almost three times less likely to engage in green transformation compared to those that do not view regulations as burdensome. By contrast, in the EU no such relationship is observed. This pattern indicates a perception–implementation gap in the Turkish context, suggesting that even well-designed environmental policies may fail to deliver their intended effect if they are framed or experienced by firms primarily as constraints rather than as enabling instruments. Perceived obstacles related to tax rates, however, are not statistically significant in either

region, underscoring that fiscal perceptions do not appear to play a decisive role in shaping firms' environmental upgrading.

4.4. Organizational Capacity

Organizational resources and governance structures emerge as consistent enablers of green transformation. In both Türkiye and the EU, firms with a board of directors are significantly more likely to undergo green transformation, with the likelihood more than doubling in Türkiye and increasing by nearly half in the EU. This finding aligns with Velte (2024), who highlights that structured board oversight, particularly when sustainability is explicitly incorporated into governance, strengthens firms' environmental performance. Similarly, the presence of a formalized business strategy substantially increases the probability of transition in both regions, reinforcing the arguments of Mehta et al. (2025) and Marchiori (2022) that systematic strategic planning is critical for embedding sustainability into core business models.

Firm complexity, proxied by multi-establishment status, has an even greater impact in Türkiye, where multi-establishment firms are roughly twice as likely to pursue green transformation compared to single-site firms, whereas in the EU the increase is closer to one-third. This pattern supports Martínez et al. (2024), who argue that larger organizations are better equipped to standardize sustainability practices and capitalize on economies of scale in green investments.

Certain capacity-related factors are distinctive to the EU. Firms holding an internationally recognized quality certification, such as ISO 14001, demonstrate a significantly higher probability of adopting green practices, consistent with Ofori et al. (2023), who find that such certifications enhance performance through process optimization and resource efficiency. Female ownership also has a modest yet positive effect in the EU, in line with Fernández et al. (2021) and Chang et al. (2024), who show that gender diversity in leadership fosters stronger ESG outcomes and long-term sustainability integration.

4.5. Operational Conditions

Operational disruptions, such as power outages, are found to significantly increase the likelihood of firms engaging in green transformation. In Türkiye, firms experiencing outages are more than twice as likely to transition compared to their counterparts without such disruptions, while in the EU the probability is about one and a half times higher. This finding echoes World Bank (2025), which notes that unreliable electricity supply often compels firms to invest in renewable energy generation, storage, and efficiency improvements. Similarly, competition from informal firms is positively associated with green transformation, with the effect again stronger in Türkiye. Turkish firms exposed to informal competition are nearly twice as likely to adopt green practices, whereas the increase is more modest in the EU. This pattern supports Flores et al. (2024), who argue that formal enterprises often respond to informal-sector competition by differentiating themselves through green innovation and productivity gains.

4.6. Financial and Market Access

Access to finance emerges as a consistent enabling factor in both regions. Firms in Türkiye with access to credit are about 1.7 times more likely to achieve a green transformation, while in the EU the corresponding effect is around 1.4 times. This finding reinforces Abda's (2025) argument on the role of green microfinance in enabling sustainable development and aligns with Buchetti et al. (2025), who show that targeted green credit lines and loan guarantees channel capital toward environmentally beneficial projects, particularly for firms with lower emissions.

By contrast, participation in capital markets through stock market listing does not significantly predict green transformation in either Türkiye or the EU, suggesting that access to equity markets does not automatically translate into environmental upgrading. Export activity shows only a marginal positive association in the EU, where firms with higher export shares are slightly more likely to engage in green transformation, but the effect remains economically small. This result is consistent with Meneto and Siedschlag (2020), who find that while green innovation supports export participation, it does not necessarily drive higher export intensity. In Türkiye, no significant relationship is found between export share and green transformation, underscoring that external market access plays a limited role in shaping environmental upgrading in less mature sustainability contexts.

5. Robustness Checks

To validate the robustness of the baseline findings, we conduct two supplementary analyses, reported in the robustness check tables (Tables 5 to 7). First, we compare the logistic regression estimates with those from probit models to assess the sensitivity of the results to the choice of estimation method. While the two approaches differ in their underlying distributional assumptions, the logit model relying on the logistic cumulative distribution function and the probit model on the standard normal distribution, both produce broadly consistent outcomes. Key determinants such as customer environmental requirements, exposure to energy performance standards, the presence of formalized business strategies, board governance structures, and CO_2 emissions reporting retain their expected signs and statistical significance across both specifications. Although coefficient magnitudes are generally smaller in the probit models, the stability in direction and significance underscores that the findings are not artifacts of model choice.

A technical note is warranted here regarding the way results are presented. In the baseline logit models, odds ratios were reported because logit coefficients have a natural interpretation in terms of the log-odds of the dependent variable, and exponentiating them yields directly interpretable odds ratios. Probit models, however, operate differently: coefficients represent changes in a latent z-score that indexes the underlying probability, not changes in log-odds. Because of this, exponentiating probit coefficients does not yield meaningful odds ratios. For consistency and comparability across models, we therefore report coefficients for both logit and probit specifications in the robustness checks, focusing interpretation on the direction and significance of effects rather than on odds ratios.

Second, we explore an alternative definition of successful green transition by classifying firms above the 75th percentile of the Green Transformation Index as transition achievers, instead of using the median threshold. This more stringent benchmark allows us to assess whether the identified drivers remain valid when attention shifts to top-performing firms. The results confirm that the principal determinants highlighted in the baseline analysis remain robust under this alternative definition. In particular, customer environmental requirements continue to exert a substantial positive influence, while regulatory instruments such as energy performance standards and organizational features such as formalized business strategies retain their strong and statistically significant effects.

Some minor variations emerge under the 75th percentile specification. For instance, certain contextual variables such as competition from informal firms or perceptions of regulatory burden shift slightly in magnitude or significance. However, the core explanatory variables, including market-driven pressures, regulatory exposure, and organizational capabilities, remain consistent predictors of green transformation across both median and upper-quartile thresholds. This consistency reinforces the view that the identified determinants apply not only to the average firm but also to those that represent the leading edge of sustainability adoption.

Taken together, these robustness checks confirm the reliability of the baseline results. The convergence of findings across different estimation techniques (logit and probit) and alternative outcome definitions (median vs. 75th percentile) demonstrates that the observed relationships between external pressures, organizational structures, financial access, and green transformation are stable and not sensitive to model specification or measurement thresholds. This strengthens confidence that the identified drivers represent structural and persistent determinants of firm-level environmental adaptation rather than methodological artifacts.

Table 6. Robustness Check on the Green Transition Dynamics: Different Estimation Methods EU-16 Firms

EU-16 FIRMS	LOGIT		PROBIT	
VARIABLES	Coefficients	P-Values	Coefficients	P-Values
Customers Require Certifications or Adherence to Some Environmental Standards?	1.425***	(0.000)	0.803***	(0.000)
Over Last 3 Years, Experienced Monetary Losses Due To Extreme Weather Events	0.600***	(0.000)	0.349***	(0.000)
Over Last 3 Years, Experienced Monetary Losses from Pollution	0.529*	(0.065)	0.294*	(0.072)
In Last Fiscal Year, Was This Establishment Subject to an Energy Tax or Levy?	0.222**	(0.043)	0.121*	(0.053)
In Last Fiscal Year, Was This Establishment Subject to an Energy Performance Standard in Its Operations?	0.986***	(0.000)	0.558***	(0.000)
How Much of an Obstacle: Environmental Regulations	0.092	(0.547)	0.052	(0.572)
How Much of an Obstacle: Tax Rates	0.011	(0.896)	0.005	(0.925)
Establishment Part of a Multi-Establishment Firm?	0.309***	(0.001)	0.187***	(0.000)
Does Firm Have Formalized Written Business Strategy?	0.668***	(0.000)	0.405***	(0.000)
Does Firm Have Board of Directors or Supervisory Board?	0.361*	(0.090)	0.214*	(0.087)
Does Establishment Have an Internationally-Recognized Quality Certification?	0.480***	(0.000)	0.286***	(0.000)
Over Last Fiscal Year, Did This Establishment Experience Power Outages?	0.419***	(0.000)	0.254***	(0.000)
Does This Establishment Compete Against Unregistered or Informal Firms?	0.219	(0.260)	0.129	(0.261)
Over Last 3 Years, Did This Establishment Emit CO_2 ?	1.050***	(0.000)	0.616***	(0.000)
Establishment Has a Line of Credit or Loan From a Financial Institution?	0.354***	(0.003)	0.206***	(0.003)
% of Sales: Direct Exports	0.005***	(0.002)	0.003***	(0.001)
Shares Traded on the Stock Market?	0.045	(0.798)	0.021	(0.836)
Female Owner?	0.136	(0.153)	0.083	(0.135)
Observations	5,871		5,871	
	Pseudo R^2=0.2240		Pseudo R^2=0.2236	
Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Country dummy variables are included in the regression analysis				

Table 7. Robustness Check on the Green Transition Dynamics: Different Estimation Methods Türkiye Firms

TÜRKİYE FIRMS	LOGIT		PROBIT	
VARIABLES	Coefficients	P-Values	Coefficients	P-Values
Customers Require Certifications or Adherence to Some Environmental Standards?	2.382***	(0.000)	1.433***	(0.000)
Over Last 3 Years, Experienced Monetary Losses Due to Extreme Weather Events	0.299	(0.691)	0.200	(0.639)
Over Last 3 Years, Experienced Monetary Losses from Pollution	-0.337	(0.712)	-0.258	(0.564)
In Last Fiscal Year, Was This Establishment Subject to an Energy Tax or Levy?	0.689**	(0.028)	0.369**	(0.033)

In Last Fiscal Year, Was This Establishment Subject to an Energy Performance Standard in Its Operations?	1.421***	(0.000)	0.820***	(0.000)
How Much of an Obstacle: Environmental Regulations	-1.023***	(0.000)	-0.567***	(0.000)
How Much of an Obstacle: Tax Rates	-0.434	(0.119)	-0.233	(0.115)
Establishment Part of a Multi-Establishment Firm?	0.731*	(0.066)	0.420*	(0.069)
Does Firm Have Formalized Written Business Strategy?	0.670**	(0.020)	0.405**	(0.012)
Does Firm Have Board of Directors or Supervisory Board?	0.842***	(0.004)	0.474***	(0.002)
Does Establishment Have an Internationally-Recognized Quality Certification?	-0.162	(0.533)	-0.120	(0.408)
Over Last Fiscal Year, Did This Establishment Experience Power Outages?	0.748***	(0.001)	0.418***	(0.001)
Does This Establishment Compete Against Unregistered or Informal Firms?	0.550**	(0.031)	0.309**	(0.024)
Over Last 3 Years, Did This Establishment Emit CO_2 ?	-0.167	(0.661)	-0.099	(0.651)
Establishment Has a Line of Credit or Loan From a Financial Institution?	0.510**	(0.035)	0.283**	(0.032)
% of Sales: Direct Exports	-0.002	(0.683)	-0.001	(0.719)
Shares Traded on the Stock Market?	-0.361	(0.171)	-0.216	(0.130)
Female Owner?	0.294	(0.323)	0.155	(0.347)
Observations	739		739	
	Pseudo R^2 =0.3939		Pseudo R^2 =0.3957	
Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Country dummy variables are included in the regression analysis				

Table 8. Robustness Check on the Green Transition Dynamics: Definition of Successful Transition –75% Threshold and Logit Method

LOGIT	**TÜRKİYE FIRMS ABOVE 75% THRESHOLD**		**EU-16 FIRMS ABOVE 75% THRESHOLD**	
VARIABLES	**Coefficients**	**P-Values**	**Coefficients**	**P-Values**
Customers Require Certifications or Adherence to Some Environmental Standards?	3.129***	(0.000)	1.237***	(0.000)
Over Last 3 Years, Experienced Monetary Losses Due to Extreme Weather Events	1.831	(0.153)	0.600***	(0.001)
Over Last 3 Years, Experienced Monetary Losses rom Pollution	1.161	(0.355)	0.577***	(0.001)
In Last Fiscal Year, Was This Establishment Subject to an Energy Tax or Levy?	2.025***	(0.001)	0.164	(0.258)
In Last Fiscal Year, Was This Establishment Subject to an Energy Performance Standard in Its Operations?	0.846	(0.111)	1.225***	(0.000)
How Much of an Obstacle: Environmental Regulations	-1.556***	(0.000)	0.171	(0.220)
How Much of an Obstacle: Tax Rates	-0.589	(0.216)	-0.117	(0.211)
Establishment Part of a Multi-Establishment Firm?	0.798	(0.134)	0.364***	(0.000)
Does Firm Have Formalized Written Business Strategy?	1.439***	(0.003)	0.674***	(0.000)
Does Firm Have Board of Directors or Supervisory Board?	1.197**	(0.035)	0.289**	(0.027)
Does Establishment Have an Internationally-Recognized Quality Certification?	-0.240	(0.580)	0.512***	(0.000)
Over Last Fiscal Year, Did This Establishment Experience Power Outages?	0.550	(0.132)	0.368***	(0.001)
Does This Establishment Compete Against Unregistered or Informal Firms?	0.344	(0.393)	0.288	(0.122)
Over Last 3 Years, Did This Establishment Emit CO_2 ?	0.123	(0.815)	0.998***	(0.000)

Establishment Has a Line of Credit or Loan From a Financial Institution?	0.947**	(0.017)	0.370***	(0.000)
% of Sales: Direct Exports	0.012*	(0.086)	0.008***	(0.000)
Shares Traded on the Stock Market?	-0.922*	(0.056)	0.086	(0.339)
Female Owner?	1.093**	(0.012)	0.117	(0.145)
Observations	739		5,871	
	Pseudo R^2=0.6335		Pseudo R^2=0.2477	
Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Country dummy variables are included in the regression analysis				

6. Policy Implications and Concluding Remarks

The findings indicate that accelerating green transformation in Türkiye requires a comprehensive and multi-dimensional strategy. Market-driven incentives should be prioritized by strengthening sustainability certification schemes and raising the visibility of green standards in both domestic and export markets. Since customer-driven requirements emerge as the strongest determinant in the Turkish context, policymakers could facilitate partnerships between domestic firms and environmentally progressive international buyers, establish publicly accessible databases of certified firms, and launch consumer-awareness campaigns that emphasize the value of sustainable products. By stimulating domestic demand for green standards in addition to meeting export requirements, such initiatives would embed sustainability into the long-term competitiveness of Turkish firms.

In parallel, communication and awareness-raising measures can address other external pressures. For instance, the results show that frequent electricity outages act as a driver of green transformation. Yet many firms underestimate the economic losses caused by these disruptions. Public–private partnerships involving chambers of commerce, energy providers, and regulatory agencies could therefore organize targeted PR campaigns to make the financial implications of outages more visible. By framing energy inefficiency as a concrete cost to competitiveness, such campaigns would encourage firms to adopt renewable energy solutions, storage systems, and efficiency-enhancing technologies.

Regulatory levers also need to be deployed consistently and predictably. Energy performance standards and environmental taxes are both associated with higher likelihoods of green transformation, but negative perceptions of regulatory burden in Türkiye significantly reduce firm engagement. This perception–implementation gap underscores the importance of designing regulations that are not only stringent but also collaborative in nature. Clear communication of policy objectives, phased enforcement timelines, and transitional support programs could reduce compliance costs and help firms reframe regulations as opportunities for modernization and improved market positioning rather than as punitive measures.

Financing mechanisms represent another critical pillar. Beyond expanding concessional green credit lines and public–private guarantee schemes, Turkish banks could integrate environmental performance standards into their lending practices. Credit allocation could be tied explicitly to green criteria, rewarding firms with environmental certifications, low-carbon production plans, or demonstrable efficiency improvements with more favorable terms, while applying higher costs of capital to highly polluting firms. This would operationalize the “polluter pays” principle within the financial system and align private incentives with public policy objectives. In doing so, Türkiye could replicate the mechanisms identified by Buchetti et al. (2025) and Abda (2025), where financial access not only enables project implementation but also rewards lower emissions with preferential terms.

Organizational capacity must also be strengthened. The results highlight the importance of formalized strategic planning, board-level governance structures, and gender diversity in leadership. Capacity-building programs for executives and board members should emphasize incorporating sustainability into long-term corporate strategies. In addition, public recognition schemes or fiscal incentives could further promote the adoption of sustainability-linked governance frameworks, signaling to markets and stakeholders that environmental responsibility is integral to corporate competitiveness.

Finally, policy design should account for the heterogeneity of Turkish firms. Larger, multi-establishment companies are already better positioned to absorb the costs of environmental innovation and could serve as "anchor firms" disseminating sustainability standards and clean technologies along their supply chains. Smaller enterprises, however, often face resource and scale constraints. They may require more hands-on technical support and pooled mechanisms such as shared infrastructure, cooperative procurement of clean technologies, or sector-specific green clusters. A dual-track approach, combining leadership by large firms with targeted support for SMEs, would make the green transformation process more inclusive, resilient, and sustainable.

In sum, the evidence suggests that green transformation in Türkiye cannot be achieved solely through regulatory compulsion or isolated market initiatives. Instead, it requires the alignment of consumer awareness, consistent regulatory frameworks, supportive financial instruments, and enhanced organizational capacities. By embedding sustainability as both a compliance requirement and a source of competitive advantage, Türkiye can not only mitigate climate risks but also strengthen the resilience and international competitiveness of its corporate sector.

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Araştırma Makalesi

Determinants of Corporate Green Transformation: A Comparative Analysis of Firms in Türkiye and The EU

Kurumsal Yeşil Dönüşümün Belirleyicileri: Türkiye ve Avrupa Birliği Firmaları Üzerine Karşılaştırmalı Bir Analiz

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KURUMSAL YEŞİL DÖNÜŞÜMÜN BELİRLEYİCİLERİ: TÜRKİYE VE AVRUPA BİRLİĞİ FİRMALARI ÜZERİNE KARŞILAŞTIRMALI BİR ANALİZ

Genişletilmiş Özet

Bu çalışma, kurumsal yeşil dönüşüm süreçlerini belirleyen unsurları, Türkiye ve Avrupa Birliği (AB) firmaları üzerinden karşılaştırmalı olarak incelemektedir. Analiz, Avrupa İmar ve Kalkınma Bankası (EBRD), Dünya Bankası ve Avrupa Yatırım Bankası (EIB) tarafından yürütülen 2018–2020 İş Ortamı ve İşletme Performansı Anketi (BEEPS) kapsamında toplanan 5.871 AB firması ve 739 Türk firmasına ait veriler kullanılarak gerçekleştirilmiştir.

Çalışmada öncelikle firma düzeyindeki uygulamalardan "Yeşil Dönüşüm Endeksi" türetilmiş ve medyan değerinin üzerindeki firmalar "yeşil dönüşümü gerçekleştirmiş" olarak sınıflandırılmıştır. Daha sonra lojistik regresyon modelleri ile yeşil dönüşümün belirleyenleri altı kavramsal kategoriye ayrılarak analiz edilmiştir: (i) dışsal baskılar (müşteri çevre talepleri, aşırı hava olayları ve kirlilikten kaynaklanan kayıplar), (ii) düzenleyici çerçeve (enerji vergileri ve enerji performans standartları), (iii) algılanan engeller (çevre mevzuatları ve vergi oranları), (iv) organizasyonel kapasite (resmî strateji belgeleri, yönetim kurulları, kalite sertifikaları, grup şirket yapısı ve kadın sahipliği), (v) operasyonel koşullar (elektrik kesintileri, kayıt dışı rekabet ve doğrudan emisyonlar) ve (vi) finansal kaynaklar ve piyasalara erişim (krediye erişim, ihracat payı ve borsa kotasyonu).

Bulgular, hem Türkiye hem de AB'de; müşterilerden gelen çevresel taleplerin, düzenleyici otoritelerce uygulanan enerji performans standartlarının ve firmanın bir resmî strateji belgesine sahip olmasının yeşil dönüşüm üzerinde en güçlü belirleyiciler olduğunu göstermektedir. Türkiye örnekleminde bu faktörlerin etkisi AB firmalarına kıyasla daha belirgin olup, piyasa temelli teşviklerin ve düzenleyici araçların firmaları yönlendirmede kritik rol oynadığı görülmektedir. Buna karşılık AB'de, firmaların kalite sertifikalarına sahip olması, firma ortakları arasında kadın bulunması ve firma operasyonlarının çevresel risklere doğrudan maruz kalması gibi faktörlerin Türkiye firmalarına kıyasla yeşil dönüşümde daha belirgin olduğu anlaşılmaktadır. Finansmana erişim her iki bölgede de yeşil dönüşümü desteklerken, çevre düzenlemelerinin bir engel olarak algılanması yalnızca Türkiye'deki firmaların yeşil dönüşümü açısından olumsuz bir etki yaratmaktadır.

Güvenilirlik kriterleri kapsamında, lojistik regresyon ve probit regresyon modelleri karşılaştırılmış, ayrıca "Yeşil Dönüşüm Endeksi" için medyan eşiğe ek olarak %75 eşik değeri de test edilmiştir. Bulgular, metodoloji ve eşik seviyesi değişse de temel belirleyicilerin (müşteri talepleri, enerji

standartları, stratejik planlama ve kurumsal yönetişim) istikrarlı şekilde anlamlı kaldığını göstermektedir. Bu sonuçlar, bulguların metodolojik tercihlerden bağımsız olarak güvenilir ve geçerli olduğunu teyit etmektedir.

Elde edilen sonuçlar ışığında Türkiye için politika önerileri çok boyutlu bir yaklaşımı gerekli kılmaktadır. Öncelikle, müşteri taleplerinin yeşil dönüşüm üzerindeki belirleyici etkisi dikkate alınarak piyasa temelli teşvikler güçlendirilmeli, sürdürülebilirlik sertifikasyon programları yaygınlaştırılmalı ve hem yerli tüketicilerin hem de uluslararası alıcıların bilinçlendirilmesine yönelik çalışmalar yürütülmelidir. İkinci olarak, enerji performans standartları ve çevresel vergiler gibi düzenleyici araçlar öngörülebilir ve tutarlı bir biçimde uygulanmalı, aynı zamanda firmaların bu düzenlemeleri bir engel olarak değil modernleşme fırsatı olarak görmelerini sağlayacak destekleyici ve iletişim odaklı politikalar geliştirilmelidir. Üçüncü olarak, yeşil finansman mekanizmaları yaygınlaştırılmalı; bankaların kredi tahsis süreçlerine çevresel kriterler entegre edilerek düşük emisyonlu firmalara avantajlı koşullar sağlanmalı, yüksek emisyonlu firmaların ise dönüşüme yönlendirilmesi için farklılaştırılmış maliyetlendirme yapılmalıdır. Bu bağlamda KOBİ'lere özel kredi hatları, garanti mekanizmaları ve düşük karbon yatırımlarına yönelik vergi teşvikleri ön plana çıkmaktadır. Dördüncü olarak, kurumsal yönetişim kapasitesinin geliştirilmesi kritik olup, yönetim kurullarında sürdürülebilirlik komitelerinin kurulması, stratejik planlamaya çevresel hedeflerin entegrasyonu ve kadın liderliğinin teşvik edilmesi firmaların dönüşüm kabiliyetini güçlendirecektir. Son olarak, operasyonel kırılganlıkların azaltılması amacıyla özellikle elektrik kesintileri gibi doğrudan verimlilik kayıplarına yol açan sorunlara karşı farkındalık artırıcı çalışmalar yapılmalı ve firmaların bu kayıpları telafi edecek yenilenebilir enerji, depolama ve verimlilik yatırımlarına yönelmeleri desteklenmelidir. Bu bütüncül adımlar, Türkiye'de sürdürülebilirliği bir uyum zorunluluğu olmaktan çıkarıp stratejik bir rekabet avantajına dönüştürerek firmaların hem çevresel performansını hem de uzun vadeli ekonomik dayanıklılığını güçlendirecektir.