



**REPUBLIC OF TÜRKİYE
ADANA ALPARSLAN TÜRKER SCIENCE AND TECHNOLOGY
UNIVERSITY**

**GRADUATE SCHOOL
BUSINESS ADMINISTRATION DEPARTMENT**

**THE RELATIONSHIP BETWEEN FINANCIAL REPORTING
QUALITY AND SUSTAINABILITY REPORTING DISCLOSURES: AN
APPLICATION ON BORSA ISTANBUL AND GERMAN STOCK
EXCHANGE COMPANIES**

MERAL KARADAĞ

Ph.D.



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ADANA, 2025

CERTIFICATION OF APPROVAL

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DECLARATION OF CONFORMITY

In this thesis study, which was prepared following the thesis writing rules of Adana Alparslan Türkeş Science and Technology University Institute of Graduate School, I declare that I provide all the information, documents, evaluations and results in accordance with scientific ethics and moral codes without resorting to any means or assistance that would be contrary to scientific ethics and traditions. I also declare that I refer to all of the articles I used in this study with appropriate references and accept all moral and legal consequences if a situation is found contrary to my statement regarding my work.

18/07/2025

[Signature]

MERAL KARADAĞ

ÖZET

FINANSAL RAPORLAMA KALİTESİ VE SÜRDÜRÜLEBİLİRLİK RAPORLAMASI BİLGİ AÇIKLAMALARI İLİŞKİSİ: BORSA İSTANBUL VE ALMAN BORSASI ŞİRKETLERİ ÜZERİNE BİR UYGULAMA

Meral KARADAĞ

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Temmuz 2025, 262 sayfa

Bu tez, finansal raporlama kalitesi (FRK) ile sürdürülebilirlik raporlaması bilgi açıklamaları arasındaki ilişkiyi, Türkiye ve Almanya örneklemi temelinde ampirik olarak analiz etmektedir. Çalışma, 2019–2022 yılları arasında Borsa İstanbul’da (BIST) işlem gören 75 Türk şirketi ile Alman borsasında işlem gören 140 şirkete ilişkin verileri kapsamaktadır.

Çalışmada kullanılan tüm finansal, çevresel, sosyal ve yönetim (ÇSY-ESG) verileri, London Stock Exchange Group (LSEG) bünyesindeki Refinitiv veri tabanından temin edilmiştir. Analiz sürecinde panel veri regresyon analizleri, bağımsız örneklem için t-testi ve çapraz kesit bağımlılığı testleri gibi istatistiksel yöntemler uygulanmıştır. Finansal raporlama kalitesinin ölçümünde ise kâr yönetimine dayalı Modifiye Edilmiş Jones Modeli ile Performans Eşlemeli Modifiye Edilmiş Jones Modeli kullanılmıştır.

Türkiye örneğine ilişkin analizlerde, genel ESG skorları ile finansal raporlama kalitesi arasında istatistiksel olarak anlamlı bir ilişki tespit edilmemiştir. Ancak, yönetim skoru değişkeni ile hem Modifiye Edilmiş Jones Modeli (FRK1), hem de Performans Eşlemeli Modifiye Edilmiş Jones Modeli (FRK2) kapsamında hesaplanan finansal raporlama kalitesi arasında pozitif yönlü ve istatistiksel olarak anlamlı ilişkiler tespit edilmiştir. Ayrıca, Modifiye Edilmiş Jones Modeli (FRK1) kapsamında hesaplanan finansal raporlama kalitesi ile emisyon skoru değişkeni arasında negatif ve istatistiksel olarak anlamlı bir ilişki tespit edilmiştir. Bu bulgular, bazı ESG alt bileşenlerinin finansal raporlama kalitesi üzerinde sınırlı da olsa anlamlı etkiler yarattığını ortaya koymuştur. Bununla birlikte, 2019–2021 döneminde sürdürülebilirlik

raporlaması yapan firmaların, raporlama yapmayan firmalara kıyasla istatistiksel olarak anlamlı bir biçimde daha yüksek finansal raporlama kalitesi sergilediği tespit edilmiştir. Ancak bu fark, 2022 yılı itibarıyla anlamlılığını yitirmiştir.

Almanya örneklemine ilişkin analizlerde ise, Modifiye Edilmiş Jones Modeli (FRK1) ve Performans Eşlemeli Modifiye Edilmiş Jones Modeli (FRK2) kapsamında hesaplanan finansal raporlama kalitesi ile yönetim skoru, CSR (Corporate Social Responsibility score) strateji skoru ve emisyon ticaretine katılım değişkenleri arasında negatif ve istatistiksel olarak anlamlı ilişkiler tespit edilmiştir. Buna karşılık, her iki model kapsamında hesaplanan finansal raporlama kalitesi ile kurumsal yönetim skoru arasında pozitif ve istatistiksel olarak anlamlı bir ilişki saptanmıştır. Elde edilen bulgular, ilgili değişkenlerin işletmelerin finansal raporlama uygulamalarının kalitesini anlamlı ölçüde etkilediğini göstermektedir.

Çalışmanın bulguları, sürdürülebilirlik raporlamasının finansal raporlama kalitesiyle ilişkisini yalnızca kurumsal bağlamların değil, aynı zamanda yasal düzenlemeler ve yatırımcı beklentileri gibi dışsal faktörlerin de etkilediğini göstermektedir. Bu sonuç, politika yapıcılar ve düzenleyici kurumlar açısından sürdürülebilirlik açıklamalarının içeriğini güçlendirmeye yönelik stratejilerin gerekliliğini ortaya koymakta, ayrıca karşılaştırmalı analizlere dayanan uluslararası literatüre anlamlı bir katkı sunmaktadır.

Anahtar Kelimeler: Alman Borsası, Borsa İstanbul, ESG Skorları, Sürdürülebilirlik Raporlaması Bilgi Açıklamaları, Finansal Raporlama Kalitesi.

ABSTRACT

THE RELATIONSHIP BETWEEN FINANCIAL REPORTING QUALITY AND SUSTAINABILITY REPORTING DISCLOSURES: AN APPLICATION ON BORSA ISTANBUL AND GERMAN STOCK EXCHANGE COMPANIES

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July 2025, 262 pages

This thesis empirically examines the relationship between financial reporting quality (FRQ) and sustainability reporting disclosures based on the samples of Turkey and Germany. The study covers data from 75 Turkish companies listed on Borsa Istanbul (BIST) and 140 companies listed on German Stock Exchange (GSE) for the period 2019–2022.

All financial and environmental, social and governance (ESG) data employed in this study were sourced from the Refinitiv database, a subsidiary of the London Stock Exchange Group (LSEG). The empirical analysis utilised a range of statistical techniques, including panel data regression analyses, independent samples t-test, and cross-sectional dependence tests. The measurement of financial reporting quality (FRQ) was grounded in earnings management (EM) proxies, specifically the Modified Jones Model and the Performance-Matched Modified Jones Model.

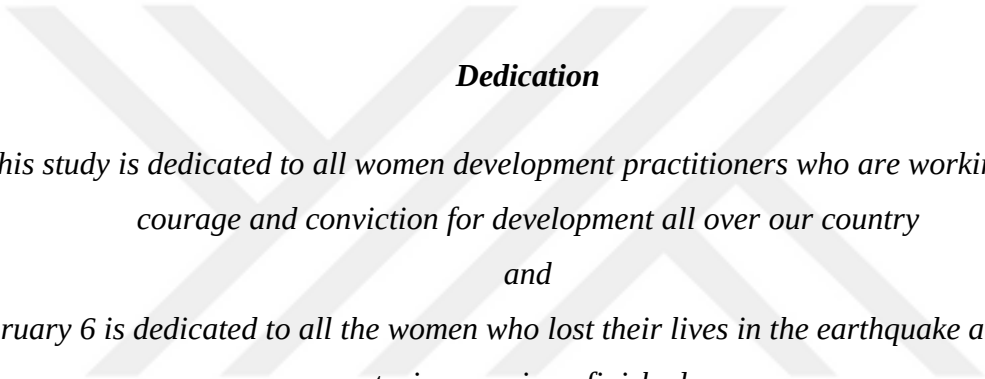
In the analyses conducted for the Turkish sample, no statistically significant relationship was identified between overall ESG scores and financial reporting quality. However, the management score variable exhibited a positive and statistically significant association with financial reporting quality as measured by both the Modified Jones Model (FRQ1) and the Performance-Matched Modified Jones Model (FRQ2). Furthermore, within the framework of the Modified Jones Model (FRQ1), a negative and statistically significant relationship was observed between financial reporting quality and the emissions score variable. These findings indicate that certain ESG subcomponents, albeit to a limited extent, exert significant effects on

financial reporting quality. Moreover, during the 2019–2021 period, firms engaged in sustainability reporting demonstrated statistically significantly higher financial reporting quality compared to non-reporting firms. However, this difference lost its statistical significance as of 2022.

In the analyses for the German sample, financial reporting quality, as measured by the Modified Jones Model (FRQ1) and the Performance-Matched Modified Jones Model (FRQ2), was found to have negative and statistically significant associations with the management score, CSR (Corporate Social Responsibility score) strategy score and emissions trading participation variables. In contrast, a positive and statistically significant relationship was identified between financial reporting quality, under both models, and the governance score. These findings suggest that the variables in question significantly influence the quality of firms' financial reporting practices.

The findings of this study demonstrate that the relationship between sustainability reporting and financial reporting quality is influenced not only by institutional contexts but also by external factors such as regulatory frameworks and investor expectations. This outcome underscores the necessity, from the perspective of policymakers and regulatory bodies, of developing strategies aimed at enhancing the content of sustainability disclosures. Furthermore, it provides a meaningful contribution to the international literature based on comparative analyses.

Keywords: Borsa Istanbul, ESG Scores, German Stock Exchange, Financial Reporting Quality, Sustainability Reporting Disclosures.



Dedication

*This study is dedicated to all women development practitioners who are working with
courage and conviction for development all over our country
and
February 6 is dedicated to all the women who lost their lives in the earthquake and whose
stories remain unfinished.
The deepest inspiration is born from their presence.*

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my invaluable advisor, Professor Alpaslan YAŞAR, for his knowledge, academic guidance and patience throughout my doctoral studies. I owe him endless thanks for shaping the direction of my scientific journey with his opinions, constructive criticism and guiding attitude, and for making this process meaningful.

My sincere thanks also go to my jury members, Assoc. Prof. Dr. Ahmet Özcan and Assoc. Prof. Dr. Neriman Yalçın, who have a special place in my heart thanks to their supportive and encouraging approach. I always felt their support throughout the thesis process.

Their evaluations and academic approaches have brought different perspectives to my study.

Words cannot express the gratitude I feel towards my dear sister, Assoc. Prof. Dr. Filiz Karadağ Üçdal, who has always been there for me, supporting me emotionally and academically throughout this process. Her presence made me feel that I was never alone on this journey.

I would also like to thank my beloved family, who have always had faith in me, followed my every step with excitement and nurtured all the values that make me who I am. Their support has been the invisible yet solid foundation of this process.

And... I would also like to thank all my friends and loved ones who have touched my life and heart, and who have given me strength through their presence.

Your presence has made this journey meaningful not only academically, but spiritually too.

This thesis is not just my work; it is the product of a collective effort involving the labour, faith and love of the people I have walked the road with.

TABLE OF CONTENTS

CERTIFICATION OF APPROVAL	i
ÖZET	iii
ABSTRACT	v
<i>Dedication</i>	vii
TABLE OF CONTENTS	ix
LIST OF FIGURES	xiii
LIST OF TABLES	xiv
LIST OF ABBREVIATIONS	xv
1. INTRODUCTION	1
1.1. Problem Statement	1
1.2. Purpose and Significance of the Study	2
1.3. Research Questions	4
1.4. Definition of Key Terms	5
1.5. Scope of the Study	6
1.6. Contribution of the Study to the Literature	7
1.7. Limitations of the Study	8
2. THEORETICAL FOUNDATIONS AND LITERATURE REVIEW	10
2.1. Financial Reporting	10
2.1.1. Objectives of Financial Reporting	10
2.1.2. Basic Qualitative Characteristics of Useful Financial Information	13
2.1.2.1. Relevance	14
2.1.2.2. Faithful Presentation	14
2.1.3. Supporting Characteristics of Useful Financial Information	15
2.1.3.1. Comparability	15
2.1.3.2. Verifiability	15
2.1.3.3. Timeliness	16
2.1.3.4. Understandability	16
2.2. Financial Reporting Quality	16
2.3. Measuring Financial Reporting Quality	18
2.3.1. Earnings Quality and Earnings Management	19
2.4. Measurement of Earnings Management and Applied Models	23

2.4.1. Models Based on Total Accruals in Measuring Earnings Management	23
2.4.1.1. Healy Model	26
2.4.1.2. DeAngelo Model	29
2.4.1.3. Jones Model	30
2.4.1.4. Industry Model	35
2.4.1.5. Modified Jones Model	36
2.4.1.6. Cross-Sectional Approach to the Jones and Modified Jones Model	38
2.4.1.7. Performance-Matched Model	39
2.4.1.8. Performance-Matched Approach to the Jones Model	40
2.4.1.9. Performance-Matched Approach to the Modified Jones Model	41
2.4.1.10. Dechow and Dichev Model	42
2.4.1.11. McNichols Model	43
2.4.1.12. Larcker and Richardson Model	44
2.4.1.13. Stubben Model	45
2.4.2. Transaction Based Models for Measuring Earnings Management	46
2.4.2.1. Jackson & Wilcox Model	47
2.4.2.2. Herrmann, Inoue & Thomas Model	49
2.4.2.3. Roychowdhury Model	50
2.4.3. Other Methods for Measuring Earnings Management	55
2.4.3.1. Models Based on Specific Accruals	56
2.4.3.2. Frequency Distribution Approach	57
2.4.3.3. Discretionary Sales Revenue Approach	58
2.5. Sustainability and Reporting Approach	59
2.5.1. Concept of Sustainability	60
2.5.2. Chronological Overview of Sustainable Development Worldwide	64
2.5.3. Chronological Overview of Sustainable Development Türkiye	70
2.5.4. Theories of Sustainability	74
2.5.4.1. Stakeholder Theory	74
2.5.4.2. Legitimacy Theory	75
2.5.4.3. Political Economy Theory	76
2.5.4.4. Institutional Theory	78
2.5.5. Corporate Sustainability	79

2.5.6. Dimensions of Corporate Sustainability	84
2.5.6.1. Economic Sustainability	85
2.5.6.2. Social Sustainability	87
2.5.6.3. Environmental Sustainability	88
2.5.7. Measuring Corporate Sustainability: ESG Scores and Refinitiv Rating System	90
2.5.8. Sustainability Reporting and Development	94
2.5.8.1. Chronology of Global Regulatory Developments in Sustainability Reporting	102
2.5.8.2. Chronology of Regulatory Developments in Türkiye on Sustainability Reporting	110
2.5.9. Sustainability Reporting Frameworks	119
2.5.10. GRI and Reporting Frameworks	122
2.5.10.1. G3 and G3.1 Reporting Frameworks	124
2.5.10.2. G4 Reporting Framework	126
2.5.10.3. GRI Standards Series	128
2.5.11. Integrated Reporting	131
2.6. Previous Research on the Relationship between Financial Reporting Quality and Sustainability Reporting	134
2.6.1. International Research	135
2.6.2. Studies in Türkiye	146
3. RESEARCH METHODS	158
3.1. Research Question and Hypotheses	158
3.2. Research Method and Model	159
3.3. Data Set and Sample Selection	160
3.3.1. Data Collection Process	160
3.3.2. Sample and Selection of Sample Countries	160
3.3.3. Descriptive Statistics of the Sample	166
3.4. Research Variables	169
3.4.1. Dependent Variables	169
3.4.2. Independent Variables	171
3.4.3. Control Variables	172
3.5. Data Analysis	174
3.6. Ethical Considerations	177

4. FINDINGS AND DISCUSSION	178
5. CONCLUSIONS	213
6. RECOMMENDATIONS	217
6.1. Policy and Practice Recommendations	217
6.2. Suggestions for Future Studies	218
REFERENCES	220
CURRICULUM VITAE	



LIST OF FIGURES

Figure 2.1. Sustainable Development Goals	67
Figure 2.2. Foundations of Corporate Sustainability	81
Figure 2.3. Corporate Sustainability and Other Related Concepts.....	84
Figure 2.4. Evolution of Reporting	98
Figure 2.5. EU Corporate Sustainability Standards Directive.....	108
Figure 2.6. G3 Reporting Framework Standard Disclosures Section	125



LIST OF TABLES

Table 2.1. Sustainability Definitions	61
Table 2.2. Environmental, Social and Corporate Governance (ESG) Score Key Dimensions, Categories and Weights.....	91
Table 2.3. Sustainability Reporting Calendar under CSRD	109
Table 2.4. Globally Accepted Sustainability Reporting Frameworks	120
Table 2.5. G4 Indicators and Aspects.....	128
Table 2.6. GRI Standards Series.....	129
Table 2.7. Differences between Sustainability Reporting and Integrated Reporting	133
Table 3.1. Descriptive Statistics for Türkiye Sample.....	166
Table 3.2. Descriptive Statistics for the Germany Sample.....	168
Table 3.3. Independent Variables and Definitions	172
Table 3.4. Control Variables and Definitions.....	173
Table 3.5. Modified Jones Models Estimated for Türkiye Sample	178
Table 3.6. Performance-Matched Modified Jones Models Estimated for Türkiye Sample	178
Table 3.7. Correlation Matrix between Variables for Türkiye Sample	180
Table 3.8. Horizontal Cross-Sectional Dependence Results for Variables in Türkiye Sample	182
Table 3.9. Stationarity Test Results for Variables in Türkiye Sample	182
Table 3.10. Effect Type Selections for Panel Regression Models for Türkiye Sample	183
Table 3.11. Diagnostic Tests for Panel Regression Models for Türkiye Sample.....	184
Table 3.12. Panel Regression Estimation Results for Türkiye Sample	185
Table 3.13. Modified Jones Models Estimated for the German Sample	187
Table 3.14. Performance-Matched Modified Jones Models Estimated for Germany Sample	187
Table 3.15. Correlation Matrix between Variables for Germany Sample	189
Table 3.16. Horizontal Cross-Sectional Dependence Test Results for Variables in Germany Sample.....	192
Table 3.17. Stationarity Analysis of Variables in Germany Sample.....	192
Table 3.18. Effect Type for Panel Regression Models for Germany Sample	193
Table 3.19. Diagnostic Tests for Panel Regression Models for Germany Sample	194
Table 3.20. Panel Regression Models for Germany Sample	195
Table 3.21. Hypothesis Results of Panel Regression Models	197
Table 3.22. Comparison of Financial Reporting Quality between Türkiye and Germany... ..	199
Table 3.23. Modified Jones Models Estimated for the Control Group	200
Table 3.24. Performance-Matched Modified Jones Models Estimated for the Control Group	201
Table 3.25. Comparative Analysis of Financial Reporting Quality Values between the Main Sample and the Control Group.....	203

LIST OF ABBREVIATIONS

AASB	: Australian Accounting Standards Board
AB	: European Union
ASB	: UK Accounting Standards Board
BBDK	: Banking Regulation and Supervision Agency
BIST	: Borsa Istanbul
CBAM	: Carbon Border Adjustment Mechanism
CDP	: Carbon Disclosure Project
CERES	: Coalition for Environmentally Responsible Economies
COP	: Conference of the Parties
CSR	: Corporate Social Responsibility
CSRD	: EU Corporate Sustainability Reporting Directive
ÇSY	: Environmental, Social and Governance
DPT	: State Planning Organization
EC	: European Com
EFRAG	: European Financial Reporting Advisory Group
EM	: Earning Management
ESG	: Environmental, Social and Governance
ESG	: Environmental, Social and Governance
ETS	: Emissions Trading System
FASB	: Financial Accounting Standards Board
FRK	: Financial Reporting Quality
FRK1	: Calculated through the Modified Jones Model
FRK2	: Calculated through the Performance-Matched Modified Jones Model
FRQ	: Financial Reporting Quality
FRQ1	: Calculated through the Modified Jones Model
FRQ2	: Calculated through the Performance-Matched Modified Jones Model
GAPP	: Generally Accepted Accounting Principles
GRI	: Global Reporting Initiative
GSE	: German Stock Exchanges
IASB	: International Accounting Standards Board
IDASEP	: Climate Change Mitigation Strategy and Action Plan

IDUSEP	: Climate Change Adaptation Strategy and Action Plan
IFRS	: International Financial Reporting Standards
IIRC	: International Integrated Reporting Council
ISMMO	: Istanbul Chamber of Certified Public Accountants
ISO	: International Organization for Standardization
KGK	: Public Oversight, Accounting and Auditing Standards Authority
MDGs	: Millennium Development Goals
MoEUCC	: Ministry of Environment, Urbanization and Climate Change
MoT	: Republic of Türkiye Ministry of Trade
NFRD	: Non-Financial Reporting Directive
OECD	: Organization for Economic Cooperation and Development
SASB	: Sustainability Accounting Standards Board
SDGs	: Sustainable Development Goals
SEC	: US Securities and Exchange Commission
SKDM	: Carbon Regulatory Mechanism at the Border
SPK	: Capital Markets Board
TBL	: Responsible Care Approach
TFRS	: Turkish Financial Reporting Standards
TMS	: Turkish Accounting Standards
TÜİK	: Turkish Statistical Institute
UN	: United Nations
UNCTAD	: United Nations Conference on Trade and Development
UNEP	: United Nations Environment Program
UNFCCC	: United Nations Framework Convention on Climate Change
USA	: United States of America
WBCSD	: World Business Council for Sustainable Development

1. INTRODUCTION

This study builds on the theoretical and practical gaps in the literature on the impact of sustainability disclosures on financial reporting quality. This chapter presents the theoretical underpinnings and research context of the study on the relationship between financial reporting quality and sustainability reporting in a systematic manner. First, the problem statement is presented and the purpose, scope and scientific significance of the study are explained. Then, the main research question and key variables are defined, and the contribution of the study to the literature and its limitations are elaborated. This chapter provides not only an introduction but also a holistic framework that brings together the theoretical underpinnings and methodological orientation of the study.

1.1. Problem Statement

Today, businesses are increasingly expected to report transparently not only on their financial performance but also on their environmental and social responsibilities. Although sustainability reporting is widely regarded as a key mechanism for corporate transparency and accountability, its linkage to financial reporting quality remains underexplored in the literature (Clarkson et al. 2008). Nevertheless, studies examining the impact of ESG (Environmental, Social, Governance) disclosures on reporting quality have predominantly relied on aggregate ESG scores (Mio, Fasan & Farneti, 2020). Specifically, studies that assess the effects of environmental subcomponents such as emission scores and participation in emission trading schemes as independent variables influencing financial reporting quality are notably scarce. In this context, there is a need for disaggregated analyses that examine the impact of environmental performance on financial transparency.

In Türkiye, sustainability reporting has become mandatory in 2024 for companies meeting specific thresholds and criteria. This necessitated a reassessment of the previous periods when voluntary disclosures were dominant. However, the effects of this transition process on firms' financial reporting behaviour have not yet been sufficiently examined. Furthermore, the uncertainty triggered by the COVID-19 pandemic has heightened stakeholder trust in demand for both financial and non-financial disclosures of businesses has increased; in this context, a period in which the value of information for investors and stakeholders has been questioned has emerged (Leuz & Wysocki, 2016).

On the other hand, cross-country and comparative studies on the relationship between ESG disclosures and financial reporting quality are extremely limited. However, the information value and impact of ESG disclosures may vary in countries with different institutional structures, regulatory frameworks and market dynamics (Hummel & Schlick, 2016; Velte, 2022). In this context, comparing Germany, which has a developed economy and a well-established regulatory system, with the developing Turkish economy is important to fill this gap in the literature.

In this framework, this study aims to make an original contribution to the gap in the existing literature by comparatively analysing the impact of environmental sub-components (emission score and emission trading status) and regulatory transitions on financial reporting quality through the samples of Türkiye and Germany.

1.2. Purpose and Significance of the Study

Today, the reliability and transparency of financial reporting is of critical importance not only for investors but also for all stakeholders with social, environmental and governance responsibilities. Especially since the early 2000s, factors such as large-scale economic crises and financial instability, increased harmonization efforts in accounting standards, and the expansion of regulatory practices have led to a serious debate on the accuracy and quality of the information provided to the public through financial statements. These developments have led to an intensive focus on the concept of FRQ in literature and practice (Dechow, 2002). On the other hand, stakeholders' increasing demand for information is not limited to financial data, sustainability disclosures covering environmental, social and governance (ESG) areas have also gained importance. Therefore, businesses have entered a stage where it is essential to evaluate not only their financial performance but also their social and environmental impacts (Mio, Fasan & Farneti, 2020).

Today, sustainability reporting has gone beyond the traditional corporate social responsibility (CSR) approach and has become one of the main indicators of firms' long-term value creation capacity. With this transformation, the nature of ESG disclosures and the extent to which these disclosures overlap with financial reporting has emerged as a new research area (Hanh & Kühnen, 2013).

This study aims to examine the relationship between financial reporting quality and information disclosures in sustainability reports in a sample of firms listed on BIST and GSE. Although there are strong theoretical links between these two concepts in the literature, empirical studies, especially in developing countries, are limited. On the other hand, the variables representing sustainability performance in the existing studies in the literature are mostly limited to ESG scores at the basic level; especially the evaluation of the environmental dimension at the sub-division level is not sufficiently included. However, the use of indicators that allow for a more detailed and quantitative assessment of environmental performance allows for a more comprehensive analysis of the content of sustainability disclosures and a more accurate measurement of the impact of these variables on financial reporting quality.

In this perspective, the statistical modelling of the study includes not only core indicators such as ESG Score, Environmental Score, Social Score and Corporate Governance Score, but also more specific environmental and governance indicators such as Management Score, CSR Strategy Score, Emission Score and Emission Trading. Therefore, the inclusion of these indicators, which represent different dimensions of sustainability, as independent variables in the analysis model increases both the scope and analytical depth of the study, and in this respect, the study makes a meaningful contribution to the literature.

In the measurement of financial reporting quality, two earnings management-based models, which are widely used in the literature and are considered highly reliable, were used: Modified Jones Model (FRQ1) (Dechow, Sloan & Sweeney, 1995) and Performance-Matched Modified Jones Model (FRQ2) (Kothari, Leone & Wasley, 2005). These models are used to evaluate firms' earnings management practices through discretionary accruals.

Another unique aspect of the study is its comparative analysis structure. The selection of the Türkiye-Germany sample was driven not only by data availability but also by the economic and regulatory relations between the two countries. Germany is one of Türkiye's top export destinations and sustainability-based trade rules such as the European Union's carbon regulation at the border are expected to have an increasing impact on Turkish firms in the near future (Turkish Statistical Institute [TÜİK], 2024). In this context, as emphasized in KPMG's Sustainability Reporting Survey for 2022, sustainability reporting in Germany has been institutionalized and moved to the level of obligation. In Türkiye, the situation is different; the level of reporting may vary on a company basis and does not exhibit a systematic structure.

In order to clarify these differences, a control group consisting of companies listed on the BIST that do not make sustainability reporting was also formed in the study. Thus, the differences in financial reporting quality between firms with and without ESG disclosures can also be observed.

Another factor that increases the importance of the study is that the study period includes an exceptional global process such as the COVID-19 pandemic. While the pandemic caused major fluctuations in firms' activities, it also increased stakeholders' demand for information and transparency expectations from firms (Albitar et al., 2021). In this process, there has been a noticeable increase in regulations especially for sustainability reporting, and firms have turned to ensure their legitimacy through both financial and non-financial information. From this perspective, the study analyses the dynamics between ESG disclosures and financial reporting quality during the pandemic period and reveals the impact of this process on financial reporting (Albitar et al., 2021)

Thanks to the multiple modelling approach used in the study, the direction and strength of the relationship between firms' earnings management behaviours and ESG performance are evaluated from different perspectives. In this context, the study not only contributes to the academic literature, but also can guide investors' decision-making processes, regulatory authorities' policy development efforts, and firms' corporate strategies.

This study aims to empirically investigate whether there is a significant and systematic relationship between disclosure of information on sustainability reporting and financial reporting quality.

1.3. Research Questions

Within the framework of the problem statement, the main question of the research is determined as **"Is there a significant and systematic relationship between information disclosures in firms' sustainability reports and financial reporting quality?"**. In line with this main question, the following sub-research questions were formulated in order to deepen the scope of the research and guide the analysis process:

1. Is there a significant relationship between FRQ1 and ESG score?
2. Is there a significant relationship between FRQ2 and ESG score?
3. Is there a significant relationship between FRQ1 and environmental score?
4. Is there a significant relationship between FRQ2 and environmental score?
5. Is there a significant relationship between FRQ1 and social score?
6. Is there a significant relationship between FRQ2 and social score?
7. Is there a significant relationship between FRQ1 and governance score?
8. Is there a significant relationship between FRQ2 and governance score?
9. Is there a significant relationship between FRQ1 and management score?
10. Is there a significant relationship between FRQ2 and management score?
11. Is there a significant relationship between FRQ1 and CSR Strategy score?
12. Is there a significant relationship between FRQ2 and CSR Strategy score?
13. Is there a significant relationship between FRQ1 and emission score?
14. Is there a significant relationship between FQK2 and emission score?
15. Is there a significant relationship between FRQ1 and emissions trading?
16. Is there a significant relationship between FRQ2 and emissions trading?

1.4. Definition of Key Terms

Financial Reporting Quality: Financial reporting quality is the high level of qualitative characteristics such as accuracy, reliability, objectivity and timeliness of the information contained in the financial statements of enterprises (Dechow & Dichev, 2002). Quality reporting reduces information asymmetry for investors and other stakeholders, thereby enabling resource allocation.

Sustainability Reporting: Sustainability reporting is defined as the transparent public disclosure of the environmental, social and governance activities of businesses (Global Reporting Initiative [GRI], 2021). Sustainability reports function as a means of measuring the long-term strategic sustainability and social impact of the business.

ESG Scores (Environmental, Social and Governance Performance): ESG scores are rating indicators that measure firms' performance in environmental, social and governance areas and are derived from various subcomponents (Friede, Busch & Bassen, 2015). In this study, eight sub-components (ESG Score, Environmental Score, Social Score, Corporate Governance

Score, Management Score, CSR Strategy Score, Emission Score, Participation in Emission Trading) obtained from the Refinitiv ESG dataset are used as the basis of the ESG scores. was used.

1.5. Scope of the Study

This thesis investigates the relationship between sustainability disclosures and financial reporting quality, focusing on publicly listed firms in Türkiye and Germany. The analysis encompasses companies listed on the main indices of Borsa Istanbul and German Stock Exchange.

The study evaluates sustainability-reporting data from a total of 180 firms for the 2019–2022 period, including 40 firms from Türkiye and 140 from Germany. Separate analyses were conducted for each country, and the results were interpreted comparatively. Additionally, a control group of 35 BIST-listed firms in Türkiye that do not engage in sustainability reporting was included. For this group, only financial reporting quality was assessed and compared to that of the firms disclosing sustainability information.

All financial and non-financial data used in the study were sourced from the Refinitiv database of the London Stock Exchange Group (LSEG), accessed through the data infrastructure of Alparslan Türkeş Science and Technology University. Refinitiv is one of the most comprehensive global data providers of ESG metrics. ESG disclosures and financial data were compiled in a panel format, and firms with incomplete records were excluded from the analysis, resulting in a total of 860 firm-year observations.

The selection of the 2019–2022 period reflects a time of significant regulatory transformation and the strengthening of the global sustainability reporting framework. In Germany, the implementation of the EU Corporate Sustainability Reporting Directive (CSRD) led to heightened disclosure requirements and a shift toward transparency and comparability in sustainability reporting (European Commission [EC], 2022). Additionally, the IFRS S1 (General Requirements for Disclosure of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures), issued by the International Sustainability Standards Board (ISSB), shaped corporate preparedness during this period (International Financial

Reporting Standards [IFRS], 2023). Although these standards officially take effect in Türkiye as of 2024, the years between 2019 and 2022 represent the preparatory phase for businesses.

Furthermore, the global impact of the COVID-19 pandemic re-emphasized the importance of transparency in both financial reporting and ESG disclosures. The pandemic spurred companies to report more extensively on sustainability-related risk management and crisis resilience, thereby reinforcing the visibility of the relationship between sustainability disclosures and financial reporting quality (Albitiar et al., 2021).

In line with similar studies, certain industries with unique financial reporting structures were excluded from the sample. These include real estate investment trusts, mutual funds, insurance firms, banks, leasing and factoring companies, venture capital investment trusts, and other financial institutions. These sectors were omitted due to their distinct balance sheet compositions primarily cash and financial instruments and non-comparable accounting practices. In addition, holding companies were excluded owing to structural complexities arising from intra-group transactions and consolidated financial statements.

1.6. Contribution of the Study to the Literature

This study is one of the few empirical studies in this field by comparatively analysing the relationship between financial reporting quality and sustainability disclosures for Türkiye and Germany. Unlike analyses in the literature, which commonly use only core ESG scores, this study includes sub-indicators that include environmental and governance dimensions of sustainability.

This study differs from previous studies by using more specific environmental and governance indicators such as Management Score, CSR Strategy Score, Emissions Score and Emissions Trading. Therefore, the inclusion of these indicators, which represent different dimensions of sustainability, as independent variables in the analysis model increases both the scope and the analytical depth of the study; in this respect, the study makes a significant contribution to the literature. Moreover, the comparative structure of the study allows us to assess the effects of different regulatory and institutional frameworks in Türkiye and Germany on the relationship between financial reporting quality and sustainability disclosures. In addition, through a control

group of firms that do not publish sustainability reports, the reflection of reporting level on financial reporting quality is analysed with a holistic approach.

The fact that the research period includes an exceptional global process such as the COVID-19 pandemic has allowed us to analyse the effects of ESG disclosures on financial reporting in the context of crisis conditions, a dimension that is rarely addressed in the literature.

This study contributes empirically and methodologically to the existing literature by focusing on the systematic impact of sustainability disclosures on financial reporting. In addition, the findings of the study are expected to contribute not only to academic knowledge but also to shaping corporate reporting strategies of companies and guiding sustainability policies of regulatory authorities.

1.7. Limitations of the Study

This study examines the relationship between sustainability disclosures and financial reporting quality over the period 2019-2022 for Germany and Türkiye. However, there are some limitations in terms of research design, data sources and methods applied. These limitations should be carefully considered in terms of the generalizability and interpretability of the findings.

In this framework, the study has various limitations depending on both the sample structure and the methods used. Below, the main limitations affecting the scope of the study are presented in detail: First, the main sample of the study (Türkiye, Germany) is limited to only those firms that report on sustainability and for which complete data (ESG, financial) are available. In this context, firms that do not provide data suitable for the measurement of ESG scores, emission data and financial reporting quality are excluded from the analysis. In addition, firms that differ significantly from other sectors in terms of their accounting structures and fields of activity are also excluded. Accordingly, real estate investment trusts, investment trusts, banks, insurance companies, leasing firms, venture capital investment trusts, securities firms, factoring institutions, other financial institutions and holdings due to their complex intra-group structure are excluded from the sample. This exclusion was made to ensure data integrity in cross-sector comparisons and to maintain methodological consistency in the measurement of financial reporting quality. However, this prevents the sample from being representative of all sectors

and necessitates the evaluation of the findings within a generalization framework limited only to the sectors included in the scope.

Second, the ESG scores used in the study are obtained from the Refinitiv (LSEG) database. Although these scores provide a quantitative assessment of firms' disclosures on sustainability activities, they focus on the presence of disclosures rather than their content. This means that sustainability performance is measured only through disclosed policies and practices, which may be insufficient to reflect the actual environmental and social impacts of firms. Therefore, the potential for disclosure-based scores to create information asymmetries is an important consideration when interpreting the results of the analysis.

Third, the Modified Jones Model (FRQ1) and the Performance-Matched Modified Jones Model (FRQ2), which are used to measure financial reporting quality, indirectly measure accounting-based earnings management behaviours through accruals. Although these models are widely accepted in the literature, they cannot fully control for factors such as firm-specific accounting policies, regulatory differences across countries, and variation in reporting standards. Therefore, a certain margin of caution should be observed when interpreting the calculated FRQ.

Fourth, the firm-level control variables used in the study are limited to key indicators such as return on assets (ROA), firm size, financial leverage, audit tenure and duality in the management structure. However, institutional differences between Türkiye and Germany, country-specific environmental regulation levels, legal framework or macroeconomic factors affecting sustainability reporting are not included in the model. This may cause cross-country comparative analyses to have limited explanatory power.

Considering all these limitations, the findings of the study provide results that cover specific sectors and time periods, do not ignore the institutional context, but should be interpreted with caution due to their representativeness. Future studies may strengthen the findings by using longer-term data, increasing the diversity of sectors and including content analyses focusing on disclosure quality.

2. THEORETICAL FOUNDATIONS AND LITERATURE REVIEW

2.1. Financial Reporting

Financial reporting is a systematic information production process that aims to present the financial position, operating results and cash flows of enterprises to internal and external stakeholders in an accurate, transparent and consistent manner. This process enables the analysis of the current performance of the enterprise through financial statements and serves as a basic instrument for making strategic decisions for the future (Bushman & Smith, 2001). Financial reporting also requires the disclosure of additional information in the notes to the financial statements.

The quality of financial reporting is directly related to the accuracy, transparency and consistency of this process (Schipper, 2003). High quality financial reporting provides a reliable basis for decision-making processes by enabling information users to assess the economic reality of the business in a sound manner. Therefore, monitoring and objectively measuring financial reporting quality is critical, especially for investors, creditors, regulators and other stakeholders (Bushman & Smith, 2001).

In this section of the thesis, the theoretical framework of financial reporting, financial reporting quality and measurement of financial reporting quality will be discussed. First, the general structure and function of financial reporting will be discussed and the role of this process in the decision-making mechanisms of enterprises will be analysed from a theoretical perspective. Subsequently, the concepts of financial reporting quality will be explained in detail and the importance of this concept in the literature will be emphasized. At the end of the chapter, the methods used in the measurement of financial reporting quality will be presented in chronological order and the main features, application areas and limitations of each model will be evaluated. In this framework, theoretical and practical approaches to the objective measurement of financial reporting quality will be systematically analysed.

2.1.1. Objectives of Financial Reporting

With the globalization process, the deepening of international capital markets and the acceleration of capital movements have led to the strategic importance of mergers and

acquisitions on a global scale. These developments have caused investor decisions to become more complex and multidimensional; accordingly, the need for financial reporting has increased and the accuracy and reliability of the information presented in financial statements have become a determining factor for investors.

Financial reporting is a process that systematically communicates information on the financial structure, financial performance and cash flows of entities to all stakeholder groups and information users. Financial reports play a guiding role in resource allocation for enterprises by forming a fundamental basis for decision-making processes for information users and investors (Bushman & Smith, 2001; Healy & Palepu, 2001). It also makes it possible for businesses to be categorized by information users and investors based on their financial performance. In addition, it contributes to market efficiency by reducing information asymmetries and conflicts of interest that may arise among information users, regulators, investors and other stakeholders (Diamond & Verrecchia, 1991). In this framework, the financial reporting process, which reports the financial transactions of enterprises within the scope of their commercial activities, is a vital resource for the financial system and market actors.

Within the scope of the Generally Accepted Accounting Principles (GAPP), a complete set of financial statements consists of balance sheet, income statement, cost of sales statement, fund flow statement, statement of changes in equity, cash flow statement and profit distribution statement (Istanbul Chamber of Certified Public Accountants [ISMMO], 1992). The basic financial statements are the income statement and balance sheet. Other statements are additional financial statements. In the Presentation of Financial Statements (TMS1) standard within the scope of International Financial Accounting Standards (IFRS) published in order to ensure uniformity of practice in financial reporting in the international arena and to enable comparability, a complete set of financial statements;

- (a) Statement of financial position at the end of the period,
- (b) Statement of profit or loss and other comprehensive income for the period,
- (c) Statement of changes in equity for the period,
- (d) Cash flow statement for the period,

- (e) Notes containing significant accounting policies and other explanatory information (Public Oversight Authority [KGK], 2017).

The modern accounting literature on the objectives of financial reporting has shown a significant development with the "Decision Usefulness" theory introduced in the 1950s. This theory argued that financial statements aim to provide quality information about businesses, enabling stakeholders to make more informed decisions (Zeff, 2013). In the 1960s, a broader conceptualization of the function and objectives of financial reporting began, which laid the foundation for the current understanding of financial reporting. In Türkiye, the purpose of financial statements, according to the General Communiqué on Accounting System Practices;

- Provide information about resources, assets, changes in resources and assets and the results of business activities,
- Provide decision-making information for lenders, investors and other information users,
- To provide information useful in assessing future cash flows (Revenue Administration [GİB], 1992).

In the Presentation of Financial Statements standard (TMS1), financial statements, which are the main source of financial reporting, are defined as *"a formalized presentation of an entity's financial position and financial performance"*. The objective of financial statements is *"to provide information about an entity's financial position, financial performance and cash flows to a wide range of users that will be useful when making economic decisions"* (KGK, 2017). To achieve this objective, financial statements provide information on the following:

- a)** Assets
- b)** Obligations
- c)** Equity,
- d)** Income and expenses, including gains and losses,
- e)** Contributions made by the partners in their capacity as partners and distributions made to the partners and
- f)** Cash flows.

In the conceptual framework published within the scope of TFRS, the purpose of financial reporting is defined as *"to provide current and potential investors, lenders and other creditors with financial information about the reporting entity that will be useful when making decisions about providing resources to that entity"* (KGK, 2018). The decisions specified within the scope of the objective are as follows:

- (a) Purchase, sale or holding of equity instruments and debt instruments,
- (b) Provision or payment of loans and the like or
- (c) The exercise by management of rights such as voting or otherwise influencing the activities of the entity that affect the use of its economic resources.

In the Conceptual Framework, which is complementary to TFRS, it is stated that in order for financial reporting to fulfil its purpose, the information presented should be useful financial information and should have basic qualitative characteristics in order to fulfil this condition. The key qualitative characteristics are relevance and fair presentation. In this framework, the usefulness of the financial information presented in this framework is possible only if it is presented in accordance with the need and in accordance with the truth. Presenting an event that does not meet the need in a fair manner or presenting an event that meets the need in an untrue manner is far from being the right basis for information users to make decisions. In the Conceptual Framework, the supporting qualitative characteristics of financial information that is intended to be presented in accordance with the need and in accordance with the truth are defined as comparable, verifiable, timely presentation and understandability (KGK, 2018).

In the context of the Conceptual Framework perspective, useful financial information should have basic and supporting qualitative characteristics. Detailed explanations on the basic and supporting qualitative characteristics of financial information are provided below.

2.1.2. Basic Qualitative Characteristics of Useful Financial Information

Relevance and fair presentation are defined as the main qualitative characteristics that useful financial information should have.

2.1.2.1. Relevance

Financial information that has the potential to make a difference in the decisions of information users is considered to be tailor-made information. Even if the information users do not benefit from the financial information or obtain the information from other sources, the information may have the potential to make a difference in the decision taken. The power of financial information to make a difference is related to whether it has either confirmation value or predictive value, or both.

The predictive value of financial information refers to the ability of information users to use financial information as an input for predicting future results. Confirmatory value refers to the ability of information to provide feedback on prior assessments. There is a reciprocal relationship between the predictive value and the confirmatory value of financial information. Information that has confirmation value generally also has predictive value. For example, the amount of net sales for the current accounting year can be used as a basis for estimating the amount of net sales to be realized in future periods, as well as for comparing the net sales projections made in previous periods. In order for financial information to be relevant, it should be meaningful and effective for decision makers. At this point, the materiality level of the information is also a determining factor. Materiality is defined as the ability of a financial information to affect the decisions of information users if it is provided incorrectly or not provided at all. Therefore, if financial information affects the decisions of information users, it is material (KGK, 2018).

2.1.2.2. Faithful Presentation

Financial information can only be useful for information users if it covers the financial and economic events of the financial year reported and presents the substance of these events in a fair and accurate manner. In general, the legal form and economic substance of events are the same. However, there may be situations where they differ. In cases where they differ, the principle of fair presentation is of utmost importance. Fair presentation is a presentation that is objective, complete and accurate. Impartial presentation means that financial information is not presented in a way that misleads users of the information or directs them to a particular conclusion. In other words, it is the objective presentation of information. In unbiased presentation, financial information has the possibility to be evaluated rationally by the primary users. In this framework, unbiased presentation eliminates manipulation. Full disclosure is

disclosure that includes the essence of financial and economic events and all explanatory information and definitions necessary for information users to evaluate these events accurately and completely. Error-free presentation refers to the absence of errors and omissions in the process of identifying economic and financial events, as well as the correct selection and application of the methods used in the reporting process (KGK, 2018).

Impartiality is supported by acting prudently. In general, prudence is defined as acting cautiously in decisions to be taken in uncertain situations. It is a reflection of the concept of prudence that entities should not overstate their income and assets or understate their expenses and liabilities in financial reporting. Accurate presentation means the absence of errors or omissions in the presentation of events of a financial nature, as well as the error-free selection and application of the method and process in obtaining the reported financial information. Based on these definitions, it would be appropriate to conclude that error-free presentation does not mean perfect accuracy in every respect.

2.1.3. Supporting Characteristics of Useful Financial Information

Comparability, verifiability, timeliness and understandability are the supporting qualitative characteristics of useful financial information.

2.1.3.1. Comparability

Comparability is a supporting feature that enables information users to make meaningful comparisons between items in financial reports and to assess periodic or inter-entity similarities and differences. Comparability differs from other supporting features in that it is not limited to a single account item. For this feature to be possible, the existence of at least two items is mandatory. Comparability of financial information depends on the presentation of similar items in a similar manner and different items in a distinguishable manner. Achieving a certain level of comparability is only possible if the basic qualitative characteristics are present (KGK, 2018).

2.1.3.2. Verifiability

Verifiability ensures that events of a financial nature that the reported financial information is intended to disclose are presented fairly. In other words, it means that independent observers agree that the disclosed information is presented fairly. Verifiability can be achieved either

directly or indirectly. In direct verification, a financial event is verified by a physical action. An example of direct verification is the verification of the inventories item in the financial statements by physically counting them. Indirect verification verifies the outputs by checking and recalculating the inputs used in a formula, a method or a model. An example of indirect verification is the recalculation of the carrying amount of inventories in the financial statements (KGK, 2018).

2.1.3.3. *Timeliness*

Timely presentation refers to the presentation of financial information at a time when it is likely to influence the decisions of the primary users. In general, as time passes, the usefulness of information to users diminishes. However, in some cases, information that largely determines the trends of users remains relevant and useful long after the end of the reporting period (KGK, 2018).

2.1.3.4. *Understandability*

Understandability refers to the classification and identification of financial information presented in a clear and substantive manner. Some economic events that are required to be presented are complex in nature and are not easily understood. It is a requirement of the quality of understandability that complex and complex financial events are presented in their simplest form in accordance with their essence (KGK, 2018).

2.2. Financial Reporting Quality

The word quality originates from the Latin word "qualis", which means "what the content consists of". In its simplest form, quality is used as a measure of quality and is concerned with the extent to which the products and services produced can meet the current or future needs and expectations of their beneficiaries. The International Organization for Standardization (ISO) defines quality as "the sum of attributes based on the ability to meet identified or potential needs". In this framework, the conformity of a service or product to predetermined standards determines the quality level of that product/service. Therefore, quality not only increases the level of adoption of the products and services produced by enterprises by the society, but also enables them to gain competitive advantage in the market (ISO, 2015).

In the context of financial reporting, quality is directly related to the extent to which the information presented in financial reports accurately reflects the current status of the entity. More broadly, FRQ is assessed in terms of how accurately the reported financial information reflects the financial performance of the entity and how useful this information is to information users in forecasting future cash flows (Robinson & Henry, 2009). The general acceptance of FRQ is that financial reports should provide complete, accurate, unbiased presentation of the general economic situation and performance of the enterprises, as well as verifiable and predictive information. Enterprises that report within this framework are considered to have high FRQ (Gaynor et al., 2016).

The main determinant of FRQ in terms of regulatory practices is the value of accounting reporting. According to the Financial Accounting Standards Board (FASB), the International Accounting Standards Board (IASB), the UK Accounting Standards Board (ASB) and the Australian Accounting Standards Board (AASB), FRQ *"represents financial statements that provide fair and accurate information about an entity's fundamental financial position and economic performance"* (Herath & Albarqi, 2017). According to the IASB, the basic principle of assessing FRQ is related to the relevant and fair presentation of the information disclosed in a company's financial reports. These qualitative characteristics not only facilitate the assessment of the usefulness of financial reports, but also allow for a high level of quality. Therefore, the IASB's emphasis on FRQ is on having transparent financial reports (Gajevszky, 2015).

FRQ is evaluated in the literature within the framework of two main approaches. The first approach is based on a perspective that focuses on financial reporting serving the needs of information users. According to this approach, the main determinant of FRQ is the degree to which reports are useful for users (Jonas & Blanchet, 2000). On the other hand, the second approach adopts a perspective that realizes financial reporting with the aim of protecting investors and shareholders. In this framework, FRQ is measured based on the provision of "complete, unbiased and accurate" information for investors and shareholders. In this approach, quality financial reports are considered to be transparent, complete and accurate financial statements that do not create uncertainty for shareholders and investors (Talebnia & Salehi, 2011). There is a fundamental difference between these two approaches to FRQ. In the first approach, which prioritizes the needs of information users, it is accepted that the qualitative

characteristics of financial information make FRQ. The second approach prioritizes the needs of corporate governance. This approach is based on transparent and complete financial reporting, meeting the needs of investors and shareholders, and protecting their interests at a higher level. Therefore, reporting that prioritizes and protects shareholder and investor interests is considered to be of high quality (Jonas & Blanchet, 2000).

In recent years, factors such as frequent economic crises and financial instability, increased harmonization efforts in accounting standards, and the expansion of regulatory practices have caused financial reporting processes to become a more important focus. The increase in accounting scandals around the world, especially in the early 21st century, has caused the arrows to be directed towards weaknesses in FRQ.

2.3. Measuring Financial Reporting Quality

Financial reporting quality has three dimensions, namely "predictive and confirmatory", "objectivity and accuracy" and "completeness", and is based on the qualitative characteristics of useful financial information specified in the Conceptual Framework. Many approaches to measuring these three dimensions have been developed by researchers in the literature; however, there is no universally accepted criterion for assessing FRQ. Each approach developed for the measurement of FRQ has focused on different characteristics of useful financial information defined in the Conceptual Framework (Önce & Çavuş, 2019). The approaches developed to assess the quality of financial reports are outlined below.

- **Approach Focusing on Qualitative Characteristics of Financial Information:** In this approach, if the reported financial information has the basic and supporting qualitative characteristics in the Conceptual Framework, it is accepted that the reporting is of high quality (Beest et al. 2009).
- **External Indicators Based Approach:** This approach evaluates issues such as errors in financial reporting, misstatements of earnings, internal control weaknesses, fraud and the level of voluntary disclosure as the main criteria of FRQ. Accordingly, the quality of financial reporting increases as the level of negative issues decreases.
- **Earnings Quality Approach:** This approach focuses on the determinant role of reported earnings in FRQ. Accordingly, high earnings quality directly implies high

FRQ. There is no commonly accepted standard definition of earnings quality in the literature, nor is there a single, generally accepted method for measuring it. Each of the measures that assess FRQ through earnings quality focuses on a different aspect of the reporting process (Francis et al., 2006; Gaynor et al., 2016; Beest et al., 2009). In this framework, methods for measuring earnings quality fall into two main categories: accounting-based and market-based approaches. Accounting-based methods aim to analyse the reliability of earnings through elements such as earnings management, accrual quality, continuity, stability and predictability. In contrast, market-based methods are based on measures such as value relevance, earnings reaction coefficient, conservatism and timely loss reporting.

In this thesis, earnings management, which is an important element of earnings quality, is taken into account in the assessment of FRQ. In this context, the concept of earnings management and the methods and models used to measure this concept are analysed in detail under the relevant sub-headings.

2.3.1. Earnings Quality and Earnings Management

Earnings quality is generally associated with the extent to which disclosed earnings are useful to information users in their decision-making processes. In this context, high earnings quality is related to the extent to which earnings accurately reflect the current state and economic performance of the entity. At the same time, high earnings quality is considered as an indicator that can help predict future business performance and is used as an important criterion in determining the market value of the enterprise. Therefore, the accuracy, reliability and predictive power of earnings reported in financial reports are key components of earnings quality (Francis et al., 2006; Gaynor et al., 2016).

For information users and investors, obtaining high quality financial information is a primary demand. The demand for high quality financial information corresponds to the efficiency criterion of high quality earnings in the capital market (Herath & Albarqi, 2017). The determinants of FRQ include earnings quality and earnings management, which are directly related to each other. Earnings management aims to keep profits at a certain level, while earnings quality evaluates the reliability of these strategies. The literature on earnings

management and earnings quality is dominated by results that suggest that highly managed earnings are associated with low earnings quality (Lo, 2008). In terms of regulatory practices, earnings quality generally refers to reporting in accordance with the legal regulations in force. "Earnings Management", one of the earnings quality measurement methods, constitutes one of the accounting-based measurement methods (Yaşar, 2011).

Francis et al. (2006) positioned FRQ as a special case for information quality and defined "Earnings Quality" as a summary indicator of FRQ.

Although earnings quality often framed in terms of the extent to which earnings are managed has been widely studied in the academic literature, there is no universally accepted definition. Nevertheless, various expressions are used in the literature to describe practices commonly recognized as earnings management. These include the following:

- a) Accounting fraud,
- b) Financial statement management,
- c) Financial statement manipulation,
- d) Income smoothing,
- e) Restructuring the income statement,
- f) Aggressive accounting,
- g) Numbers game
- h) Falsifying accounting records,
- i) Creative accounting,
- j) Opportunistic accounting,
- k) The magic power of accounting,
- l) Balance sheet window dressing,
- m) Pulling forward future income,
- n) Differing earnings recognition,
- o) Accounting wizardry.

Earnings management, which is generally defined as operations that involve activities that make the current situation appear different from what it really is in order to influence the future decisions of businesses, information users and especially investors, has become more important

especially with the accounting scandals in large-scale companies such as Tyco, Enron, Parmalat, WorldCom and Xerox.

In the accounting literature, the concept of earnings management has generally been evaluated from two main perspectives. The first perspective considers earnings management as a practice that takes advantage of the flexibilities offered by generally accepted accounting principles and policies and remains within the legal framework. In this approach, managers' discretion over accounting practices allows a certain level of managerial direction in financial reporting. On the other hand, the second perspective defines earnings management as the process of manipulating financial information in a way that does not reflect economic reality, which is carried out in a manner inconsistent with accounting standards and regulations. Both approaches point out that earnings management has a direct impact on the ethical foundations and credibility of financial reporting. Earnings management is defined in the literature as the process of shaping financial results in a way that can affect the future cash flows of the enterprise by taking advantage of the flexibility of choice within the scope of accounting principles. It is not possible to reach a common definition of the concept of earnings management in the literature; different researchers have brought various definitions and classifications to this concept in line with their own perspectives (Yaşar, 2011). Some examples of these definitions in the literature are given below.

According to Shipper (1989), earnings management is "*a deliberate intervention in the external financial reporting process with the intent to achieve some private gain*" (Schipper, 1989). In the context of this definition, earnings management includes actions taken by rearranging the timing of investment and financial decisions in order to make disclosed profits or components of profits look different.

Healy and Wahlen (1999) defined earnings management as "*when financial reports are altered by managers' decisions, both in the financial reporting process and in the formulation of transactions, in order to mislead some shareholders about the economic performance of the company or to influence contractual outcomes based on disclosed earnings*" (Healy & Wahlen, 1999). Healy and Wahlen's (1999) definition of earnings management emphasizes two critical dimensions. The first one is that managers have the opportunity to shape financial information by using their discretion in the financial reporting process. For example, managers can shape

accounting transactions by making forecasts based on uncertainties about future economic conditions, such as the economic lives of fixed assets, bad debt amounts and scrap values. The second dimension involves earnings management practices that aim to mislead shareholders by misrepresenting the economic performance of the firm (Healy & Wahlen, 1999).

Beneish, on the other hand, defined it as *"an opportunistic approach that asserts that businesses plan their profit policies according to the expectations of financial statement users and market participants"* (Beneish, 1999).

Mulford and Comiskey (2005) defined it as *"the effective manipulation of profits toward a predetermined goal. This target may be a limit set by management, a forecast made by analysts, or an amount related to a sustainable level of profit. Generally, earnings management entails taking measures to retain and reduce profits in years of good financial health in order to use them in years of poor financial health. This more limited form of earnings management is known as income smoothing"* (Mulford & Comiskey, 2005).

The Securities and Exchange Commission (SEC), one of the regulatory agencies, defines earnings management from an abuse-based perspective. According to the SEC, abusive earnings management is the use of accounting tricks and manipulative practices to achieve desired results (SEC, 1999). Former SEC Chairman A. Levitt defined the concept of earnings management from this perspective: *"Flexibility in accounting standards allows the business world to keep pace with innovations. Abuses such as earnings management occur when these flexibilities are abused. The trick is used to hide the true financial volatility. This conceals the true economic consequences of management's decisions."*

Dechow and Skinner's definition is *"the intentional and deliberate misstatement, understatement, or non-disclosure of material facts or accounting data that would cause users of financial statements to change their judgments and opinions"* (Dechow & Skinner, 2000).

Investors consider profitability indicators as a fundamental evaluation element in their decision-making processes regarding enterprises. Accordingly, profit amounts stand out as one of the primary criteria that shape investment preferences. Therefore, earnings management activities carried out by enterprises reduce the quality of financial reporting and lead to the inclusion of

elements that do not reflect the truth in financial reports. This situation, which brings along inefficient resource management, puts information users who make decisions based on financial reports that do not reflect the real situation of enterprises in a riskier position (Francis et al., 2004).

2.4. Measurement of Earnings Management and Applied Models

Financial reporting aims to present the economic activities of enterprises in a transparent and accurate manner to all stakeholders. However, the flexibility of managers to make decisions within the framework of accounting principles and policies in the preparation of financial statements allows them to manipulate the financial performance of enterprises in line with a specific target. This situation is defined as earnings management in the literature and has been intensively discussed especially due to its effects on the quality of financial reporting of enterprises. Earnings management refers to accounting practices that are carried out in order to keep the earnings of the business at a certain level or to direct them to a certain target (Francis et al, 2004). The negative effects of these practices on the objectivity and reliability of financial reporting may lead to misleading information users and reducing market efficiency.

Measurement of earnings management is critical for the decision-making processes of information users of financial reports and for understanding their impact on businesses. With this perspective, different methods have been developed in the literature for the determination of earnings management and are generally classified into two main groups: accrual-based and transaction-based models.

Both models are discussed in detail below and then other alternative approaches to the determination of earnings management are examined. All approaches in the literature provide an important framework for understanding the behaviour of business managers in the financial reporting process and for measuring the effects of earnings management.

2.4.1. Models Based on Total Accruals in Measuring Earnings Management

As stated in the Conceptual Framework, financial statements, which are presented to the public to disclose information about the results of operations and financial performance of entities, are prepared on the accrual basis of accounting. The accrual basis of accounting requires economic transactions and events to be recognized in the financial statements in the period in which they

occur, regardless of the date on which the related cash inflows or outflows occur. Accordingly, such transactions are recognized in the period in which they occur and reported in the financial statements of that period. Therefore, this situation allows operating earnings to be separated from cash flows and to be manipulated more easily (Ball et.al., 2016). Accrual-based models have an important role in analysing FRQ, especially in detecting discretionary accruals. These models are used to measure managers' tendency to manipulate the results in financial statements and to analyse deviations in reporting (Sweeney, 1994; Watts & Zimmerman, 1986).

Studies in the literature have adopted two main approaches to the calculation of total accruals: the balance sheet-based approach and the cash flow statement-based approach. Studies that adopt the balance sheet approach use the following formula to calculate total accruals.

Total Accruals = [(Change in Current Assets - Change in Cash and Cash Equivalents) - (Change in Short-Term Debt - Change in Principal Instalments and Interest on Long-Term Loans - Provision for Taxes and Other Legal Liabilities Payable)] - Depreciation and Amortization Expenses.

Under the cash flow statement approach, total accruals are generally calculated as follows (Dechow et al., 1995).

Total Accruals = Operating Profit - Cash Flow from Operating Activities.

Hribar and Collins (2002) compared balance sheet-based and cash flow statement-based approaches to calculate total accruals. The findings of the study revealed that the cash flow statement approach provides more accurate and reliable results in the calculation of accruals. In contrast, the use of the balance sheet approach resulted in significant errors and deviations in the calculation of accruals. These results suggest that the cash flow statement approach is a more appropriate choice for accurately measuring the quality of financial reporting and for conducting sound financial analysis (Hribar & Collins, 2002).

Since the mid-1980s, academic research has predominantly used models based on total accruals to measure earnings management practices. The main premise of these models is that the accrual-based accounting system offers more accounting flexibility compared to cash flows and allows for easier management of profits through this flexibility.

Dechow and Skinner (2000) argue that business managers have to make various strategic decisions when determining the timing and amount of accrual of revenues and expenses in an accrual-based accounting system. It is emphasized that this situation, combined with different business objectives and conditions, inevitably triggers earnings management practices. In other words, the main reason for earnings management is the flexibility provided to managers by the accrual-based accounting system and the manipulability of profit through accounting policies. Therefore, in order to produce accurate results, academic studies have prioritized total accruals in the detection and measurement of earnings management. From this perspective, Healy (1985) was the first researcher to measure earnings management based on total accruals. In the studies conducted after Healy (1985), total accruals are divided into discretionary accruals and non-discretionary accruals.

$$TA_{it}=DA_{it}+NDA_{it}$$

TA_{it} : Total accruals of enterprise i at time t

DA_{it} : Discretionary accruals of enterprise i at time t

NDA_{it} : Non-discretionary accruals of enterprise i at time t

Total accruals do not directly reflect earnings management directly, but rather the difference between the entity's unrealized income and expense items in the reporting period. When total accruals are negative, this indicates that the entity's unrealized expenses are greater than its unrealized revenues, while when they are positive, it means that unrealized revenues are in excess. Discretionary accruals are the main determinant of earnings management.

Discretionary accruals are accounting practices that are not required by accounting regulations, standards and principles, but are the result of management's discretionary choices over accounting policies. Through such accruals, management can intervene in the financial reporting process and affect periodic profitability in line with its own objectives (Healy & Wahlen, 1999). Examples of discretionary accruals are financial statement items such as bad debts, allowances for doubtful receivables, provisions for doubtful accounts, and gains/losses on asset sales. These items are among the areas where managers can realize earnings management practices by using accounting flexibility.

Non-discretionary (mandatory) accruals arise as a result of transactions that arise from the ordinary activities of the enterprises and that must be recognized in accordance with generally

accepted accounting principles and standards. These accruals, unlike discretionary accruals, occur outside the discretion of the management and therefore cannot be used for earnings management or financial manipulation (Healy, 1985).

In the literature, various empirical models have been developed to measure accrual-based earnings management by decomposing total accruals and estimating discretionary accruals. Although none of these models claim to measure accrual-based earnings management completely and accurately, each of them has been developed by taking into account the criticisms of previous models. These models and their methodological features are discussed in detail below.

2.4.1.1. Healy Model

Healy (1985) developed the first analytical model to identify earnings management through discretionary accruals in what is considered to be a landmark study in the literature on the measurement of earnings management. This model has made a significant contribution to the literature by providing a basis for the measurement and analysis of earnings management behaviours.

Healy (1985) analysed data from 94 firms for the period 1930-1980 to show that bonus-based incentive systems allow managers to use accounting policies to consciously increase or decrease profits. He argued that managers tend to use discretionary accruals as a tool in their earnings management practices throughout their tenure. He also argued that due to the existence of various control mechanisms such as independent audits, banks, audit committees, etc., managers have limited opportunities to use positive discretionary accruals to continuously increase profits or negative discretionary accruals to continuously decrease profits.

According to Healy, the specific rules of accounting and control mechanisms cause managers to limit their earnings management strategies to certain periods. For example, managers who prefer positive discretionary accruals in one period to show high profits may have to resort to negative discretionary accruals in the following period due to the offsetting effect of these transactions. In this framework, the study argues that the sum of discretionary accruals realized by managers during their tenure will theoretically approach zero or reach equilibrium. This inference argues that the nature of earnings management does not allow one-way manipulation

in a sustainable manner and that managers have to act within the limits of accounting policies and control mechanisms.

Unlike other models in the literature, Healy's model assumes the systematic existence of discretionary accruals in every period. This approach is based on the assumption that managers will resort to earnings management in every period they are in office. Therefore, if the manager did not use discretionary accruals during his/her tenure, it follows that the average of the total accruals realized in the fiscal periods that include his/her tenure will be equal to the non-discretionary accrual amount of each year. This model provides a theoretical framework for analysing managers' behaviour with respect to earnings management.

In the Healy model, earnings management measurement consists of a three-stage process. In the first stage (Stage 1), the total accruals of the firm for the period corresponding to each year of the managers' tenure are calculated using the balance sheet approach. In this process, total values are obtained on an annual basis by taking into account the accruals included in the financial reports of the entity. In the second stage (Stage 2), the total accruals for each year during the manager's tenure are averaged and this average represents the non-discretionary accruals for the observation year. This stage is carried out to identify systematic elements of accruals that occur independently of management. In the last stage (Stage 3), the size of discretionary accruals is calculated by subtracting non-discretionary accruals from total accruals in the observation year. In addition, each parameter is compared to the total assets of the enterprise in the previous period in order to make healthy comparisons between enterprises and to eliminate numerical differences arising from scale differences. This method allows for a comparable analysis of earnings management practices across different enterprises (Healy, 1985).

$$\begin{aligned}
 \text{Phase 1} \quad \frac{TA_{it}}{A_{it-1}} &= \frac{(\Delta CA_{it} - \Delta CASH_{it}) - (\Delta CL_{it} - \Delta CMLD_{it} - \Delta TP_{it}) - DEP_{it}}{A_{it-1}} \\
 \text{Phase 2} \quad \frac{NDA_{it}}{A_{it-1}} &= 1/n \sum_{t=2}^n \frac{TA_{it}}{A_{it-1}} \\
 \text{Phase 3} \quad \frac{DA_{it}}{A_{it-1}} &= \frac{TA_{it}}{A_{it-1}} - \frac{NDA_{it}}{A_{it-1}}
 \end{aligned}$$

A_{it-1} : Total assets of enterprise i at time t-1

TA_{it} : Total accruals of enterprise i at time t

NDA_{it} : Non-discretionary accruals of enterprise i at time t

n : Number of years

DA_{it} : Discretionary accruals of enterprise i at time t

Total accruals (TA) consist of two main components: discretionary accruals (DA) and non-discretionary accruals (NDA). The difference obtained by subtracting the average non-discretionary accrual amount from the total accrual amount calculated for the year under review constitutes discretionary accruals. If the difference obtained at the end of the calculations is negative, it is concluded that the entity has resorted to discretionary accruals in a way to decrease profit in the relevant period; if the difference is positive, it is concluded that the management has accrual-based practices to increase profit.

One of the main limitations of the Healy model is that non-discretionary accruals are assumed to be a constant value for each year. Non-discretionary accruals, on the other hand, generally consist of legal obligations and transactions arising from the economic activities of the enterprise, which occur outside the initiative of the management. However, such accruals may vary significantly between periods depending on the economic conditions in which the entity operates and changes in the legal regulations to which it is subject. This may cause the average non-discretionary accruals, which are calculated by indexing total accruals to the total assets of the previous period, to not fully correspond to the actual financial position of the entity. Therefore, the discretionary accrual amounts calculated based on the Healy model may not accurately reflect the existence of earnings management, which may lead to misleading results.

An important limitation of the model is that it is based on the assumption that managers practice earnings management every year. However, auditing processes and legal regulations prevent earnings management practices from being repeated in the same way every period. Nevertheless, the model assumes that discretionary accruals will level out over time and that positive and negative accruals will be the same across years. According to this assumption, a period in which managers create positive accruals through earnings management will be followed by a period of negative accruals of the same magnitude. However, in reality, managers do not prefer earnings management practices every year. Therefore, the model cannot fully reflect the actual decision-making processes and management practices of enterprises and has limited explanatory power (Healy & Wahlen, 1999).

2.4.1.2. DeAngelo Model

DeAngelo conducted a study on 64 companies listed on the New York Stock Exchange and the American Stock Exchange during the period 1973-1982. DeAngelo's study focused on the 'Management-Buyout' process, examining whether business managers practice earnings management in order to acquire stocks at a price below the market price. According to DeAngelo's hypothesis, managers in publicly listed firms may deliberately reduce their book value by using earnings management strategies to acquire the shares of existing shareholders at a relatively low price. In the study, total accruals are divided into two categories: discretionary accruals and non-discretionary accruals (Ocak,2013).

According to DeAngelo (1986), although there is no direct indication of the existence of a regular earnings management practice, non-discretionary accruals tend to be negative in many businesses due to the impact of recurring and non-discretionary accounting items such as depreciation. Such items have a significant weight in the financial statements and play a decisive role in total accruals. Healy's (1985) study is a good example for this situation. The total accruals of the enterprises whose data were analysed in the study were predominantly negative.

DeAngelo argued that if there is no earnings management in an enterprise, the non-discretionary accruals in that enterprise are equal to the total accruals of the previous period. Based on this assumption, DeAngelo equates the total accruals in the period before the managers' takeover with the non-discretionary accruals in the period of the takeover. If there is a difference between discretionary accruals and total accruals between the two periods, this difference is considered to be an indicator of earnings management practices. Moreover, similar to Healy's approach, in order to eliminate numerical differences, each component is expressed as a ratio to the total assets of the previous period (DeAngelo, 1986).

In the first step (Stage 1) of DeAngelo's model, total annual accruals are calculated over the tenure of the managers using a cash flow-based approach. In the second step, the mandatory accruals of the year in which the shares are acquired, i.e. the review period, are matched with the total accruals of the previous period in which the manager did not acquire the shares. This matching is based on the assumption that earnings management was not practiced during the period in which the shares were acquired. Finally, in the third stage, discretionary accruals for

the year are calculated by subtracting mandatory accruals from total accruals for the observation year.

$$\text{Phase 1} \quad \frac{TA_{it}}{A_{it-1}} = \frac{EBED_{it} - CFO_{it}}{A_{it-1}}$$

$$\text{Phase 2} \quad \frac{NDA_{it}}{A_{it-1}} = \frac{TA_{it-1}}{A_{it-1}}$$

$$\text{Phase 3} \quad \frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \frac{NDA_{it}}{A_{it-1}}$$

According to the DeAngelo model, the current period's non-discretionary accruals are considered equivalent to the total accruals of the previous period. Discretionary accruals are calculated based on the difference between the current period's total accruals and non-discretionary accruals.

DeAngelo's model is basically a specification of the model developed by Healy. However, the distinguishing feature of this model is that the estimate of non-discretionary accruals is limited to the prior period. DeAngelo's model assumes that non-discretionary accruals will remain constant and will not be affected by the economic conditions in which the entity operates.

Another limitation of the DeAngelo model is that, similar to the Healy model, it is based on the assumption that non-discretionary accruals will not vary regardless of the economic conditions of the entity. However, changes in the economic environment in which the entity operates may lead to changes in non-discretionary accruals. This may lead to potential errors in the determination of discretionary accruals, which is an indicator of accrual-based earnings management (DeAngelo, 1986).

2.4.1.3. Jones Model

In his study, Jones (1991) examined the enterprises that were subjected to investigations by the US International Trade Commission regarding import incentives and investigated whether these enterprises deliberately understated their profits during the investigation process. The study analysed whether the uncertainty of whether trade policy measures, such as reduced quotas, increased tariffs, and exemptions from anti-dumping duties and countervailing duties, would

be sustained led businesses to engage in earnings management. From this perspective, the Jones model makes an important contribution to understanding how firms may manipulate their financial reporting in response to exogenous regulations (Jones, 1991).

Jones (1991) argues that business managers may manipulate accounting data within the framework of import support regulations in order to benefit from import support elements such as tariff advantages and quotas. Therefore, Jones argued that managers will tend to resort to earnings management techniques in order to increase the magnitude of the advantages they obtain. In this case, it is argued that firms may resort to strategies of understating their profits in order to benefit from import subsidies.

Jones analysed the financial statements of a total of 23 enterprises from footwear, copper, stainless steel, carbon steel and automobile sectors that were subject to import subsidy investigations between 1980 and 1985. In 1980, 4 of these enterprises, operating in the automobile sector, applied to the US International Trade Commission for exemption from safeguard measures, but their applications were rejected. On the other hand, in 1982, 5 enterprises operating in the carbon steel sector applied to the same commission for exemption from anti-dumping duties and countervailing duties and their applications were accepted. In 1983, two enterprises in the stainless steel sector applied for exemption from safeguard measures and both applications were approved. In 1984, four enterprises in the copper sector similarly applied for exemption from safeguard measures and all of their applications were granted. In the footwear sector, eight enterprises each applied for exemption from safeguard measures in 1984 and 1985. In 1984, no exemption was granted to the enterprises that applied, while the applications made in 1985 were approved. By examining these enterprises, Jones aimed to analyse whether the enterprises were engaged in earnings management before the safeguard measures were provided. While evaluating earnings management, he divided total accruals into two groups as discretionary accruals and non-discretionary accruals, following the approach of previous models.

1. **Discretionary Accruals (DA):** It refers to accruals that are created by managers' interventions to the extent permitted by accounting standards when reporting the financial performance of enterprises. These accruals include transactions that do not arise from the actual economic activities of the entity, but rather involve the use

of accounting policies or estimates by managers to change profits or other financial indicators (Jones, 1991). Although discretionary accruals provide managers with flexibility in financial reporting, their overuse increases the risk of financial statement manipulation. Therefore, the disaggregation and control of accruals is critical for a more accurate assessment of business performance (Healy, 1985; Jones, 1991; Dechow, Sloan & Sweeney, 1995).

2. **Non-Discretionary Accruals (NDA):** It consists of accruals that are not subject to the intervention of managers arising from natural economic activities and accounting standards in the financial reporting process of an enterprise (Jones, 1991). These accruals are directly affected by the underlying activities of the firm and arise in the process of recognizing income or expenses in a given period.

The limitation of the Healy and DeAngelo models is that they are based on the assumption that non-discretionary accruals will always remain constant during the periods when managers are involved in the management of the firm. These models are built on the assumption that changes in total accruals are caused only by discretionary accruals. However, Jones builds on this assumption by arguing that the economic conditions in which an entity operates (for example, changes in the size of the entity, changes in the duration of the operating cycle) can affect non-discretionary accruals. Following the calculation of total accruals, the Jones model follows a two-stage process: the first stage is the estimation of accruals and the second stage is the determination of accruals.

1. Estimation Phase

Under normal circumstances, total accruals consist only of mandatory (non-discretionary) accruals when there is no change in the economic conditions of the entity, when there are no differences in legal regulations, and when managers do not use discretionary accruals for earnings management purposes. In this case, total accruals for the current period are equal to the non-discretionary accruals calculated as indexed to the total assets of the previous period.

$$\frac{TA_{it}}{A_{it-1}} = \frac{NDA_{it}}{A_{it-1}}$$

However, non-discretionary accruals change depending on the economic situation of the business. Jones developed a regression model to determine how and in which direction the change will occur. Explanations regarding this model are given below.

$$\frac{TA_{it}}{A_{it-1}} - \frac{NDA_{it}}{A_{it-1}} = \alpha_i \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \beta_{2i} \left(\frac{PPE_{it}}{A_{it-1}} \right) + \epsilon_{it}$$

Where;

ΔREV_{it} : the change in revenue of firm i in period t ($REV_t - REV_{t-1}$)

PPE_{it} : gross tangible fixed asset value of the firm in period t

$\alpha_{0i}, \alpha_{1i}, \alpha_{2i}$: denote the parameters of the firm.

ϵ_{it} : Error term

Jones assumed that if managers do not use discretionary accruals for earnings management purposes, total accruals will be equal to non-discretionary accruals. Since Jones stated that changes in the economic structure of the firm may affect non-discretionary accruals, he argued that total accruals can be related to factors such as changes in sales, asset size, and tangible fixed assets, which are indicators of economic conditions. In line with this assumption, he conducted a regression analysis based on time series using the least squares method to determine total accruals.

The change in economic conditions is considered in the context of business growth or downsizing. To put it more clearly; the growth or shrinkage of the scale of the enterprise causes a parallel increase or decrease in the asset and resource structure. Therefore, such changes cause total accruals, which are assumed to be equal to non-discretionary accruals, to increase or decrease compared to previous periods. For example, an increase in the amount of fixed assets of an enterprise compared to the previous year will lead to an increase in depreciation expenses, while the sale of a fixed asset of the enterprise will lead to a decrease in depreciation expenses compared to the previous year.

In the regression model, the beta coefficient of the change in sales determines the magnitude and direction of the increase or decrease in sales on total accruals, which are assumed to be equal to non-discretionary accruals. Similarly, the beta coefficient of the change in property,

plant and equipment indicates the magnitude and direction of the effect of the change in total property, plant and equipment on total accruals, which are assumed to be equal to non-discretionary accruals. In order to determine these beta coefficients, Jones performed regression analysis using the least squares method based on time series. This analysis aims to reveal the effect of periodic changes in the economic conditions of the enterprise on total accruals, which are considered equal to non-discretionary accruals. In this context, the relevant beta coefficients were calculated by using the changes in sales and tangible fixed asset totals in the past periods of the enterprise to determine the changes and trends that may occur in total accruals considered equal to non-discretionary accruals. The coefficients were used in the next stage, the identification stage.

2. Determination Phase

The coefficients α , β_1 and β_2 determined at the estimation stage are used to calculate the level at which total accruals are assumed to consist only of mandatory (non-discretionary) accruals by placing them in the equation below. These coefficients are determined by taking into account the economic conditions of the entity and the previous period data, and allow for a more realistic and accurate estimation of the accrual level.

$$\frac{T\hat{A}_{ip}}{A_{ip-1}} - \frac{ND\hat{A}_{ip}}{A_{ip-1}} = \hat{\alpha}_i \left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right)$$

$T\hat{A}_{ip}=ND\hat{A}_{ip}$: Determined amount of total accruals assumed to be equal to non-discretionary accruals.

At the determination stage, the difference between the actual total accruals and the total accruals obtained by using the coefficients α , β_1 , β_2 calculated at the estimation stage and assumed to be equal to non-discretionary accruals represents the level of discretionary accruals as an indicator measuring the entity's accrual-based earnings management practices.

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \frac{T\hat{A}_{ip}}{A_{ip-1}} \text{ or } \frac{ND\hat{A}_{ip}}{A_{ip-1}} \text{ that is}$$

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \left[\alpha_i \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \beta_{2i} \left(\frac{PPE_{it}}{A_{it-1}} \right) \right]$$

What is actually done is to determine the total accruals, assuming that profits are not managed based on historical data, which are assumed to be equal to the non-discretionary accruals, and calculate the difference between this amount and the actual total accruals. This difference determines the amount of profit managed as an indicator of earnings management. If this difference is zero, it will be concluded that discretionary accruals do not occur.

2.4.1.4. Industry Model

Similar to Jones (1991), the industry model relaxes the assumption that non-discretionary accruals are constant in all periods and that changes in total accruals are driven by discretionary accruals. However, instead of directly addressing the determinants of non-discretionary accruals, this model assumes that firms in the same industry experience changes in these determinants in a similar way. Under this approach, non-discretionary accruals are calculated using the following model assuming a common dynamic at the sectoral level (Dechow et al., 1995).

$$NDA_t = \gamma_1 + \gamma_2 \text{ mediant}(TA_t/A_{t-1})$$

Since NDA_t is not directly observable in this model, it is calculated indirectly using total accruals (TA_t) based on the Healy (1995) model. This calculation takes into account the median value of the ratio of accruals to total assets (TA_t/A_{t-1}). Here, the median (TA_t/A_{t-1}) represents the median of total accruals adjusted by total assets of firms in the same sector other than the sample firms in the analysis. The firm-specific parameters γ_1 and γ_2 in the model represent the coefficients obtained using the least squares method over the observations of the estimation period.

The ability of the industry model to reduce the margin of error in measuring discretionary accruals is questioned by two main criticisms. First, the model only takes into account changes in non-discretionary accruals that are common across firms in the same industry. However, if these changes are mainly driven by firm-specific conditions, the industry model may fail to produce reliable indicators of discretionary accruals. Second, the model tends to capture similar discretionary accrual trends across firms operating in the same industry. This may lead to misleading results in the identification of earnings management practices. The severity of this problem depends on the extent to which earnings management motivations are common across sectors (Dechow et al., 1995).

2.4.1.5. Modified Jones Model

In the specification phase of the Jones model, sales are treated as a component of non-discretionary accruals. This approach is based on the assumption that sales are not subject to manipulation and are therefore objectively reported. However, in practice, entities may recognize revenue before the sales are realized, i.e. before the risk and reward are transferred to the counterparty, or defer revenue recognition even if the sales are realized. This allows for the manipulation of reported profit, which in turn makes it possible to manage profit upwards or downwards. Earnings management, especially when performed on sales revenue, can lead to deviations in the total accruals and their components that are related to the non-discretionary accruals made by the Jones Model in the determination phase. These deviations may cause errors in the magnitudes calculated with the effect of earnings management and may adversely affect the accuracy and reliability of the model. In this context, sales manipulation poses an important problem in detecting the effect of earnings management on accruals. Dechow, Sloan and Sweeney developed the Modified Jones Model by taking into account the potential limitations of the Jones Model. This model basically consists of two main stages similar to the Jones Model. These are the estimation stage and the determination stage. However, the Modified Jones Model aims to model manipulations on sales and other income items more reliably by making certain adaptations in order to detect profit manipulation more accurately. While the estimation stage parallels the methodology applied in the Jones Model, innovations in the identification stage allow for more precise detection of financial reporting manipulations (Dechow et al., 1995).

1. Estimation Phase

Under the assumption that earnings management does not exist, total accruals are assumed to be equal to non-discretionary accruals. This assumption allows for the identification of changes in non-discretionary accruals compared to the previous period due to factors such as business growth. Accordingly, the relationship between total accruals and non-discretionary accruals is subjected to regression analysis using the least squares method together with variables such as change in sales and total tangible fixed assets. This methodological approach aims to improve the accuracy of the parameters required to calculate changes in non-discretionary accruals.

$$\frac{TA_{it}}{A_{it-1}} = \frac{NDA_{it}}{A_{it-1}} = \alpha_i \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \beta_{2i} \left(\frac{PPE_{it}}{A_{it-1}} \right) + \epsilon_{it}$$

The coefficients α , β_1 and β_2 obtained as a result of the regression analysis explain the direction and magnitude of changes in total accruals depending on factors such as the growth or downsizing process of the enterprise and changes in internal economic conditions. These parameters are then used in the second stage of the model, the identification stage, allowing a more detailed analysis of changes in accruals.

2. Determination Phase

The parameters α , β_1 and β_2 obtained in the estimation stage are used to determine the level of total accruals, which are assumed to be equal to "non-discretionary accruals" in the equation below. However, in determining total accruals in this way, it should be taken into account that the change in sales revenues also includes credit sales. Since credit sales constitute a more favourable option for earnings management than cash sales, it has been stated that the change in receivables should be subtracted from the change in total sales. Dechow and other researchers assume that all credit sales are used for earnings management. Accordingly, in order to accurately determine the level of non-discretionary accruals estimated by the parameters α , β_1 and β_2 , receivables are excluded from sales.

$$\frac{T\hat{A}_{ip}}{A_{ip-1}} = \frac{ND\hat{A}_{ip}}{A_{ip-1}} = \hat{\alpha}_i \left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip} - \Delta REC_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right) + \epsilon_{ip}$$

ΔREC_{ip} : The change in the receivables of enterprise i at time t compared to the previous period.

Finally, given that total accruals are composed of non-discretionary and discretionary accruals, the amount of discretionary accruals would be the difference between total accruals realized in that period and total accruals assumed to be equal to non-discretionary accruals. This difference represents the determined amount of discretionary accruals.

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \frac{T\hat{A}_{ip}}{A_{ip-1}} \text{ or } \frac{ND\hat{A}_{ip}}{A_{ip-1}}$$

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \hat{\alpha}_i \left[\left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip} - \Delta REC_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right) \right]$$

2.4.1.6. Cross-Sectional Approach to the Jones and Modified Jones Model

The Jones Model and its modified version, the Modified Jones Model, are based on regression analysis using the least squares method based on time series. In the estimation stage of the model, the coefficients α , β_1 and β_2 are estimated to explain the direction and magnitude of an entity's sales change and total tangible fixed assets on total accruals, which are assumed to be equal to non-discretionary accruals. In this process, data on the changes in sales and total tangible fixed assets of the enterprise in previous years are used. In order for the model to yield statistically significant results, at least 10 years of data should be available in the estimation stage and 11 years of data should be available in the identification stage.

M. Defond and J. Jiambalvo suggested that these parameters can be estimated by using regression analysis based on the horizontal cross-sectional least squares method in a sector with at least 6 enterprises instead of the least squares method based on time series. In today's studies, regression analysis based on the cross-sectional least squares method is generally used to estimate the parameters (DeFond & Jiambalvo, 1994).

K. V. Peasnell, P. F. Pope and S. Young argued that regression analysis based on the cross-sectional least squares method would produce more realistic results in estimating discretionary accruals, which are considered as an indicator of accrual-based earnings management (Peasnell, Pope & Young, 2000). In this context, he emphasized that parameter estimation using the least squares method based on time series may be restrictive for practitioners. This is because in order for practitioners to obtain effective parameter estimates, it will probably be necessary to collect data such as changes in sales and total tangible fixed assets for a long period of time such as 15-20 years. Moreover, if variables such as changes in sales and total tangible fixed assets remain constant or change little over the long time period, the estimated parameters will have limited power to accurately predict discretionary accruals as an indicator of earnings management. These views were also expressed in a 1996 paper by K. R. Subramanyam (Subramanyam, 1996).

Parameter estimation by regression analysis based on the cross-sectional least squares method is applied in the same way in both models. In this method, parameters are estimated for each

period using the available accounting data of each enterprise. More precisely, in the regression analysis based on the cross-sectional least squares method, discretionary accruals are estimated on an industry-specific basis. For example, assuming that economic conditions in an industry are favourable, if enterprises tend to flatten profits, the discretionary accruals of enterprises in that industry will generally be negative. In this case, although cross-sectional analysis cannot detect all negative discretionary accruals, earnings management practices will be industry-specific. In other words, according to the industry average, enterprises that prefer negative discretionary accruals are categorized as those that are trying to reduce their profits, while enterprises that prefer positive discretionary accruals are considered as those that are trying to increase their profits.

2.4.1.7. Performance-Matched Model

Kasznik (1999) and Dechow, Sloan and Sweeney (1995) found that there is a positive relationship between discretionary accruals, which is an indicator of accrual-based earnings management, and the financial performance of firms as a result of Jones Model and Modified Jones Model applications. These findings indicate that managers may resort to earnings management practices by increasing discretionary accruals during high performance periods (Dechow et al., 1995; Kasznik, 1999).

Hribar and Collins (2002) also support this approach, emphasizing the necessity of evaluating cash flows and accruals together and arguing that classical models carry the risk of systematic bias in performance-sensitive firms. Teoh, Welch, and Wong (1998) show that prior to initial public offerings, firms resort more to earnings management and manipulate accruals to influence investor perceptions. Moreover, Francis, LaFond, Olsson, and Schipper (2006) analyze the relationship between FRQ and the cost of capital and argue that discretionary accruals are sensitive to firm characteristics and therefore, it is imperative to control for performance variables in the models.

Accordingly, the inclusion of ROA (return on assets ratio) in the estimation model allows us to determine the extent to which total accruals equalized to non-discretionary accruals are affected by factors such as change in sales, total tangible assets and ROA. In this way, non-discretionary accruals that are incorrectly classified as discretionary accruals due to changes in the firm's

performance by the Jones and Modified Jones Models during the identification period can be accurately identified (Ocak, 2013).

In a study published in 2005, Kothari et al. reorganized the Jones and Modified Jones Models by considering the rate of return on assets (ROA). This adjustment was carried out using cross-sectional ordinary least squares (OLS) regression analysis to estimate the parameters by industry. Below, Kothari's modifications to the Jones and Modified Jones Models are discussed in detail (Kothari, Leone & Wasley, 2005).

2.4.1.8. Performance-Matched Approach to the Jones Model

1. Estimation Stage

Assuming that non-discretionary accruals are equal to total accruals under the assumption of no earnings management, Kothari et al. regressed non-discretionary accruals that may arise from changes in economic conditions on the firm's sales change and total tangible fixed assets using the least squares method. In addition to the Jones Model, they also include the previous year's return on assets (ROA) ratio in the regression model. In this way, they aimed to more accurately calculate the impact of extreme changes in the firm's performance on total accruals equated to non-discretionary accruals.

$$\frac{TA_{it}}{A_{it-1}} = \frac{NDA_{it}}{A_{it-1}} = \alpha_i \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \beta_{2i} \left(\frac{PPE_{it}}{A_{it-1}} \right) + \beta_{3i} ROA_{it-1} + \epsilon_{it}$$

2. Determination Phase

In the second stage, Kothari et al. calculated total accruals equalized to non-discretionary accruals, taking into account the parameters obtained in the first stage - change in sales, tangible fixed asset amount and return on assets (ROA), which indicates the performance of the enterprise. The difference between the amount determined by this calculation and the total accruals realized in that period is considered as the discretionary accrual amount, which is considered as an accrual-based earnings management indicator (Dechow et al., 2012).

$$\frac{T\hat{A}_{ip}}{A_{ip-1}} - \frac{N\hat{D}\hat{A}_{ip}}{A_{ip-1}} = \hat{\alpha}_i \left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{3i} ROA_{ip-1}$$

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \frac{T\hat{A}_{ip}}{A_{ip-1}} \text{ or } \frac{ND\hat{A}_{ip}}{A_{ip-1}}$$

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - [\hat{a}_i(\frac{1}{A_{ip-1}}) + \hat{\beta}_{1i}(\frac{\Delta REV_{ip}}{A_{ip-1}}) + \hat{\beta}_{2i}(\frac{PPE_{ip}}{A_{ip-1}}) + \hat{\beta}_{3i} ROA_{ip-1}]$$

2.4.1.9. Performance-Matched Approach to the Modified Jones Model

Combining the Modified Jones Model with a performance-matched approach increases the analytical capacity of the model and makes it possible to obtain more reliable and accurate results. The performance-matched approach allows the model to reduce systematic biases due to sectoral or cyclical effects by taking into account operational performance differences across firms. This method allows for a more accurate and objective assessment in earnings management analysis.

1. Estimation Phase

Compared to the Jones Model, the Performance-Matched Approach in the Modified Jones Model differs from the Jones Model in that Kothari et al. include the active rate of return in the estimation stage. As in the original Modified Jones Model, but taking into account the entity's return on assets compared to the previous year, this model estimates changes in non-discretionary accruals that may arise due to changes in the entity's economic environment and significant variations in its performance. This addition attempts to more accurately model the effects of fluctuations in an entity's performance and the economic environment on total accruals.

$$\frac{TA_{it}}{A_{it-1}} = \frac{NDA_{it}}{A_{it-1}} = a_i(\frac{1}{A_{it-1}}) + \beta_{1i}(\frac{\Delta REV_{it}}{A_{it-1}}) + \beta_{2i}(\frac{PPE_{it}}{A_{it-1}}) + \beta_{3i} ROA_{it-1} + \epsilon_{it}$$

2. Determination Stage

The parameters estimated in the first stage are used in the second stage to determine total accruals equalized to non-discretionary accruals. In this stage, the difference between the estimated total accruals and the actual total accruals determines the amount of discretionary accruals as an indicator of earnings management. Unlike the Performance Matched Jones Model, the identification stage takes into account that credit sales may be an appropriate item for earnings management and therefore the amount remaining after subtracting receivables from sales is included in the regression model.

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \hat{\alpha}_i \left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip} - \Delta REC_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{3i} ROA_{ip-1}$$

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \frac{T\hat{A}_{ip}}{A_{ip-1}} \text{ or } \frac{ND\hat{A}_{ip}}{A_{ip-1}}$$

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \left[\hat{\alpha}_i \left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip} - \Delta REC_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{3i} ROA_{ip-1} \right]$$

2.4.1.10. Dechow and Dichev Model

Dechow and Dichev (2002) aim to analyse more comprehensively the impact of accruals on financial reporting by proposing working capital as a new measure of the quality of accruals in accounting practice. Accruals provide flexibility that can affect the recognition of cash flows over time, thus requiring assumptions and estimates of future cash flows. In this context, Dechow and Dichev develop a model that proposes to measure accrual quality through the change in firm-specific working capital. The change in working capital includes not only cash flows from operations in the past period, but also cash flows from current and future operations. These characteristics of working capital reveal the relationship between accruals and cash flows and ensure their traceability, as accrual generating items tend to be converted into cash flows within one year.

In the model developed by Dechow and Dichev (2002), two main methods stand out in measuring accrual quality. The first method evaluates firm-specific accrual quality based on the standard error of the residuals. In this approach, a high standard error value is taken as an indicator of poor accrual quality. The basic assumption of this model is that accruals are not only an accounting-based analysis, but also an assessment of whether they are consistent with the company's cash flows. In this context, changes in working capital provide a deeper understanding of the quality of accruals and serve as a tool to question the accuracy and reliability of firms' financial reporting processes.

The perspective offered by the Dechow and Dichev (2002) model is not only limited to the accounting data of companies, but also reveals the relationship between the financial position of the company and its cash flows. This model serves as an important tool to increase the transparency of earnings management and accounting practices, especially in order to

accurately monitor and report accruals. This model, which reveals the effects of the dynamic structure of working capital on the quality of accruals, provides an important analytical framework for improving financial reporting accuracy at the firm level (Dechow & Dichev, 2002).

$$\Delta WC_t = \alpha + \beta_1(CFO_{t-1}) + \beta_2(CFO_t) + \beta_3(CFO_{t+1}) + \varepsilon_t$$

ΔWC_t : Working capital change ($WC_t - WC_{t-1}$)

CFO_{t-1} : Cash flow from operating activities in year t-1

CFO_t : Cash flow from operating activities in year t

CFO_{t+1} : Cash flow from operating activities in year t+1

ε_t : Non-cash accruals

This model not only analyzes accruals based on accounting data but also measures their alignment with cash flows. Considering that the volatile nature of working capital has a strategic role in determining accrual quality, this model provides an effective method for businesses to accurately and comprehensively analyze their financial reporting and earnings management processes. Therefore, the model serves as an important tool that evaluates the financial structure of enterprises and the transparency of accounting practices by examining the effects of changes in working capital on accrual quality (Ocak, 2013).

2.4.1.11. McNichols Model

McNichols (2002) conducted a comprehensive study of FRQ and examined the impact of the accuracy of accounting data and earnings forecasts on the decisions of market participants. McNichols (2002) examines how market participants perceive the accuracy of firms' accounting policies and earnings forecasts and the effects of these perceptions on stock prices. In this framework, accurate and reliable financial reporting has a significant impact on the market value of companies.

Within the scope of the study, the model developed by McNichols (2002) evaluates the quality of companies' financial reporting by measuring both the accuracy of past data and the reliability of these data in future forecasts (McNichols, 2002). The model emphasizes that the level of transparency in the financial reports of companies is of great importance for investors and other stakeholders. In the model developed by McNichols (2002), the strategic decisions of

companies, market conditions and regulatory frameworks are also taken into account along with accounting practices in measuring the quality of financial reporting.

The accuracy of companies' financial data and forecasts plays a critical role in investors' decision-making processes. For this reason, McNichols (2002) argued that in order to properly assess the quality of financial reporting, not only the accounting data of companies, but also how these data are presented and how they are perceived by investors should be taken into consideration.

As a result, McNichols (2002) developed a model that assesses the quality of financial reporting and the accuracy of earnings forecasts, enabling companies to more accurately predict market performance. This model contributes to increasing the transparency of companies by enabling investors and other stakeholders to assess their future financial position more reliably.

$$\Delta WC_t = \alpha + \beta_1(CFO_{t-1}) + \beta_2(CFO_t) + \beta_3(CFO_{t+1}) + \Delta Rev_t + PPE_t + \varepsilon_{it}$$

ΔWC_t : change in working capital of the enterprise in period t

This study of McNichols is important in terms of measuring and understanding the relationship between financial reporting and investor behaviour.

2.4.1.12. Larcker and Richardson Model

The Larcker and Richardson model is an important tool for determining the quality of accruals arising from the accounting practices of enterprises with an accrual-based approach. Accrual-based models specifically aim to determine whether an entity's income and expense accruals are consistent with future cash flows.

Larcker and Richardson model aims to measure the effects of accruals on future financial position. While assessing the accuracy of accruals, the model also analyses the potential risks of deviations in accounting policies and the quality of the company's financial reporting. Another important feature of the model is that while evaluating the quality of financial reporting, it also examines the relationship between the market capitalization, investor perception and future performance of the firms.

In their study, Larcker and Richardson examined how accruals and transparency in accounting policies affect the financial performance of enterprises and investors' opinions about the company. The purpose of the model they developed with this perspective was to measure the level of financial transparency of companies by providing investors with the opportunity to make a more accurate assessment. The model allows for a more effective assessment of FRQ by examining the effects of accrual-based accounting practices on financial reports in depth. In addition, Larcker and Richardson conclude that inconsistencies in corporate accounting policies may exacerbate transparency problems in financial statements, which may have negative effects on investor decisions.

Larcker and Richardson model is based on the Modified Jones Model with the inclusion of market-to-book ratio and cash flow from operations variables. The inclusion of these variables in the model increased the explanatory power of the model and enabled a more accurate assessment of FRQ (Larcker & Richardson, 2004).

$$TA = a + \beta_1(\Delta Rev - \Delta Rec) + \beta_2 PPE + \beta_3 BM + \beta_4 CFO + \varepsilon$$

BM: It represents the market capitalization/book value ratio and the other variables are as previously defined.

2.4.1.13. Stubben Model

The Stubben model aims to increase the transparency and reliability of accounting practices by focusing on the identification of abnormal deviations in companies' financial reports. The model, which is based on the analysis of accrual-based accounting items in particular, offers the opportunity to evaluate the real financial performance of companies by revealing the possibilities of manipulation.

The theoretical basis of the model is the analysis of accruals in the income statement of companies (Stubben, 2010). Deviations of accruals beyond expected norms increase the probability of earnings management. Stubben proposed a methodology based on regression analysis to detect these deviations. This methodology requires the use of several financial indicators in the model, such as current asset accounts, beginning-of-period debt balances, and sales revenues. Within the scope of the model, the difference between the level of estimated accruals and the actual level is considered as an indicator of the risk of financial manipulation.

The Stubben model is widely used in earnings management studies by both academic researchers and practitioners. In addition to supporting ethical standards in financial reporting, the model is a critical tool for auditors to assess whether companies' accounting practices are legitimate. Auditors and financial analysts also use the model to limit the accuracy of companies' financial reports and their conformity with market expectations (Stubben, 2010). The model is given mathematically below.

$$\Delta Rec_{it} = \alpha + \beta_1 \Delta Rev_{it} + \varepsilon_{it}$$

ΔRec_{it} : The change in the amount of receivables of firm i in period t

ΔRev_{it} : is the change in the revenue of firm i in period t.

In conclusion, the Stubben model provides an effective academic and practical method for analysing earnings management and accounting manipulation. This model is critical for assessing the adequacy of companies' ability to reflect their true financial position and for ensuring market transparency.

Methods and models for identifying accrual-based earnings management have been widely recognized in the literature. The pioneering work of scholars such as Healy, DeAngelo, Jones, Dechow and Kothari has made significant contributions to earnings management analysis. These models have continued to be developed over time and new approaches have been introduced to the literature. In Türkiye, it can be stated that these models are widely used and accepted in doctoral and master's theses, compliance studies conducted by various institutions and academic articles.

2.4.2. Transaction Based Models for Measuring Earnings Management

Transaction-based earnings management is a technique that allows businesses to manipulate their profits by strategically arranging the timing of accounting transactions. Such transactions are common in everyday life. For example, "special discounts" at supermarkets to dispose of excess stocks, "deep discounts" at gas stations due to the increase in oil prices, or "out of stock" sales by sellers when the prices of tobacco products rise are typical examples of transaction-based earnings management (Herrmann et al., 2003).

Businesses are not only limited to managing their profits on an accrual basis, but also have the opportunity to present their profits in different ways by strategically organizing their accounting transactions. While accrual-based earnings management detection methods attempt to determine what portion of accruals is discretionary, transaction-based earnings management detection methods determine how much of the transactions recorded in the accounting records are artificially manipulated to manage profits (Jackson & Wilcox, 2000).

Accrual-based earnings management techniques attracted more attention, especially in the aftermath of major scandals such as Enron and WorldCom, which led governments and regulators to strictly supervise this process. Following these developments, businesses turned to transaction-based earnings management techniques (Rowchowdhury, 2006). Since the 2000s, various models of how much of the transactions are managed have been developed and these models have started to be accepted in academic circles.

Researchers such as Jackson and Wilcox (2000), Herrmann, Inoue and Thomas (2003) and Rowchowdhury (2006) have developed important theories to identify these different dimensions of earnings management. These models provide an important analysis to understand how businesses manage their profits and how much of accounting transactions are shaped by intervention. Specifically, Jackson and Wilcox (2000) elaborate on the effects of managing transactions on profits, while Herrmann et al. (2003) investigate the long-term effects of transaction-based earnings management.

2.4.2.1. Jackson & Wilcox Model

Jackson and Wilcox (2000) argue that management has several reasons to manage profits to achieve short-term goals without violating generally accepted accounting principles. One of these reasons is to meet stakeholders' expectations regarding sales and profitability. According to Jackson and Wilcox, businesses make large sales discounts in the last quarter of an accounting period to get customers to buy the products and thus aim to meet expectations about profitability and sales (Jackson & Wilcox, 2000). In this context, Jackson and Wilcox (2000), in their study conducted between 1989 and 1997, categorized the businesses in the sample into two groups. The first group consists of enterprises that announce small amounts of profit above zero. These enterprises made large sales discounts in the last quarter of the accounting period in order to overcome the zero figure and to achieve the appearance of a profitable business,

even in low amounts. Another requirement to be included in this group is that the same enterprise must have posted profits above zero for the last three years. The other group consists of enterprises that make sales discounts but do not meet the other requirements.

According to Jackson and Wilcox (2000), when the gross profit on sales of these two groups are compared, it is expected that businesses that disclose small profits above zero through sales discounts will have statistically significantly higher gross profit on sales than businesses in the other group.

$$GPP = \frac{NS - COGS}{NS}$$

GPP: Gross Sales Profit

NS: Net Sales

COGS: Cost of Sales

In the study, it is expected that the difference between the fourth quarter gross sales profit of the sample year and the third quarter gross sales profit and the difference between the fourth quarter gross sales profit and the gross sales profits in the fourth quarter of the previous year will be significantly higher in enterprises that are considered to manage profits through sales discounts. This shows that earnings management strategies are used to increase profits through sales discounts, especially at the end of the period.

$$GPP_A = GPP_{3Q} - GPP_{4Q}$$

$$GPP_B = GPP_{4Y-1} - GPP_{4Y}$$

GPP_A: Difference in gross profit on sales between two quarterly periods in the sample year

GPP_{3Q}: 3rd Quarter gross profitability on sales in the sample year

GPP_{4Q}: 4th Quarter gross profitability on sales in the sample year

GPP_B: Differences in gross profitability on sales for the same quarter between two years

GPP_{(4H-) (1)}: prior year 4th quarter gross sales profitability

GPP_{4Y}: Current year 4th quarter gross profitability on sales

In the analysis that compares gross sales profits with past periods, it is determined that firms that achieve profits at the expected level through sales discounts show statistically significant differences compared to firms that do not exceed this threshold despite similar discounts. Although this model has been referenced in a limited number of studies, it has contributed to the literature.

2.4.2.2. *Herrmann, Inoue & Thomas Model*

Another model developed to examine transaction-based earnings management was proposed by Don Herrmann, Tatsuo Inoue and Wayne B. Thomas. This model provides important findings on how asset sales affect the profitability of businesses. In the sample analysed in this study, 95% of Japanese enterprises realized their asset sales by making a profit. Moreover, 68% of the sample enterprises increased their profits by 5% as a result of asset sales compared to enterprises without asset sales. This finding suggests that businesses utilize asset sales to improve their profitability performance. Herrmann et al. argued that asset sales can be used as a profit enhancement strategy to achieve the expected performance when the current profitability performance of the firm is inconsistent with management's expectations (Herrmann et al., 2003).

In the study, which was conducted with the annual data of three thousand sixty-eight enterprises listed on the Tokyo Stock Exchange for the period 1993-1997, the difference between the profitability of the enterprises in each industry from the sale of assets and the average profitability from the sale of assets of all enterprises operating in that industry was calculated and compared with the current performance of the enterprise. Current performance is defined as the difference between the operating profit of the enterprise in the current period and the past expectations of the management about the operating profit in the current period. All data have been proportioned to total assets at the beginning of the period in order to eliminate size differences.

$$EISA = ISA - ISA_m$$

EISA: Difference between profitability from asset sales and industry average

ISA: Profit on sale of assets

ISA_m : Average profit from the sale of assets in an industry

$$CP = COI - LFCOI$$

CP: Current performance

COI: Current period operating profit

LFCOI: Management's expectation of operating profit for the current period.

The findings of the study revealed that businesses use asset sales as a strategic tool to improve their profitability and that they prefer this method especially during periods of lower profitability expectations. Similarly, previous research on transaction-based earnings management suggests that businesses seek to optimize their profits not only through accounting practices but also through strategic transactions (Healy & Wahlen, 1999). The model proposed by Herrmann, Inoue and Thomas provides important clues on how to integrate transaction-based earnings management practice with financial reporting and asset management strategies.

2.4.2.3. Roychowdhury Model

Roychowdhury (2006) developed a model using three techniques to identify transaction-based earnings management. This model makes an important contribution to understanding the earnings management strategies of businesses. According to Roychowdhury, earnings management of enterprises is possible by changing the timing of sales, by adjusting the timing of research and development, marketing-sales-distribution and general administrative expenses in their operations, or by producing/stockpiling more than demanded. These techniques allow businesses to manipulate their profitability to achieve short-term goals (Roychowdhury, 2006). Roychowdhury examined these methods more closely and created forecasting models for each expense item and then compared these forecasted amounts with the actual amounts and considered the difference as transactions related to earnings management. This approach provides an important methodology for understanding the role and impact of transaction-based earnings management in financial reporting.

According to Roychowdhury, businesses may temporarily increase their sales revenues by applying price discounts while realizing sales related to their operations. In this process, sales revenues will continue until prices return to their previous level. As a result, profitability in the current period will increase with each sale made. Another transaction-based method is to offer credit terms that are acceptable to the purchasers of the goods. For example, low-interest term sales at the end of the period by automobile dealers are an example of this strategy. Both price

discounting and providing favourable credit terms to buyers will lead to abnormally high sales revenues compared to sales under normal sales conditions, while providing the business with low cash flow in the period of the sale.

According to the researcher, businesses can manage their profits through transaction-based methods by adjusting not only sales but also the timing of operating expenses. In particular, operating expenses, such as marketing, selling, distribution, general administrative and research and development expenses, can be deferred or cut over a period of time in order to increase profits. Such an approach allows for a temporary increase in the profitability level of the business (Roychowdhury, 2006).

According to the theories of this model, another method of earnings management is to produce more than the demand. Overproduction allows fixed costs to be allocated to more products, which leads to lower unit costs. Lower unit costs reduce the cost of sales, thereby increasing profitability. However, this may also be interpreted by financial statement users as an increase in operating profitability. On the other hand, factors such as additional production costs due to overproduction and storage costs may not be covered by the revenue generated from sales. As a result, cash flow from operations will be lower compared to production at normal production levels. Moreover, under other constant conditions, each additional production of a product results in an increase in marginal cost, which leads to higher total production costs than sales revenues (Ocak, 2013).

Considering the reverse of all three cases, the profits of the business management will be reduced by manipulating transactions. In this framework, the author bases transaction-based earnings management on three key indicators.

1. Indicator: Discretionary Portion of Cash Flows from Operating Activities

According to Roychowdhury, excessive price discounts or offering attractive credit terms to customers have a negative impact on operating cash flows in the current period. In this context, the researcher tried to estimate the abnormal portion of operating cash flows. As a first step, it analysed how sales and changes in sales affect cash flows from operating activities and the direction of this effect.

1. Phase

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_{i0} \left(\frac{1}{A_{it-1}} \right) + \alpha_{i1} \left(\frac{S_{it}}{A_{it-1}} \right) + \alpha_{i2} \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \epsilon_{it}$$

CFO_{it} : cash flow from operating activities of enterprise i at time t

S_{it} : sales of enterprise i at time t

ΔS_{it} : Change in sales of enterprise i at time t

$\alpha_{(i0)}, \alpha_{(i1)}, \alpha_{(i2)}$: sales and change in sales effect on cash flow from operating activities

A_{it-1} : total assets of the previous period.

The parameters α_{i0} , α_{i1} and α_{i2} , obtained by the cross-sectional least squares method, show the effect and direction of sales and changes in sales on cash flow from operating activities, and these parameters are then used to determine the level of cash flow from operating activities (Stage 2).

2. Phase

$$\frac{\hat{CFO}_{it}}{A_{it-1}} = \hat{\alpha}_{i0} \left(\frac{1}{A_{it-1}} \right) + \hat{\alpha}_{i1} \left(\frac{S_{it}}{A_{it-1}} \right) + \hat{\alpha}_{i2} \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \epsilon_{it}$$

According to Roychowdhury, the difference between actual and projected operating cash flows would represent discretionary operating cash flow.

$$DCFO_{it} = \frac{CFO_{it}}{A_{it-1}} - \frac{\hat{CFO}_{it}}{A_{it-1}}$$

$DCFO_{it}$: Discretionary Operating Cash Flow of Enterprise i at Time t

2. Indicator: Discretionary Portion of Operating Expenses

Operating expenses are expenses incurred in carrying out the principal activities of an enterprise, such as marketing-sales-distribution, research and development, and general and administrative expenses. Sales can be regarded as a function of these expenses, because under normal circumstances, an increase in sales leads to an increase in these expenses. In this

framework, in the first stage (Stage 1), the author tried to estimate the effect of sales on operating expenses and the direction of this effect.

1. Phase

$$\frac{OPEXP_{it}}{A_{it-1}} = a_{i0}\left(\frac{1}{A_{it-1}}\right) + a_{1i}\left(\frac{S_{it}}{A_{it-1}}\right) + \epsilon_{it}$$

OPEXP_{it}: Research and development, marketing-sales-distribution, general administrative expenses of enterprise i at time t.

The parameters α_{i0} and α_{1i} , obtained by the cross-sectional least squares method, are used to determine the effect of sales on operating expenses and the direction of this effect. These parameters were analysed in the second stage (Stage 2) to determine the level of operating expenses.

2. Phase

$$\frac{OPEXP_{it}}{A_{it-1}} = \hat{a}_{i0}\left(\frac{1}{A_{it-1}}\right) + \hat{a}_{1i}\left(\frac{S_{it}}{A_{it-1}}\right)$$

According to the researcher's approach, the difference between actual operating expenses and estimated operating expenses reflects discretionary operating expenses.

$$DOPEXP_{it} = \frac{OPEXP_{it}}{A_{it-1}} - \frac{OPEXP_{it}}{A_{it-1}}$$

DOPEXP_{it}: Discretionary Operating Expenses of Enterprise i at Time t.

3. Indicator: Discretionary Portion of Production Costs

Roychowdhury predicts that production in excess of demand will reduce fixed costs per unit, but will increase the total cost of production due to the marginal cost of each additional product, and formulates the cost of production as follows

1. Phase

$$PRDCT_{it} = COGS_{it} + \Delta INV_{it}$$

PRDCT_{it}: Production cost of enterprise i at time t

COGS_{it}: Cost of goods sold by enterprise i at time t

ΔINV_{it} : Change in inventories of enterprise i at time t

Each of the cost of goods sold and cost of production items representing the change in inventories in the equation is then subjected to regression analysis using the least squares method together with the sales realized by the enterprise or the change in sales compared to the previous year (Stage 2).

2. Phase (A)

$$\frac{COGS_{it}}{A_{it-1}} = a_{i0} + a_{1i} \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{S_{it}}{A_{it-1}} \right) + \epsilon_{it}$$

The main purpose of analysing the cost of sales using the least squares method with sales quantities is to reveal the effect of total sales on the cost of goods sold and the direction of this effect. The coefficients α and β obtained as a result of this process allow us to calculate the direction and magnitude of the effect of sales on cost of goods sold. The same method is applied for inventory changes and the effects of these items on cost are analysed.

Phase 2 (B)

$$\frac{\Delta INV_{it}}{A_{it-1}} = a_{i0} + a_{1i} \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \beta_{i2} \left(\frac{\Delta S_{it-1}}{A_{it-1}} \right) + \epsilon_{it}$$

An increase in sales will lead to an increase in the change in inventories. For this reason, inventories are subjected to regression analysis based on the changes in sales in the previous period and the preceding period. The coefficients α and β obtained from the analysis indicate the magnitude and direction of the effect of sales changes on the change in inventories. The same method was applied for production costs and similar analyses were performed.

Phase 2 (C)

$$\frac{PRDCT_{it}}{A_{it-1}} = a_{i0} + a_{1i} \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \beta_{i2} \left(\frac{\Delta S_{it-1}}{A_{it-1}} \right) + \epsilon_{it}$$

In the first stage, cost of production was considered as the sum of cost of sales and change in inventories. Accordingly, in the second stage, the cost of production was analysed with the same variables as the cost of sales and the change in inventories. Using the α and β coefficients, the magnitude and direction of the effect of total sales, changes in sales and changes in sales in the previous period on the cost of production were determined.

The results obtained were used in the third stage to determine the level of cost of sales, change in inventories and cost of production.

3. Phase

$$\frac{COGS_{it}}{A_{it-1}} = \hat{\alpha}_{i0} + \hat{\alpha}_{i1} \left(\frac{1}{A_{it-1}} \right) + \hat{\beta}_{i1} \left(\frac{S_{it}}{A_{it-1}} \right) + \epsilon_{it}$$

$$\frac{\Delta INV_{it}}{A_{it-1}} = \hat{\alpha}_{i0} + \hat{\alpha}_{i1} \left(\frac{1}{A_{it-1}} \right) + \beta_{1i} \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \beta_{i2} \left(\frac{\Delta S_{it-1}}{A_{it-1}} \right) + \epsilon_{it}$$

$$\frac{PRDCT_{it}}{A_{it-1}} = \hat{\alpha}_{i0} + \hat{\alpha}_{i1} \left(\frac{1}{A_{it-1}} \right) + \hat{\beta}_{i1} \left(\frac{S_{it}}{A_{it-1}} \right) + \hat{\beta}_{i2} \left(\frac{\Delta S_{it}}{A_{it-1}} \right) + \hat{\beta}_{i3} \left(\frac{\Delta S_{it-1}}{A_{it-1}} \right) + \epsilon_{it}$$

Since the cost of production is the sum of the cost of sales and the change in inventories, the difference between the determined cost of sales (A) and the sum of the change in inventories (B) and the calculated cost of production (C) will be the discretionary cost of production.

$$DPRDCT_{it} = \frac{PRDCT_{it}}{A_{it-1}} - \left(\frac{COGS_{it}}{A_{it-1}} + \frac{\Delta INV_{it}}{A_{it-1}} \right)$$

REM_{it}: Discretionary Production Cost of Enterprise i at Time t

In many studies in the literature, the sum of the absolute values of the discretionary portion of cash flows from operations (DCFO), the discretionary portion of operating expenses (DOPEXP) and the discretionary portion of production costs (DPRDCT) has been considered as an indicator of transaction-based earnings management.

$$REM_{it} = |DCFO_{it}| + |DOPEXP_{it}| + |DPRDCT_{it}|$$

$$REM_{it} = \left| \left[\frac{CFO_{it}}{A_{it-1}} - \frac{CF\hat{O}_{it}}{A_{it-1}} \right] \right| + \left| \left[\frac{OPEXP_{it}}{A_{it-1}} - \frac{OPEXP\hat{P}}{A_{it-1}} \right] \right| + \left| \left[\frac{PRDCT_{it}}{A_{it-1}} - \left(\frac{COGS_{it}}{A_{it-1}} + \frac{\Delta INV_{it}}{A_{it-1}} \right) \right] \right|$$

2.4.3. Other Methods for Measuring Earnings Management

In determining earnings management, there are various models based on accruals as well as methods based on the frequency distribution approach.

2.4.3.1. Models Based on Specific Accruals

Models based on specific accrual items focus on determining the extent to which earnings management is carried out on a single accrual item in a particular sector or business with a different approach from total accruals. In these models, specific items such as allowance for doubtful receivables and provision for impairment of assets are examples (Jones, 1991; Healy & Wahlen, 1999).

Researchers examining earnings management through specific accruals have compared changes in specific items that affect profitability in the financial statements of businesses that are more likely to manage profits with businesses that are less likely to do so. In this context, it is analysed whether the changes in these accrual items of the enterprises in certain periods show a significant difference. If a significant difference is detected, it is concluded that the related accrual item is used in earnings management (Dechow et al., 1995; Kothari et al., 2005).

In addition to making comparisons with enterprises that are unlikely to manage profits, studies on the determination of earnings management have also analysed the effect of a specific reason that emerged in a particular period in an enterprise. In this framework, changes in an accrual item that is likely to be used for earnings management purposes are analysed in the periods before, during, or after the occurrence of the cause. If there are significant differences in the related accrual item between these time periods, this indicates that the item in question is used for earnings management. With this approach, it is concluded that changes in accruals are an important indicator for understanding the earnings management practices of firms (Dechow et al., 1995; Kothari et al., 2005).

McNichols and Wilson (1988) conducted an important study that revealed that businesses may set aside discretionary allowances for doubtful receivables in order to reduce their profits for certain motivating reasons. In their study, they compared the allowance for doubtful accounts of enterprises with earnings management incentives with those without such incentives and found significant differences between the two groups. These findings indicate that provisions for doubtful receivables can be used for earnings management purposes on demand (McNichols & Wilson, 1988).

Petroni (1992), in his study on insurance companies, found that financially weaker businesses set aside higher amounts of provisions for liabilities and expenses for potential future hazards and losses for the customers they insure. Another important finding of the study is that such businesses with high reserves are usually warned by the supervisory bodies that regulate insurance companies (Petroni, 1992).

Marquardt and colleagues (2004) examined whether management resorted to earnings management before the IPO and before the managers' stock acquisition practices in firms where managers' stock acquisition practices and stocks were offered to the public. For this purpose, the study analysed earnings management using the Jones Model and evaluated the earnings management practices of the enterprises through major accrual items such as receivables, inventories, payables, accrued liabilities and depreciation. The results of the study showed that receivables items are more likely to be manipulated, especially before the IPO and before the managers' stock acquisition practices (Marquardt & Wiedman, 2004).

2.4.3.2. Frequency Distribution Approach

Unlike other methods of determining earnings management, the frequency distribution approach focuses on assessing whether profits are managed qualitatively rather than quantitatively. This approach analyses whether the distribution of profitability ratios or profitability-generated data of enterprises over a given time period shows a normal distribution. Anomalies in the distribution can be interpreted as an indication of the existence of earnings management practices (Burgstahler & Dichev, 1997).

The normal distribution is recognized as one of the basic and important continuous probability distributions in statistics. This distribution is based on the assumption that a random variable X can take infinite values in a given interval. The normal distribution is used to examine whether the values of the variable X at certain points are normal. If the values of variable X show a normal distribution when analysed on a graph, this distribution is expected to have a symmetrical shape known as a bell curve (Freund, 2010).

According to some studies dealing with the distributional approach, profitability figures are also expected to show a normal distribution over a certain period of time. If profitability figures

are normally distributed, the value of (a) will be zero and profitability figures will be distributed around zero (Johnson et al. 1995; Box & Jenkins, 1976).

The method was initially used by Burgstahler and Dichev (1997) to determine whether businesses manage profits to meet investors' expectations by announcing profits above -0- or to announce profits above the previous year. According to Burgstahler and Dichev, investors prefer to invest in enterprises that announce profits above -0- or above the previous year's profits in order to gather sufficient information about the enterprise to invest in and to minimize transaction costs (transaction cost theory perspective) or because of the expectation of winning rather than losing (expectation theory perspective). This would lead them to announce a small profit rather than a loss, or a small increase over the previous year rather than a profit below the previous year. Therefore, when the distribution of the profitability figures of the enterprises in a certain time interval is analysed, a sudden decrease will be observed before the -0- figure and a sudden increase will be observed after the -0- figure. Likewise, when the change in the profitability of the enterprises compared to the previous year is analysed, there will be a sudden decrease before the -0- figure and a sudden increase after the -0- figure. These sudden falls and rises indicate that the distribution of profitability and changes in profitability is not normal, and therefore, that businesses manage their profits (Burgstahler & Dichev, 1997).

2.4.3.3. Discretionary Sales Revenue Approach

In this approach, Stephen R. Stubben (2010) sought to determine the extent to which profits are managed through the early recognition of sales revenue. According to Stubben, reported sales revenue, like total accruals, consists of discretionary and non-discretionary sales revenue. Discretionary sales revenues are considered as items that can be manipulated to manage firms' profits (Stubben, 2010).

$$R_{it} = R_{it}^{UM} + \delta_{it} RM$$

R_{it} : total sales revenues of enterprise i at time t

$R_{(it)}^{(UM)}$: non-discretionary sales revenues of enterprise i at time t

$\delta_{it}RM$: Discretionary sales revenues of enterprise i at time t

At the end of the period, part of the non-discretionary portion and all of the discretionary portion of the sales revenue remains uncollected. Therefore, a certain proportion (c) of the non-discretionary part and the entire discretionary part equals total claims (Stubben, 2010).

$$AR_{it} = c \times R_{it}^{UM} + \delta_{it} RM$$

AR_{it} : total receivables of enterprise i at time t

C: uncollected portion of non-discretionary sales revenue

Each change in discretionary sales revenue changes receivables and total sales revenue at the same rate.

$$\Delta AR_{it} = c \times \Delta R_{it} + (1-c) \times \Delta \delta_{it}$$

Δ : Change compared to the previous period

In the analysis using the least squares method, the error term obtained from the regression explaining the relationship between the change in receivables and the change in total sales revenues of all enterprises in a sector in a year reflects discretionary sales revenues and the amount of profit managed. As in the accrual-based methods of determining earnings management, Stubben (2010), in order to eliminate the size differences and heterogeneity problem in the values obtained in this model, regressed the variables on the average total assets of the enterprises in that year.

$$\frac{\Delta AR_{it}}{A} = \alpha + \beta \frac{\Delta R_{it}}{A} + \epsilon_{it}$$

A: Average Total Assets

ϵ_{it} : Error term

Stubben (2010) stated that the model he developed yielded stronger results than the accrual-based models of Jones, Modified Jones and Performance Matched Models. On the other hand, Alghamdi (2016) argues that this model is insufficient to detect expense manipulations (Alghamdi, 2016).

2.5. Sustainability and Reporting Approach

Today, sustainability has become a multifaceted approach that is not only limited to environmental issues but also includes economic development and social welfare. In this

section of the study, the social and economic dynamics that led to the emergence of the sustainable development approach, how it has developed in the world and its reflections in Türkiye are explained.

From a theoretical perspective, four main theories that are influential in the orientation of businesses towards sustainability reporting; stakeholder, legitimacy, political economy and institutional theory come to the fore. These approaches are discussed together with their effects on reporting behaviours, and then the concept of corporate sustainability is evaluated from a holistic perspective with its economic, social and environmental aspects.

In the remainder of the chapter, international developments shaping sustainability reporting and legal regulations in Türkiye are discussed. The European Union's Corporate Sustainability Reporting Directive (CSRD) and the Turkish Sustainability Reporting Standards (TSRS) stand out in this context. In addition, the GRI framework and the integrated reporting approach are also analysed in terms of content and scope.

Finally, national and international studies examining the relationship between FRQ and sustainability reporting are presented, thus providing a theoretical basis for the application part of the study.

2.5.1. Concept of Sustainability

Although the sustainability approach has set the agenda for development discussions after the 1970s and these discussions seem to have settled on the axis of sustainable development over time, the foundations of the sustainability approach were laid about three hundred years ago in the book "Sylvicultura Oeconomika" by the German accountant Hans Carl von Carlowitz. In his book for the forests of Saxony, Hans Carl von Carlowitz explained the concept of sustainability as follows: "The greatest art, science and industriousness of countries will depend on the cultivation and processing techniques that will make it possible to have a continuous, stable and sustainable use of wood. This is an indispensable reason for the survival of countries." and shed light on the present day (Oekom Verlag, 2022).

Conceptually, there are many definitions of sustainability in the literature. Robert Gilman, a prominent researcher in the field of sustainability, defined sustainability as "the ability of a society, ecosystem, or any ongoing system to function into the indefinite future without

depleting primary resources" (Context Institute, 2022). In this respect, Gilman's definition supports Carlowitz's statement.

The Oxford English Dictionary defines sustainability as "the use of the ecosystem and energy in a way that does not have negative impacts on the environment" and "the ability to continue or continue for a long time". From a business perspective, sustainability is defined as the joint assessment of the economic, environmental and social impacts of business activities.

Early definitions of sustainability often took a macro-scale perspective, aiming to identify sustainable levels of natural resource use and envision how to balance optimal production and consumption. Scientific contributions to the sustainability approach initially focused on the use of natural resources and its impact on quality of life. The relations of future generations, the target audience, with the economy, social and environmental areas were included in the process at the development stage of the concept (Wikström, 2010; Caniato et al. 2012).

Many definitions have been made for the concept of sustainability in the historical process. Although there is a general consensus among scientists on the definition of the concept, the definitions of sustainability have differed according to the content and scale of the research and analysis. A summary of the definitions of sustainability in the literature is given in Table 2.1.

Table 2.1. Sustainability Definitions

Author	Year	Definition
WCED	1987	Meeting the needs of the present without compromising the ability of future generations to meet their own needs.
Swaney	1987	Adopting practices to conserve natural resources while maintaining a strong financial structure.
Ruckelshaus	1989	It is the doctrine that development and economic growth interact and are maintained over time within the broad limits of ecological balance.
Gilman	1992	The continuous functioning of society, ecosystem or any system without depleting its main resources in the indefinite future.
IISD	1992	Adopting policies and actions that meet the needs of businesses and their stakeholders to protect, conserve and develop the human and natural resources needed in the future.

Starik and Rands	1995	The ability of one or more organizations, collectively or individually, to exist and thrive over a long period of time by allowing other communities to exist and thrive.
Costanza and Patten	1995	Sustainable systems that survive or continue.
Sikdar	2003	Environmental management is an optimal balance between economic development and social equity.
Egger	2006	Conceptually, it is the conservation or enhancement of the integrated natural systems that make up life on our planet.
Carter and Roger	2008	It is the combination of social, environmental and economic objectives and the coordination of business processes between companies in order to improve the economic performance of the company and its supply chain.
Eltayeb, Zailan and Filho	2010	It is a practice that encourages the minimization of the energy used and the efficient use of the waste generated.
Jones and Kramer	2010	Social and human sustainability involves meeting people's needs and maintaining long-term social relationships. Ecological sustainability means preserving and restoring the ecosystem for present and future generations. Financial sustainability is the ability to meet the current and future needs of shareholders.
Bansal	2010	It is the creation of organizations that adapt quickly to changes through integrated economic, social and environmental systems.
Slawinski and Bansal	2010	Sustainability is the ability of companies to respond to short-term financial, social and environmental needs without jeopardizing their long-term financial, social and environmental performance.
Chabowski Mena and Gonzalez	2011	An approach to meet current needs while developing skills that enable you to focus on the future.
Hassini, Surti and Searcy	2012	The ability to conduct business with long-term strategies and objectives to safeguard economic, environmental and social well-being.

Source: Bhanot et al., 2019; Ahi and Searcy, 2013; Wiese et al., 2012

Based on these definitions, sustainability goes beyond the understanding of economic growth focused solely on consumption; it aims to protect the integrity of the ecosystem, to observe social responsibilities and to build a development model in which development and social welfare are holistically cantered. Accordingly, the concept of sustainability considers economy, environment and society as three complementary dimensions. In the early stages of the

sustainability approach, these three dimensions, although close to each other, were generally considered as separate and independent areas.

The main feature of the concept of sustainability, which has been concretely included in the literature in the 19th century, is that it focuses on the protection of natural resources and the future of humanity and is used in different disciplines. From this perspective, sustainability is an umbrella concept that combines disciplines such as environmental science and management, social justice, economics, politics, business management and law. It is also defined as a dialectical concept that encompasses democracy, rights, honesty and similar concepts. However, when a conceptual evaluation is made in the economic field, we see that sustainability is defined as welfare maximization, especially in Neo-Classical economic theory. In this framework, sustainability is considered not only in terms of its economic and ethical dimensions, but also in terms of the functioning and balance of systems.

According to systems theory, sustainability aims to maintain the flexibility and functionality of interconnected subsystems in order to keep the overall system stable. One of the main arguments of this theory is that sustainability research is not only about understanding ecological processes, but also about the social processes of how society deals with nature (Littig & Griebler, 2005).

The theory of very weak sustainability basically argues that sustainability is possible if the total stock of capital assets remains constant over time. This assumption allows for a reduction in any capital asset if an additional capital asset (or assets) is added. Therefore, each reduction in natural capital must be offset by an increase in another form of capital asset.

According to strong sustainability advocates, critical natural capital investments cannot be substituted by other forms of capital and are therefore insufficient to sustain all of capital. Proponents of the approach therefore argue that conservation of natural resources is a necessity, not a need.

The very strong sustainability perspective focuses on the magnitude of social development relative to global carrying capacity. According to this assumption, once social development reaches global carrying capacity, no natural capital asset can be substituted. This implies that there are absolute limits to social development (Holden et al. 2014; Laine, 2005).

Weak sustainability theory, on the other hand, assumes that ecological crises can be addressed and resolved within existing social and economic institutions. Therefore, a radical paradigm shift is not considered necessary for this assumption.

2.5.2. Chronological Overview of Sustainable Development Worldwide

The development of the concept of sustainable development at the global level has been shaped by the interaction of environmental, economic and social factors. Today, sustainable development policies adopt a multidimensional approach that includes not only ecological concerns but also economic growth and social justice. In this context, it is known that the historical process of sustainability dates back to 300 years ago. Hans Carl von Carlowitz, in his book *Sylviculture Oeconomica*, dedicated to the burning forests of Saxony, used the concept of sustainability to shed light on today's sustainable development approach. The development of the sustainability approach continued with the work of British political economist Thomas Malthus in the early 1800s. In his studies, Malthus initiated the debate on whether scarce natural resources would be sufficient to meet the needs of the growing population. Malthus presented a perspective on environmentalism with his work "An Essay on the Principle of Population" published in 1798 (Basiago, 1998).

By the 19th century, the focus shifted to fossil fuels as an energy source, and concerns that fossil resources could be depleted created an agenda and led to many studies in this field (Du Pisani, 2006). Wallace wrote a chapter on the destruction of the world's resources by making a retrospective evaluation in his work "Our Wonderful Century" published in 1898. Discussing the reckless damage to nature, Wallace evaluated the unlimited extraction of non-renewable resources and the destruction of forests as an injustice to future generations. Based on these findings, it is possible to conclude that all the main topics in the Brundtland Report (1987) are included in Wallace's work. However, although the link between the wise management (protection) of nature and the understanding of sustainable development dates back to the 18th and 19th centuries, the contemporary understanding of the sustainability approach and its official recognition on international platforms started with the "Stockholm Conference on the Human Environment" held in 1972.

The industrial restructuring that started with the Industrial Revolution in the world gained momentum with the population growth after the Second World War, leading to an "unplanned"

growth process that destroys natural systems and emphasizes consumption. The extent of the environmental damage caused by this growth process began to be perceived in the late 1960s. The ecology and environmental movement, which gained momentum with this perception and awareness, gained visibility with the United Nations Stockholm Conference (1972), where the protection and development of the ecosystem was brought to the agenda. In this period, the concepts of economic growth and the environment were discussed at the global level and a consensus was reached on the necessity of establishing environmental policies to anticipate and prevent ecological problems before they occur. However, rhetoric did not translate into action.

The 1980s have gone down in history as a period when the sustainable development approach was adopted and became widespread. In other words, this period of significant developments was a period that reconciled the environmentalist awareness of the 70s with the developmentalist approach of the 60s. The development that marked this period was the publication of the Brundtland Report. In 1987, the Brundtland Report prepared by the World Commission on Environment and Development included the concept of sustainable development for the first time and defined it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This development is a historic and important step in terms of concretizing the process in the context of sustainability.

There are many definitions in the literature on the concept of sustainable development. For example, Soete and Fremann defined sustainable development as "*an economic system that transfers the needs of present generations to future generations without making natural resources non-renewable and without irreversibly destroying the environment*". This conceptual definition is based on the ability of the economic system to withstand the existence of the ecosystem in the long term in meeting social needs (Tıraş, 2012).

The environment, society and economy axes, which were considered close to each other but independent of each other at the beginning of the sustainability approach, were evaluated together with the sustainable development approach. In other words, approaches that prioritize economic growth and profit have evolved towards approaches that take into account human development with a focus on social and environmental sustainability.

The next step after the Brundtland Report introduced the concept and framework of sustainable development was the organization of the United Nations Conference on Environment and Development in Brazil in 1992 with the aim of creating roadmaps for societies on sustainable development. With the participation of 10,000 representatives from 178 countries, 1,400 non-governmental organizations and 114 heads of state, the Rio Earth Summit is an extremely important event in history for the sustainable development approach. Reducing unsustainable production and consumption methods, social welfare and ecosystem protection were the main agenda items of this conference. At the conference, an action plan titled "Agenda 21 for the 21st Century" was adopted; however, the plan failed due to the voluntary basis for the realization of the goals in the action plan and the fact that the implementation was left to the initiative of the countries themselves (United Nations [UN], 1992b).

Three years after the Rio Earth Summit, the United Nations World Summit on Social Development was convened in Copenhagen, Denmark in 1995. At the end of the summit with the participation of 186 delegates, a 25-page declaration, 10 commitments and a 100-page strategy document were published. Increasing productive employment, eradicating poverty, reducing unemployment and promoting social inclusion at national/international level were the main agenda items of the summit.

The process of development of the sustainable approach continued with the signing of the Kyoto Protocol, which was signed in 1997 but entered into force in 2005. Countries that signed the Protocol to the United Nations Framework Convention on Climate Change committed to reduce their carbon dioxide and greenhouse gas emissions and to trade carbon if they could not do so. To summarize the results of all the developments that took place in the 1990s, this was a period in which the idea that economic growth was no longer an end in itself, but a tool for development and social progress was adopted.

The process of sustainable development continued with the announcement of the Millennium Development Goals (MDGs) by the United Nations at the New York Millennium Summit (2000). The MDGs cover the goals to be achieved by 2015 at the global level (UN, 2000). In 2015, the Millennium Development Goals were revised by the United Nations as the Sustainable Development Goals (SDGs), consisting of 17 targets that focus on three main axes, including combating inequality and injustice, ending extreme poverty, preventing and adapting

to climate change, and aiming to be achieved by 2030 (Presidency of the Republic of Türkiye Strategy and Budget Directorate [T.C. Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı], 2022). Sustainable Development Goals are presented in Figure 2.1.



Figure 2.1. Sustainable Development Goals

The Sustainable Development Goals are built on a foundation of "strengthening human rights and promoting sustainable production and consumption" based on the success and progress momentum of the Millennium Development Goals. Recognizing that sustainable development cannot be achieved without involving the business world, the United Nations has set 17 goals that involve the business world. The Sustainable Development Goals are of vital importance at the global and local level in terms of revealing the vision of the business world to realize economic development without harming the ecosystem and with a structure that includes the society.

Developments on a global scale over the last 30 years have contributed to the formation of sustainable development strategies, but have not prevented us from facing the major impacts of environmental climate change. Despite all the measures taken, resource scarcity continues to pose a significant threat to the future and welfare of society in our universe where natural resources are rapidly depleting and ecosystems are being destroyed by pollution. As a result of this situation, the states parties to the United Nations Framework Convention came together in 2015 with the Paris Agreement in order to produce international cooperation and coordinated solutions in line with a common goal (Republic of Türkiye Ministry of Foreign Affairs [T.C.

Dışışleri Bakanlıđı], 2021). The agreement aims to increase the capacities of countries to combat climate change and to ensure funding flows in the context of climate-resilient strategies. Following this development, the European Union announced the "European Green Deal" in November 2019, which supports the Paris Agreement (EC, 2019). By announcing the Green Deal, the European Union launched a comprehensive transformation process to tackle the climate crisis and transition to new economic models (blue-green). Within the framework of this transformation plan, it aims to make Europe the world's first climate-neutral continent by 2050, to ensure sustainable development, sustainable financing and transition to a circular economy, to end the dependence on resource use in economic growth, and to reduce development gaps in the transformation process so that no community is left behind.

As part of the 2021 Work Program, the European Commission has revised the Green Deal by publishing the "Fit for 55" package to achieve the target of "reducing emissions by at least 55% by 2030 compared to 1990 levels". The package in question covers issues such as tightening the existing EU Emissions Trading System and applying emissions trading to new sectors; using more renewable energy, increasing energy efficiency, creating low-emission transportation alternatives and making infrastructure and energy resources available faster to support these alternatives, establishing taxation policies in line with climate targets, protecting and expanding natural carbon sinks with measures to prevent carbon leakage (EC, 2023).

The most concrete step towards the implementation of the Paris Agreement was taken with the "Carbon Border Adjustment Mechanism" under the European Green Deal. The CBAM was published by the European Commission on July 14, 2021 as part of the revision process and entered into force as of October 1, 2023 and a three-year transition period without financial obligations was initiated (Republic of Türkiye Ministry of Trade (MoT) [T.C Ticaret Bakanlıđı], 2021).

In this framework, the years 2023-2025 are planned as a transitional and preparatory phase for the implementation of the CBAM, which is expected to enter into full force in 2026. Under this process, products imported by the European Union (EU) such as aluminium, electricity, cement, fertilizer and iron-steel will be subject to a "carbon emission tax" at certain rates at the border according to their carbon content levels. This mechanism is expected to contribute significantly to the spread of sustainable production models and the reduction of global carbon emissions by

encouraging low-carbon production processes. Therefore, it is clear that the CBAM will accelerate green transformation and sustainability policies on a global and local scale. Particularly for carbon-intensive sectors, the new regulations introduced by the CBAM will require businesses to align their production processes with environmental sustainability criteria, while encouraging investments in low-carbon technologies.

The 2023 United Nations Climate Change Conference (COP28) was an important milestone in terms of expanding commitments to reduce global carbon emissions. The Conference addressed key issues such as tripling renewable energy capacity, gradually reducing fossil fuel subsidies and enhancing international cooperation to limit the global temperature rise to 1.5°C. These developments point to the acceleration of efforts to strengthen environmental sustainability in line with sustainable development goals (United Nations Climate Change [UNFCCC], 2023).

In addition, the implementation of the Kunming-Montreal Global Biodiversity Framework in 2023 also contributed to strengthening global cooperation to protect ecosystems. Within the scope of the framework, it is aimed to protect at least 30% of land and marine areas at the global level by 2030, to promote sustainable agricultural practices and to establish policies to prevent biodiversity loss (United Nations Environment Programme [UNEP], 2023).

On the other hand, the joint United Nations and World Bank report published in 2024 emphasized the effects of water scarcity on the global economy and stated that sustainable water management policies should be implemented. In this framework, the development of international agreements for the protection of water resources and making water management policies more effective were set as targets.

The European Union extended the Circular Economy Action Plan in 2023 with a sustainable development perspective. This regulation covers measures to reduce waste and increase reuse rates. Circular economy practices are seen as a recommended tool to improve waste management, optimize resource use and harmonize economic growth and environmental sustainability within the framework of sustainable development approach (EC, 2023).

In order to ensure more effective implementation of sustainable development policies on a global scale, the role of the private sector in achieving sustainable development goals and green

financing models will be discussed at the G20 Summit in November 2025 (Reuters, 2024). Green financing strategies are critical for promoting sustainable investments and directing financial resources to projects that support environmental and social sustainability.

These developments in recent years have revealed the fact that transition to a new economic model is a necessity rather than a requirement in terms of ensuring economic, environmental and social sustainability. Events that have caused environmental and economic damages at the global level have further reinforced this fact by increasing global awareness (Süklüm & Hiçyorulmaz, 2019). At this level, the dissemination of sustainable development as a way and model of doing business beyond a concept is of great importance in order to manage the negative relationship between economic activities and the ecosystem and to ensure the growth of the economy without ignoring environmental / social welfare.

2.5.3. Chronological Overview of Sustainable Development Türkiye

Türkiye's policies and practices towards sustainable development and combating climate change have undergone a significant transformation over time. Below, the main developments in this area are presented in chronological order.

The industrialization process in Türkiye started late, and awareness of its impacts on the ecosystem and environmental consciousness started to emerge in the 1970s. As a result of this awareness, environmental problems were first addressed under a separate heading in the Third Five-Year Development Plan covering 1973-1977. Following this development, with the 1982 Constitution, the concept of environmental protection was put into a constitutional framework and the protection of the ecosystem was adopted as a state policy (Budak, 2000).

As of the 1990s, environmental action plans were included in five-year development plans and global developments regarding the sustainable development approach began to be harmonized. In the following period, a significant number of environmental laws, regulations and legislation came into force and Türkiye's sustainability policies started to take shape in this context.

Türkiye's first comprehensive strategic document on combating climate change, the Turkish Climate Change Strategy (2010-2023), was published in 2010 (Republic of Türkiye Ministry of Environment, Urbanization and Climate Change [T.C. Çevre, Şehircilik ve İklim Değişikliği

Bakanlığı], 2010). In line with this strategy, the Republic of Türkiye Climate Change Action Plan (2011-2023) and Türkiye's Climate Change Adaptation Strategy and Action Plan (2011-2023) were prepared and implemented (MoEUCC, 2011).

With the expiration of the strategies and action plans, Türkiye set a new roadmap for the 2024-2030 period and put into effect the 2024-2030 Climate Change Mitigation Strategy and Action Plan (2024-2030 İDASEP) and the 2024-2030 Climate Change Adaptation Strategy and Action Plan (2024-2030 İDUSEP) (MoEUCC, 2024). This new strategy aims to accelerate low-carbon transformation in areas such as energy, industry, transportation, agriculture and urbanization in line with the 2053 Net Zero Emission Target.

Following these developments, the Green Deal Action Plan entered into force in 2021 in order to comply with the principles of the "Green Deal" published by the European Union, to cooperate in solving environmental problems and to gain a competitive advantage in the transformation process (MoT, 2021). This plan aims to support Türkiye's transition to sustainable production and trade systems and develop policies in line with the European Green Deal.

In terms of Türkiye's sustainable development approach, the ratification of the Paris Agreement in 2021 by the Turkish Grand National Assembly was an important step forward (MoEUCC, 2021). Following this ratification process, the Ministry of Environment and Urbanization was renamed as the Ministry of Environment, Urbanization and Climate Change, and more emphasis was placed on policies to combat climate change at the institutional level (MoEUCC, 2021).

Following the ratification of the Paris Agreement, Türkiye announced its net zero emission target for 2053 and started to develop new policies to accelerate low-carbon economic transformation (Presidency of the Republic of Türkiye Directorate of Communication, 2021). In line with this goal, with the Presidential Circular No. 2022/3 issued on May 21, 2022, it was announced that the week of June 5 every year will be celebrated as "Türkiye Environment Week" within the scope of "World Environment Day" (Presidency of the Republic of Türkiye[T.C. Cumhurbaşkanlığı], 2022).

In order to ensure that Türkiye achieves its sustainable development goals, the National Sustainable Development Coordination Board was established by Presidential Circular No.

2022/12 (PoRT, 2022). The Board aims to strengthen cooperation between public institutions, the private sector, academia and civil society organizations and to ensure the integration of environmental, economic and social policies with a holistic approach. The Board also serves as a coordination mechanism for monitoring, evaluating and strategically guiding the sustainable development process and supports the effective implementation of policies and actions at the national level.

In line with the 2053 net zero emission target and green development strategies, the first Climate Council was organized by the Ministry of Environment, Urbanization and Climate Change in 2022. Within the scope of the Council, short, medium and long term strategic targets were set, legislative arrangements were contributed to and climate change adaptation policies were developed. The Declaration of the Climate Council, published after three months of intensive work, includes 217 key decisions such as climate compatible cities, environmentally friendly and clean transportation, green economy, renewable energy, combating drought and climate education.

The National Contribution Declaration finalized by the Ministry of Environment, Urbanization and Climate Change¹ was submitted to the UN Secretariat at the 27th United Nations (UN) Conference of the Parties on Climate Change (COP27) held in Egypt in November 2022. In this framework, Türkiye increased its 21% emission reduction target for 2030 to 41% from the 21% it had set in 2016 (MoEUCC, 2022).

Similarly, within the scope of COP28, Türkiye made further commitments in the fight against climate change for the 2024-2030 period and expanded its sustainable development goals. In addition, the details of the carbon pricing mechanism under the Emissions Trading System (ETS) were shared at COP28 and the goal of integration into international markets was put forward.

¹ Declaration of National Contribution Article 4 of the Paris Agreement states that "each country party to the agreement shall prepare, communicate and maintain its national contribution target (Intended Nationally Determined Contributions (INDC)) to combat climate change. Parties shall implement national mitigation measures to achieve the objectives of these contributions. Countries' next national contribution targets shall aim for greater progress than the previous ones."

In order to create the institutional and legal infrastructure for these developments, the Climate Law preparation process was initiated under the coordination of the Ministry of Environment, Urbanization and Climate Change. Announced to the public in 2022, this process gained momentum when the need for legal regulation was emphasized at the Climate Council held in 2023, and the draft law was shared with the public in 2024. The draft text includes comprehensive regulations such as reducing greenhouse gas emissions in line with Türkiye's 2053 net zero emission target, establishing carbon pricing mechanisms, establishing climate coordination structures at provincial level and defining green finance instruments. As of 2025, Türkiye's Climate Law continues to be discussed in the Grand National Assembly of Türkiye. The law proposal was submitted to the Presidency of the Grand National Assembly of Türkiye on February 20, 2025 and subsequently adopted by the Environment Commission (MoEUCC,2025).

Concrete steps have been taken towards the establishment of an Emissions Trading System (ETS) within the framework of the Climate Law. Developed by the Ministry of Environment, Urbanization and Climate Change and expected to enter into force in 2026, the ETS aims to establish a carbon pricing mechanism and control carbon emissions in the industrial sector. It is envisaged that the ETS will be harmonized with the EU Emissions Trading System (EU ETS), enabling industrial enterprises to avoid carbon tax risks at the border and supporting sustainable production standards in international trade.

However, in order to promote access to green finance and sustainable investments, Türkiye's Green Finance Taxonomy was launched in 2024 (Republic of Türkiye Ministry of Treasury and Finance [T.C. Hazine ve Maliye Bakanlığı], 2024). This taxonomy includes a clear definition of financial instruments and sustainability criteria to incentivize sustainable investments. The banking sector and private financial institutions have started to expand credit mechanisms for low-carbon projects and incentive regulations have been introduced for green investments.

According to the United Nations' Sustainable Development Report for 2023, when Türkiye's performance in achieving sustainable development goals is evaluated, it is stated that progress has been made in combating climate change, but more regulations are needed in reducing industrial emissions and transition to renewable energy (UN, 2023).

2.5.4. Theories of Sustainability

When the studies on sustainability in the literature are examined, it is seen that the research is largely shaped within the framework of stakeholder theory (Freeman, 1984), legitimacy theory (Suchman, 1995), political economy theory (Gray & Lowery, 1996) and institutional theory (DiMaggio & Powell, 1983). In the context of sustainability, these theoretical approaches stand out as the main theoretical underpinnings to explain the adoption of environmental and social responsibility practices by businesses.

Stakeholder theory, legitimacy theory and political economy theory consider corporate sustainability as a strategic tool developed by businesses to positively influence stakeholders' perceptions and expectations (Deegan, 2002). These theories also provide an explanatory framework to explain the motivations that shape the financial and environmental accounting practices and reporting choices of businesses.

Similarly, institutional theory analyses organizations' orientation towards sustainability reporting in the face of environmental factors and institutional pressures in the context of institutional compliance, legitimacy and rational behaviour (DiMaggio & Powell, 1983; Scott, 2005). The basic assumptions of these theories and their relationships with corporate sustainability practices are detailed below with a theoretical perspective.

2.5.4.1. Stakeholder Theory

There are many definitions in the terminology regarding the concept of stakeholder, which forms the basis of stakeholder theory; however, it should be noted that there is no single dominant view on the concept. Freeman (1984), who contributed to the development of stakeholder theory, defined stakeholders as individuals or groups who have a legitimate material interest in the conduct of organizational activities. Within the framework of this definition, Freeman considers all stakeholders as a real asset for organizations (Donaldson & Preston, 1995).

Similar to Freeman's definition, Baron defines stakeholders as all social parties with whom the organization has a relationship and who are therefore both affected by the organization's activities and who affect the organization through their own activities.

Stakeholder theory is used to explain the reasons behind the social and environmental performance of organizations and the main focus of the theory is the relationship between stakeholders and organizations. Therefore, the basic unit of analysis of the theory is the two-way relationship between the parties (Parmar et al. 2010).

According to the stakeholder theory, every organization adopting a corporate social responsibility approach should carry out its activities by considering the legitimate interests of all stakeholders equally (Kaptein & VanTulder, 2003). In this context, it is widely believed that strong relationships with stakeholders are critical for organizations to achieve their goals. In other words, the success of an organization is directly related to how it manages its relationships with its stakeholders (employees, customers, government, suppliers, society, non-governmental organizations, consumers, etc.) (Freeman, 2023). This necessitates organizations to identify relevant stakeholders and effective stakeholder management.

In this framework, organizations create an effective communication channel with their stakeholders through sustainability reporting. Businesses that disclose their economic, environmental and social activities to their stakeholders and the society in which they operate through this communication network can positively affect the perceptions of their stakeholders and society about them. Therefore, businesses that meet the expectations of their stakeholders are approved by the society and ensure the sustainability of their activities and realize their goals (Freeman et al., 2010).

2.5.4.2. Legitimacy Theory

Legitimacy is generally defined as a generalized perception or assumption that an entity's actions are desirable, appropriate, and acceptable within a socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995). Legitimacy theory has long been one of the main frameworks used to explain the social and environmental performance of organizations (Deegan, 2002).

Legitimacy theory argues that organizations strive to meet the expectations and needs of society in order to survive. At the point of meeting these needs and expectations, institutions demand that their activities be seen as "legitimate" by society. However, it should be noted that the

needs and expectations of society change over time. Therefore, when social needs and expectations change, institutions are expected to be able to respond to the new conditions.

According to legitimacy theory, legitimacy is an important resource for institutions to survive (Nyit Chiong, 2010,). It is almost impossible for institutions to survive if they cannot gain legitimacy in society. Organizations use communication with stakeholders as a way to manage their legitimacy. At this point, reporting mediates communication between organizations and stakeholders.

Research in the literature provides evidence that organizations' legitimacy concerns determine their sustainability activities, including environmental and social issues (Deegan, 2019; Hahn & Kühnen, 2013; Patten, 1992). In line with these results, legitimacy theory claims that organizations use sustainability disclosures to manage and improve public perception (Hummel & Schlick, 2016). In other words, the pressure of organizations to be approved by society creates a basis for the realization of activities that contribute to sustainability and the disclosure of the results of these activities (Baert & Silva, 2020).

To summarize; according to the legitimacy theory, institutions want to be approved and accepted by society. This situation is critical for institutions to sustain their existence. Therefore, organizations seek to gain legitimacy by sharing information on the economic, environmental and social aspects of their activities through sustainability reporting. Failure to disclose economic, social and environmental information about corporate activities may result in organizations not being seen as legitimate by society. Considering today's conditions, statements regarding sustainability activities in the organization create a reputation gain and strengthen the brand image.

2.5.4.3. Political Economy Theory

Political economy is a branch of social science that examines the relations between society and individuals, the market and the state with the tools and methods of economics, political science and sociology. Political economy finds application in many fields such as financial economics, public finance, macroeconomic policy, labour law (Roland, 2002,).

In political economy theory, there are presuppositions about how to develop the economies of different groups in the economy. Therefore, political economy has a complex and multi-layered structure involving a wide range of political interest groups.

Political economy, a field that has been intensively studied by British scholars, was defined by Adam Smith and David Hume as a tool used by lawmakers, regulators and politicians to improve the welfare of society (Scott-Smith, 2003). Today, the scope of political economy has expanded significantly. Within this expanding framework, political economy is defined as a field that "examines the interaction of political and economic processes and analyses how power and resources are distributed in different environments and conditions" (O'Meally, 2009; Sertyeşilışık, 2014).

According to political economy theory, financial reporting is an economic, political and social document. The disclosures made within the scope of reporting have the capacity to convey economic, political and social meanings to stakeholder groups and information users (Guthrie & Parker, 1990,).

The success of sustainability policies depends on their economic viability and effectiveness. Therefore, political and economic decisions should support the sustainability approach. Effective political economy depends on the applicability of the legal, social and technical dimensions of political economy decisions.

Legal Dimension: It is important that the decisions taken within the scope of political economy are compatible with the existing legal framework and consistent with the legislation in force. In areas where the regulations in force are insufficient, necessary legal reforms should be realized and the legal infrastructure should be improved.

Social Dimension: Political economy decisions should have a positive impact on social welfare.

Technical Dimension: The realization of political economy decisions depends on the technical elements required and affected by these decisions (Sertyeşilışık & Sertyeşilışık, 2019).

In conclusion, when an assessment is made from the perspective of political economy theory in the context of the sustainability approach, it can be said that there is a two-dimensional relationship based on mutual interaction. The comprehensive implementation of the sustainability approach at the societal level depends on the support of political economy decisions. On the other hand, while political economy decision-making paves the way for the realization of sustainability approach, it also makes it possible to convey meanings to stakeholders on economic, political and social levels through reporting mechanisms.

2.5.4.4. Institutional Theory

According to institutional theory, conceptualized by Philip Selznick (1948) and later developed by Meyer and Rowan (1977), *"Organizations are incentivized to incorporate prevailing rationalized practices and procedures into organizational work and society. By doing so, organizations increase their legitimacy and likelihood of survival, regardless of the immediate effectiveness of the practices and procedures achieved"*. Institutional theory essentially argues that businesses significantly improve their sustainability in society by demonstrating compliance with norms and social expectations. This institutional congruence provides various advantages such as increased prestige, stability, legitimacy, social support, internal and external commitment, staff attractiveness and acceptance in the professions.

Institutional theory was developed by DiMaggio and Powell (1983) as new institutionalism. DiMaggio and Powell built the theory of new institutionalism on isomorphism² and focused on coercive, imitative and normative axes that lead to homogeneity in the structure, culture and outcomes of organizations (Ashrafi et al., 2018,). According to the new institutionalism approach, while organizations adopt similar structures and processes, their desire to be legitimate comes to the forefront, and the impact of this structure on organizational efficiency becomes insignificant (Ataman, 2003).

In the literature, various studies have been conducted on the basis of institutional theory to analyse corporate social responsibility activities. In other words, institutional theory has been

² Isoformism constitutes one of the foundations of the new institutionalism theory developed by DiMaggio and Powell. Isoformism is defined as the tendency of organizations to resemble each other or to adopt similar characteristics. The concept of isomorphism is a consequence of the "set of important actors" of the organizational field (regulatory bodies, key suppliers, sands operating in the same field).

adopted as a framework to explain the reasons for sustainability reporting. Research findings indicate that institutional theory complements stakeholder and legitimacy theories in explaining how businesses respond to stakeholder pressures. In addition, it is concluded that businesses gain legitimacy by responding to society's expectations through sustainability reporting, and that this legitimacy is rewarded with long-term survival.

Institutional theory deals with the interaction of organizations with their environment and the entirety of organizational practices that are shaped by the influence of societal expectations. Organizational activities are driven by the imperative for institutions to gain legitimacy and survive, and are influenced by socially constructed norms. The long-term survival of organizations depends on their acceptance by society and their ability to interact with their environment in such a way that they can perceive this acceptance (Dillard & Goodman, 2004). In this context, organizations gain legitimacy by adapting to the demands for change and, as a result, are rewarded with the capacity to sustain their existence (Carpenter & Feroz, 2001).

2.5.5. Corporate Sustainability

Businesses are one of the main factors that contribute to the improvement of the quality of life and the level of welfare in the society in which they are located through their economic activities and affect the society. Existentially, businesses create positive and negative impacts on the society in which they operate in financial, environmental and social areas.

The sustainable development approach at the enterprise scale is reflected in the concept of corporate sustainability. As defined in the Brundtland Report, sustainable development aims to meet the needs of both current and future generations. Adopting a sustainable development approach at the enterprise level should not only guarantee long-term success but also encourage collaboration and networking across various organizational systems, as well as support from top management.

For many businesses today, corporate sustainability has become both an organizational value and an integral part of their business strategy. Especially large-scale enterprises adopt corporate sustainability in order to maximize profits in the long term and make their business processes sustainable. Triple bottom line reporting mechanisms, which include social responsibility

awareness, environmental sensitivity and economic viability, are used as an important tool in the realization of corporate sustainability.

The corporate sustainability approach has emerged as a result of the adoption of a global sustainability approach and the need to communicate the financial, environmental and social impacts created at the enterprise scale to information users. From this perspective, it offers a modern management approach that is an alternative to the traditional management approach that prioritizes profit. Corporate sustainability basically refers to the policies implemented, principles adopted and actions taken by companies to have a sustainable structure in financial, environmental and social areas.

Although there is no universal definition of corporate sustainability, it was first defined by Bowen in 1953 as *"the obligation of businessmen to conduct their policies, decisions and activities in a way that is desirable in terms of the values and objectives of society"* (Bowen, 1953; Dyllick & Hockerts, 2002; Montiel, 2008). Other definitions of the concept in the literature are as follows.

Roca and Searcy (2012) defined corporate sustainability as "adopting strategies and activities that meet the needs of the business and its stakeholders while protecting, sustaining and developing the human and natural resources that will be needed in the future" (Roca & Searcy, 2012).

Marrewijk (2003) defined it as the incorporation of social and environmental issues into business activities and the business's interaction with stakeholders. Signitzer and Prexl (2007) defined it as a partially relative concept that explains the planned and strategic management of business activities in order to integrate economic, social and environmental goals and values. On the other hand, Wilson defined it as an evolving and modern corporate governance paradigm. In his study published in 2003, Wilson stated that the importance of corporate sustainability for profitability and growth has been recognized by companies and there is an awareness of the pursuit of social and environmental goals related to sustainable development.

Research in the field of corporate sustainability has revealed that the corporate sustainability approach commonly utilizes four components. These are sustainable development, corporate

social responsibility, social stakeholder theory and corporate accountability theory (Wilson, 2003).

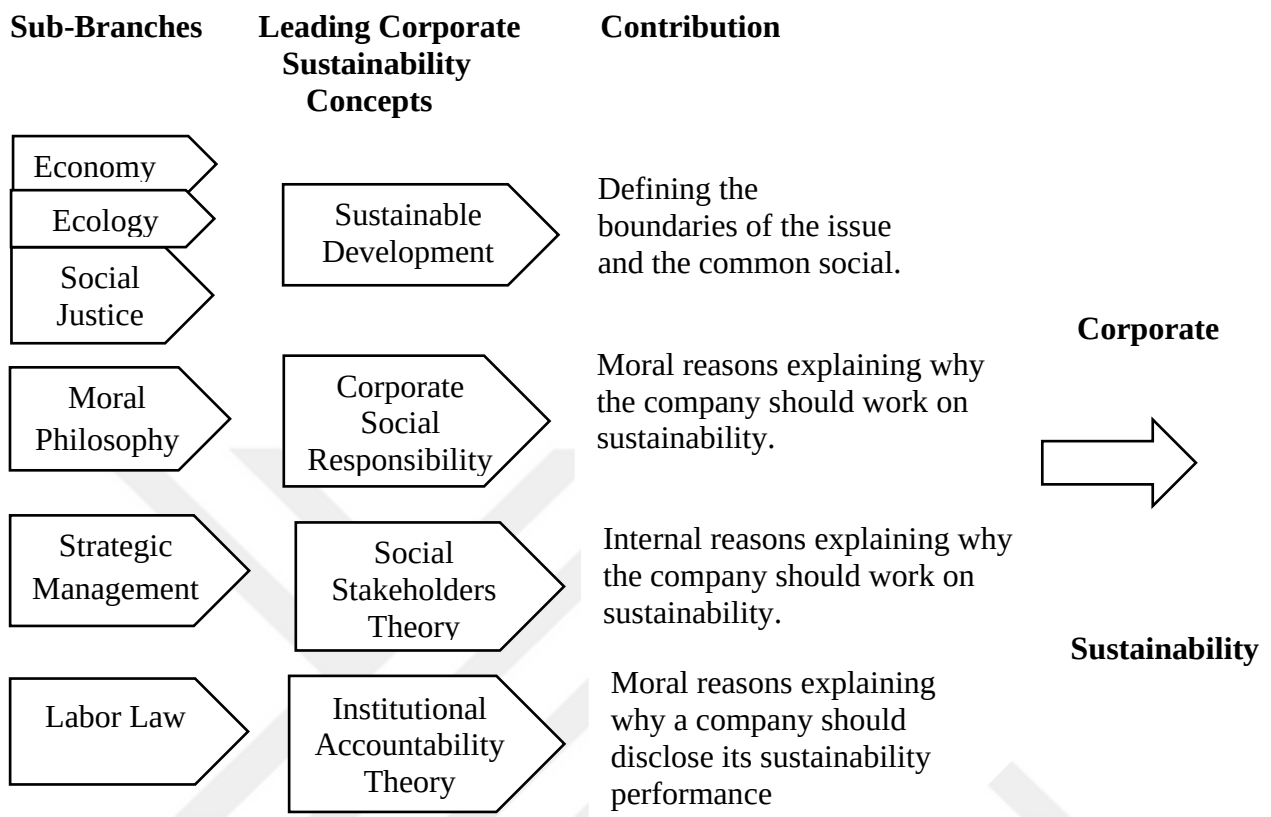


Figure 2.2. Foundations of Corporate Sustainability

Wilson bases the foundations of corporate sustainability on four components. When Figure 2.2 (Wilson, 2003), which schematically shows the foundations and sub-branches of corporate sustainability, is examined, it is seen that corporate sustainability is divided into sub-branches as economy, ecology, social justice, moral philosophy, strategic management and labour law. The first component of corporate sustainability, sustainable development, is considered within economics, ecology and social justice. Similarly, the second component, corporate social responsibility, is considered within the framework of moral philosophy and is based on moral foundations that explain why organizations should assume responsibility for sustainability. In this framework, Wilson considers corporate social responsibility as an extension of moral philosophy and attributes the reason why the company works for sustainability to these moral reasons. At this point, Wilson attributes the contribution of corporate social responsibility to corporate sustainability to social morality, ethics and values.

In Wilson's approach, social stakeholder theory is evaluated within strategic management and considered as internal reasons explaining why organizations should work for sustainability. Finally, the theory of corporate accountability is considered within the framework of labour law, and is based on moral justifications for why organizations should disclose their sustainability performance. These components of corporate sustainability are conceptually elaborated below.

Sustainable Development: The underpinnings and foundations of corporate sustainability are based on the concept of sustainable development. Sustainable development is a model of economic growth that involves continuously reducing the negative social and environmental impacts of growth (Roper, 2012).

Wilson (2003) argues that if sustainable development is believed to be a goal that should be realized by the society at large, companies have an ethical obligation to contribute to the achievement of this goal. In this context, corporate social responsibility is not only beneficial for businesses in terms of more effective participation of employees in business processes, protection of the environment, being more competitive in international markets, and the development of civil society-private sector cooperation, but also in terms of realizing sustainable development and achieving success in the social field. In this respect, companies are expected to fulfil their responsibilities towards their stakeholders.

Corporate Social Responsibility: In today's business world, corporate social responsibility, one of the fundamental elements of corporate sustainability, has become an inevitable necessity for businesses. One of the most important reasons for this is the increasing importance of corporate accountability and transparent management with the development of financial markets. Corporate social responsibility emphasizes not only voluntary contributions to social and environmental issues, but also an approach in which businesses structure their economic activities in line with these objectives (Carroll, 1999).

Corporate social responsibility is defined as a set of management practices that aim to reduce the negative effects of business activities on society and increase their positive effects (Dahlsrud, 2008). This concept states that companies have four main responsibilities towards society: economic, legal, ethical and voluntary contributions.

The United Nations Conference on Trade and Development (UNCTAD) considers corporate social responsibility from the perspective of the extent to which businesses are aligned with the goals and needs of society. According to UNCTAD, all structures expect certain functions and roles to be fulfilled in their evolution and transformation processes. With the impact of globalization, expectations for institutions and the scope of their role in society have changed dramatically. Therefore, discussions on the social responsibility standards and practices of multinational enterprises have become increasingly important in the context of global development efforts (UNCTAD, 2001).

Social Stakeholder Theory: Corporate sustainability is an adaptation of the sustainability approach to the business level. In this framework, the stakeholder theory, which forms the basis of the sustainability approach, is also the main basis of the corporate sustainability approach. The most important contribution of stakeholder theory to corporate sustainability is that it provides a framework that businesses should consider not only the interests of their shareholders but also the interests of all stakeholders affected by their activities (Wilson, 2003). In the context of corporate sustainability, the emphasis on the need to share explanations of all activities and performances of businesses with all stakeholders is a reflection of social stakeholder theory.

Corporate Accountability Theory: The theory of corporate accountability emphasizes that businesses are accountable to the external environment that they are affected by while continuing their activities. The theory claims that the key to a healthy relationship between the business and its environment depends on the fulfilment of these responsibilities (Wilson, 2003). This theory has revealed that business activities create economic, environmental and social impacts on society and therefore businesses should be held responsible for these impacts. It emphasizes the need to measure the impacts of business activities in both internal and external environments in order to determine the level of responsibility.

The theory of accountability requires that the results of the activities carried out by the business in terms of the results created by the impacts should be presented to stakeholders through reporting (Aras, 2007). When evaluated from this perspective, accountability theory mediates the establishment of a strong relationship between society and business, and the theory forms the basis for the necessity of reporting the financial and social performances of businesses (Wilson, 2003).

The four-component theory on which Wilson (2003) based corporate sustainability was developed by Signitzer and Prexl (2013) in their study on the role of communication in corporate sustainability processes. In this new approach, corporate sustainability is considered as a sub-branch of sustainable development and positioned as an umbrella concept that encompasses corporate accountability, corporate social performance, corporate citizenship, corporate social responsibility, corporate governance, human-world-benefit relationship, stakeholder approach and corporate communication (Signitzer & Prexl, 2007). The theory of corporate sustainability developed by Signitzer and Prexl (2013) is shown in Figure 2.3 (Signitzer, Prexl; 2013).

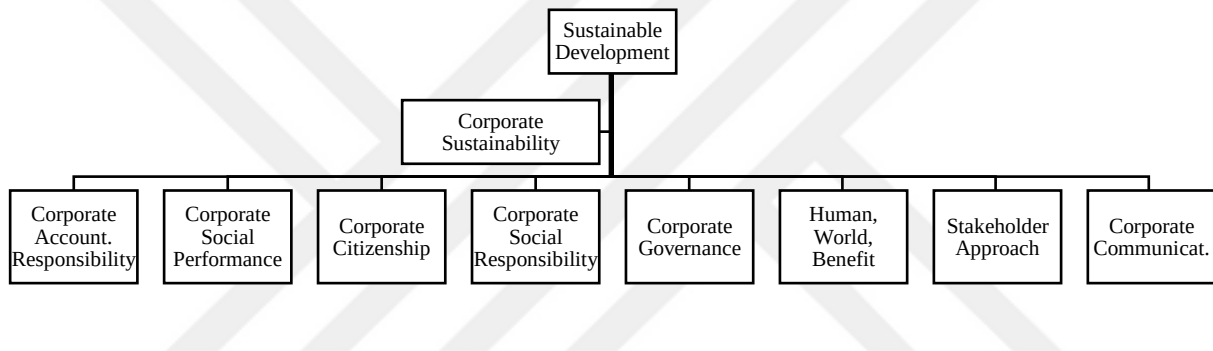


Figure 2.3. Corporate Sustainability and Other Related Concepts

There are many methods that can be used by businesses within the scope of sustainability management (Arena et al., 2009). Life cycle assessment (LCA) is one of these methods and is used to measure the resources used and the environmental impact of a product or service throughout its life cycle (Finnveden et al. 2009). Life cycle costing (LCC) takes into account the economic impacts of services and products throughout their life cycle. ISO 14000, which is used for sustainability management, is defined as the identification, valuation and development of environmental phenomena that will contribute to the quality of the services and products of enterprises. From this perspective, it is imperative that the ISO 14000 system to be implemented in enterprises is integrated with the quality management system of the enterprises.

2.5.6. Dimensions of Corporate Sustainability

In enterprises where the traditional management approach is dominant and prioritizes growth and profitability, economic-oriented activities aimed at increasing shareholder value or reducing costs are at the forefront. For businesses that adopt this approach, profit maximization

and ensuring the continuity of the business are considered sufficient to achieve economic sustainability (Hernadi, 2012). However, for businesses that adopt sustainability principles, it becomes a fundamental necessity to address and realize social, environmental and economic sustainability as a whole.

Corporate sustainability is a management approach that creates long-term business value by managing potential risks while seizing opportunities created by economic, environmental and social developments. Sustainable businesses increase their long-term business volumes by identifying potential markets for sustainable products and services in their strategies while minimizing sustainable risks and costs (Lopez et al., 2007).

In addition, corporate sustainability contributes to the development of business capabilities such as attracting investment capital, developing innovative products and expanding into new markets (Hawkins, 2006). In this framework, corporate sustainability consists of three main dimensions: economic sustainability, environmental sustainability and social sustainability.

2.5.6.1. Economic Sustainability

Economic sustainability involves the effective management of capital assets of enterprises by focusing on the financial and fiscal structure of enterprises. In other words, economic sustainability aims to keep the financial resources of enterprises at an optimal level.

There are two main approaches to economic sustainability in the literature. The first approach addresses the issue in a structural framework by focusing on how organizations and businesses can sustain their existence in the business world. The second approach evaluates the economic impact of businesses on society in line with external factors and stakeholder perspectives.

Economic sustainability necessitates a focus on internal and external impacts in sustainability management. In this context, managing the economic sustainability of microenterprises is possible by focusing on the following aspects.

- Financial performance,
- How intangible assets are managed,
- Economic impact,
- Social and environmental impacts and how these impacts are managed.

The economic sustainability of businesses is closely related to the sustainability of their assets and their economic objectives (productivity, sales revenue, market share, liquidity, net profit). Businesses basically have three economic objectives. These are profitability, growth and sustainability.

Profitability: The main purpose of businesses is to sustain their existence by earning profit as a result of their economic activities. The continuity of businesses is directly related to profit and profitability levels. Profit is traditionally defined as the positive difference between operating revenues and the cost of goods and services sold (Moore, 1988). Profitability, on the other hand, is generally defined as the return that shareholders aim to obtain in return for the capital they invest. Profitability, one of the most basic indicators of financial performance, is calculated using financial ratios. In this method, which is called "ratio analysis", mathematical relationships between accounts or groups of accounts are evaluated and inferences are made about the financial structure and profitability of the enterprise (Akdoğan & Tenker, 2003).

Although the mathematical calculation of a financial ration is relatively simple, each ration needs to be carefully analysed in order to accurately measure financial performance. Ratios, which have limited meaning when taken alone, can provide more meaningful and healthy evaluations when compared with previous periods, established standards and ratios of competitors.

Growth: Businesses, as a social system, tend to grow and it is possible to talk about a growth ambition in all businesses. In other words, there is a tendency for business owners and managers to see growth as a goal and to concentrate their activities in this direction. There are various factors that trigger the desire of businesses to grow. Foremost among these factors is the necessity to achieve competitiveness on a global scale. In addition, factors such as coping with the uncertainties and threats brought about by the rapidly developing economic system, making the most of the opportunities offered by change and speed, the transformation of consumer expectations and the fact that rival businesses operate in large markets with new technologies are among the other important reasons that lead businesses to grow. However, in order for businesses to achieve balanced growth, it is critical that they develop their organizational structures in line with their increasing business volumes.

Continuity: The main purpose of businesses is to generate income by producing goods and services that meet the needs of consumers and to make their activities sustainable in the long term. In this context, going concern is one of the fundamental principles of accounting and one of the most basic assumptions taken as a basis in the preparation of financial statements (Venuti, 2004). The going concern assumption assumes that the entity will continue its current operations indefinitely and will not be liquidated or experience a significant financial change in the near future. This assumption implies that businesses should not only maintain their current profitability, but also achieve long-term growth and financial stability. Going concern is a critical concept in financial management and requires businesses to be resilient to economic fluctuations and maintain their competitive advantage. This principle, which is based on the understanding that businesses can survive independently of their shareholders, plays an important role in financial decision-making processes and ensures the correct interpretation of financial statements (Kaplan & Norton, 1996).

On the other hand, ensuring business continuity is not limited to financial performance. Factors such as environmental factors, regulations, corporate governance practices and changing market conditions also have a direct impact on going concern (Freeman, 1984). Therefore, businesses need to create long-term value and increase their financial resilience by adopting a sustainable growth strategy (Porter & Kramer, 2018).

In the context of the conceptual explanations made above, the economic sustainability of businesses depends on their ability to realize their economic objectives (profitability, growth, continuity).

2.5.6.2. Social Sustainability

Social sustainability is an approach that aims to protect the well-being of society and future generations. At the macro level, it focuses on improving social development and quality of life, while at the micro level, it requires businesses to consider their impact on their employees, suppliers and customers. In this context, protecting the social, economic and cultural rights of individuals and communities are among the key components of social sustainability.

However, it is difficult to clearly define social sustainability conceptually. The main reason for this is that the boundaries between analytical, policy and normative approaches are not clearly

demarcated. Social sustainability is most commonly defined as "the process of creating and maintaining a socially positive condition over the long term" (Morelli, 2011). This definition generally incorporates the following principles.

- Equal access to basic services,
- A relationship system that values different cultures,
- Intergenerational equity,
- Awareness of being a community
- Political participation by citizens.

Social sustainability requires capacity development of human and social capital. While human capital is concerned with the development of individual capacities of employees and business partners, social capital is concerned with improving the quality of public services by strengthening the infrastructure for ecosystems such as education, health, justice, entrepreneurship, etc. From this perspective, socially sustainable businesses not only develop the human capacities of business partners and employees, but also contribute to the development of social capital by providing support for the realization of societal social goals. Social sustainability enables stakeholder understanding of business objectives and stakeholder alignment with the organizational value system of the business (Dyllick & Hockerts, 2002). Therefore, this will serve the legitimacy of the business and business activities and increase the role and power of businesses in society.

2.5.6.3. *Environmental Sustainability*

Environmental sustainability, which is an indispensable part of sustainable development, is defined as the ability to protect the ecosystem and natural resources. Since the ecosystem contains a life cycle, it faces existential threats of damage and extinction. Factors such as population growth, high-scale production and consumption, and air pollution jeopardize the sustainability of natural systems by disrupting environmental integrity. Global climate change is one of the most concrete and striking examples of this threat (Shazad et al., 2020).

The principle of environmental integrity provides a framework to prevent the overconsumption and destruction of the world's air, water and land resources. It recognizes that ecosystems have a limited capacity to regenerate themselves and that overuse can disrupt the ecological balance

and cause irreversible damage. Ozone depletion, biodiversity loss, inadequate waste management, deforestation, greenhouse gas emissions, toxic waste spills and habitat destruction are among the most serious damages to ecosystems caused by human activities. The deterioration of environmental integrity directly threatens not only natural life but also the basic resources of human life such as water, air and food (Önce et al. 2015). In this context, in order to ensure environmental sustainability, it is critical to consider the carrying capacity of ecosystems and manage natural resources responsibly.

Traditionally, policymakers have developed strategies that focus on how to mitigate damage when environmental problems arise. However, it is often not possible to determine in advance exactly when and where environmental threats will occur, nor is it possible to fully reverse their impacts. Therefore, preventive and long-term approaches need to be adopted to ensure environmental sustainability.

Environmental sustainability includes basic principles such as reducing the use of physical resources, adopting a recycling-oriented production approach, preferring renewable resources over non-renewable resources and eliminating the use of toxic substances in production processes. In addition, the protection of natural resources and the sustainable management of ecosystem habitats play a critical role in ensuring environmental integrity. Environmental sustainability management plays a critical role in improving the performance of businesses. Adopting environmentally friendly policies not only contributes to resource efficiency on a global and local scale, but also becomes a strategic marketing tool that gives businesses a competitive advantage (Jugend et al., 2017).

In addition, by creating an environmental image, businesses gain significant advantages such as increasing brand reputation and awareness, gaining consumer trust, benefiting from tax incentives, expanding market share and export volume. In addition, developing innovative capacity and improving business capabilities are among the benefits of environmental sustainability practices (Danso et al., 2019). Today, the expectations of society, information users and business stakeholders from businesses have changed dramatically. This change has made it necessary for businesses to adopt a sustainability approach and to structure their activities within the framework of the aforementioned approach. In this respect, it has become

a necessity for businesses to transform all workflow processes into circular business models and to create environmental strategies in a way to reduce the negative impacts on the ecosystem.

Corporate sustainability gains meaning when businesses manage economic, social and environmental dimensions together. Being able to integrate these three elements in a balanced way increases not only the short-term profitability of businesses but also their capacity to create long-term value. In today's competitive and volatile market conditions, businesses need to embrace sustainability as a strategic necessity, not as a side issue.

This integration process is not only a managerial choice, but also a matter of structure that requires rigor in the choice of methods and tools. In order to implement sustainability effectively in businesses, economic growth targets should be harmonized with environmental and social responsibilities (Herzig & Schaltegger, 2011). At this point, it is inevitable for businesses to address sustainability with a holistic management approach in order to adapt to changing world dynamics and create a lasting impact.

2.5.7. Measuring Corporate Sustainability: ESG Scores and Refinitiv Rating System

There are many ESG databases developed to measure corporate sustainability performance. Among these, Refinitiv ASSET4, KLD (MSCI), Bloomberg, Sustainalytics and EIRIS stand out. Each database differs in terms of scope of assessment, number of indicators and methodological approach.

In the study conducted by Dorfleitner et al. (2015), Refinitiv ASSET4, KLD and Bloomberg databases were compared in terms of ESG scores; it was found that Refinitiv ASSET4 has the largest set of indicators, while KLD uses a more limited number of indicators. In addition, it was observed that Refinitiv ASSET4 provides results with lower standard deviation in ESG scores compared to other databases thanks to its use of Z-score methodology. The positive correlation between the three databases suggests that different systems may share common trends in measuring ESG performance.

In this study, Refinitiv ASSET4 database is preferred for comparative analysis due to its broad data coverage and methodological transparency. Refinitiv currently operates under the umbrella of the London Stock Exchange Group (LSEG) and its ESG rating system is based on more than 870 indicators in the environmental, social and governance areas and covers approximately

16,000 public and private companies. Scores are expressed both in percentiles and letter grades ranging from A+ to D-.

ESG performance is calculated according to twelve categories under three main headings (environmental, social and governance). For each category, the company's performance is compared with similar companies in its sector and scored using the percentage ranking method. This calculation takes into account the proportion of companies that score lower than the relevant company, the share of companies with the same score and the total number of companies. The aim of this method is to emphasize relative performance rather than absolute scores and thus produce fairer and more comparable results (LSEG, 2023). Below is the ESG category score calculation formula applied by Refinitiv.

$$\text{Category Score} = \frac{(\text{Number of firms with worse values} + \frac{\text{Number of firms with the same values}}{2})}{\text{Total number of firms with reported values}}$$

The method of calculating the scores for the main dimensions of ESG is shown in Table 2.

Table 2.1. Environmental, Social and Corporate Governance (ESG) Score Key Dimensions, Categories and Weights

Source: (LSEG, 2023)

Core Dimensions	Categories	Number of Indicators Used in the Evaluation	Weights	Basic Dimension Weights
Environmental	Resource Utilization	20	% 11	% 37
	Emissions	28	% 15	
	Innovation	20	% 11	
Social	Workforce	30	% 16	% 33
	Human Rights	8	% 4	
	Society	14	% 8	
	Product Responsibility	10	% 5	
Corporate Governance	Management	35	% 19	% 30
	Shareholders	12	% 6	
	CSR Strategy	9	% 5	
Total		186	% 100	% 100

As shown in Table 2.2, scores are first calculated at the level of ten categories and then combined into three main dimensions. These three main dimensions are environmental, social and corporate governance. The sub-categories are resource use, emissions and innovation for the environmental dimension; labour, human rights, community and product responsibility for the social dimension; and governance, shareholders and CSR strategy for the corporate governance dimension. Definitions of these scores are given below.

Resource Utilization Score: Analyses the efficient use of energy consumption, water use and other natural resources. This scoring assesses companies' practices to reduce their environmental impact and their effectiveness in this process. In assessing resource use, specific environmental metrics are considered for each industry, taking into account sectoral differences. This methodology also covers the measures taken by companies in line with their resource efficiency and sustainability goals (LSEG, 2023).

Emissions Score: Assesses companies' efforts to reduce emissions of carbon dioxide and other greenhouse gases. This scoring examines companies' emission reporting processes, emission reduction targets and progress towards achieving these targets to determine their impact on reducing environmental impact. The emissions score is calculated by taking into account various factors such as companies' use of fossil fuels, transition to renewable energy, and energy efficiency. This score measures the level of achievement of environmental sustainability goals by accurately reflecting companies' activities to monitor and reduce greenhouse gas emissions (LSEG, 2023).

Innovation Score: Focuses on environmental innovations and the development of sustainable products. This scoring assesses companies' efforts to develop environmentally friendly products and services and support sustainability through green technologies and innovative solutions. The Innovation score examines companies' adoption of technological advances and innovative business models to reduce environmental impact and shows how they contribute to sustainability goals in the sector. This score measures companies' sensitivity to the environment and their effectiveness in producing innovative solutions (LSEG, 2023).

Labour Score: Assesses companies' labour practices, working conditions and workplace safety. This scoring analyses the measures companies take on issues such as employee benefits,

diversity and equality, and investments they make in the overall health of their workforce (Refinitiv, 2022). The workforce score is calculated based on criteria such as companies respecting employee rights, providing equal pay for equal work, ensuring safe working conditions and increasing workplace diversity. This score measures the steps companies take to support their workforce and the policies they implement to improve employee well-being (LSEG, 2023).

Human Rights Score: The human rights score measures a company's compliance with human rights standards across its supply chain, workforce and operations. This score is particularly relevant to how companies tackle critical human rights violations such as forced labour, child labour, discrimination and workplace rights. Refinitiv's human rights score assesses whether companies demonstrate transparency and accountability in various human rights areas. It also examines the measures companies take against human rights violations in the supply chain and policies that demonstrate their sensitivity to human rights (LSEG,2023).

Community Score: Analyses a company's impact on society, social responsibility and contributions to local development. This score measures companies' investments in areas such as public health, education, environmental impact, engagement with local communities and volunteering. The Community score functions as a system to assess companies' social contributions, in particular their practices in community health, educational opportunities, diversity and equality programs. It also covers companies' relationships with local communities and social responsibility projects (LSEG, 2023).

Product Responsibility Score: Reflects a company's capacity to produce quality products and services and the extent to which it integrates its responsibilities for customer health and safety, integrity and data privacy. This score assesses companies' compliance with the principles of ethical responsibility, transparency and sustainability in product design, development and marketing. Product safety measures, recall processes and accurate consumer information also play an important role in determining this score. Refinitiv grades the product responsibility performance of companies based on sector-specific data (LSEG, 2023).

Management Score: Evaluates a company's corporate governance practices and leadership strategies. This score includes factors such as the independence of the board of directors,

transparency in the company's decision-making processes, communication with stakeholders, and managers' adherence to ethical standards. The score is also influenced by the company's financial management, the performance of executives and the level of value creation for stakeholders. The management score reflects the company's efforts to achieve sustainable growth and create long-term value, providing an important indicator of confidence for investors.

Shareholders Score: Measures the extent to which a company fulfils its responsibilities to its shareholders. This score includes factors such as the protection of shareholder rights, transparency of communication with shareholders and the extent to which shareholders are active in the management of the company. In addition, the company's dividend policy, dividend distribution and strategies for protecting shareholders' investments are also factors that affect this score. The shareholder score helps to increase investor confidence by reflecting the company's efforts to create and sustain shareholder value.

CSR Strategy Score: Reflects a company's practice of integrating economic (financial), social and environmental dimensions into its daily decision-making processes. This score indicates how successfully the company has incorporated sustainability and social responsibility principles into the way it does business. It includes the company's efforts to create social benefits by balancing environmental sustainability, community well-being and economic development. The CSR strategy assesses the way the company fulfils its social responsibilities and its commitment to ensuring transparency and efficiency in this process.

2.5.8. Sustainability Reporting and Development

Sustainability reporting is a process that involves systematically measuring the economic, environmental and social performance of businesses and presenting them to stakeholders in line with the principles of transparency and accountability. While these reports reveal how businesses contribute to sustainable development goals, they also serve as a guiding tool for investors, regulatory authorities and other stakeholders in strategic decision-making processes (Elkington, 1997; GRI, 2021).

Sustainability reports are defined by the World Business Council for Sustainable Development (WBCSD) as public documents prepared by businesses to communicate their corporate

activities in economic, environmental and social dimensions to internal and external stakeholders. There are many different definitions of sustainability reporting in the literature. Some of the widely accepted definitions are presented below.

Godfrey and Hatch (2007) consider sustainability reporting as a reporting process integrated into business activities in which companies systematically document their social and environmental practices and present these practices to stakeholders (employees, shareholders, investors, consumers, public authorities, etc.).

Önce, Onay and Yeşilçelebi (2015) defined sustainability reports as the process of informing information users about the activities carried out by businesses in line with the sustainability approach and the performance of these activities.

Based on these definitions, it is possible to evaluate sustainability reporting as an important communication tool that takes into account all stakeholder groups and contributes to business continuity by evaluating corporate performance in economic, social and environmental terms.

Today, businesses operate in a business environment where responsibility disclosure has become a prerequisite for gaining competitive advantage and corporate social responsibility stands out as a strategic element (Walker & Sanjuan, 2008). Sustainability reporting is gaining importance for businesses not only as a means of adapting to changing competitive conditions but also as a strategic management approach (Eccles & Saltzman, 2011). Indeed, recent reports and field studies show that the number of businesses reporting on sustainability is increasing significantly every year. This trend is observed as a concrete reflection of the increasing adoption of corporate sustainability in the business world.

An assessment of the development of the sustainability reporting process reveals that there are two main reasons that lead businesses to prepare reports. The first reason is the demand of business stakeholders for a comprehensive and detailed assessment of business activities and the increasing pressure on reporting processes in this direction. Stakeholders expect businesses to transparently disclose not only their financial performance but also their environmental and social impacts. This expectation makes it mandatory for businesses to measure and report their sustainability performance in a more systematic way. The second reason is that sustainability

reporting is seen as a reputational tool for businesses and it is realized that contributions made in social and environmental areas can also benefit businesses in the long run (Gao, 2011). In addition to these main reasons, other factors that drive businesses towards sustainability reporting include the practices of regulatory bodies, the risk of inadequate or low-quality disclosures creating negative perceptions about the current performance and future risks of the business, and the need to legitimize the activities of businesses in order to sustain their existence in the long term (Düzer, 2018). In particular, the failure of businesses to present transparent and comprehensive sustainability reports may lead to a negative perception among stakeholders, damaging the reputation of businesses and investor confidence. Therefore, businesses should consider sustainability reporting not only as a legal obligation but also as a means of establishing reliable and continuous communication with stakeholders.

Through sustainability reporting, businesses communicate with all stakeholder groups (employees, investors, shareholders, consumers, suppliers, trade unions, non-governmental organizations, regulatory bodies, government) for the reasons mentioned above or for many similar reasons.

While sustainability reporting is considered as external reports to inform information users and stakeholders, it also requires the active participation of employees and managers in the processes of setting sustainability goals and collecting relevant data. This process is not only an accountability tool for external stakeholders, but also contributes to the creation of a sustainability-oriented management culture within the organization. In this context, the interaction of reporting processes within the organization and the effective management of communication are of great importance for the successful implementation of sustainability reporting (Schaltegger et al., 2006). By encouraging the participation of internal stakeholders in the process, businesses can both ensure accurate and comprehensive data collection and implement sustainability strategies more effectively.

Businesses that engage in sustainability reporting are able to analyse the positive and negative aspects by determining their future goals regarding sustainability. In addition, sustainability reporting mediates the formation of corporate image and customer loyalty by enabling the disclosure of the intangible values of the enterprises.

In terms of gaining competitive advantage, sustainability reports play an important role in this area by providing businesses with the opportunity to compare with their competitors. In this respect, it is possible to list some of the important contributions of sustainability reporting to businesses as follows (Herzig & Schaltegger, 2011).

- Identify the products, value added, services and activities that are created financially, environmentally and socially,
- Providing competitive advantage to businesses and creating the opportunity to compare with competitors,
- Contributing to corporate image formation, increasing brand value and business reputation
- Enhancing institutional accountability,
- Ensuring internal control and motivating employees positively.

When the emergence and development process of sustainability reporting is examined, it is possible to evaluate that many variables were effective in the same period; however, criticism of the traditional accounting approach is the driving force for the beginning of the process. Global financial crises, accounting scandals, climate change, epidemics and other developments in this regard have changed the expectations and evaluations of traditional financial reporting and led to criticism of the traditional reporting approach. These criticisms are that financial accounting evaluates business activities from a narrow perspective, prioritizes profitability, and puts social and environmental issues in the background, and has deficiencies in the evaluation of corporate activities that create environmental impacts (Schaltegger & Burrit, 2003). With the change in stakeholder expectations, the increasing role and power of businesses in society has led to the need for businesses to focus on social phenomena and make disclosures on these issues. Corporate social responsibility reporting has been developed to meet this need.

The corporate social responsibility reporting process, which started in the 1970s with social reporting that included the themes of society and human capital, paved the way for the emergence of reports that included environmental issues and later financial issues (Kolk, 2004,). Environmental reporting, which emerged about 10 years after the reporting approach focusing on social areas, expanded the scope of social reporting. In environmental reporting,

environmental effectiveness is the main focus. In other words, the absolute level of environmental factors in the realization of business activities is taken into account.

In the initial phase of sustainability reporting, while a unidimensional perspective was dominant, bidirectional relationships between different axes have started to be established over time. In particular, integration processes focused on economic efficiency between environmental and economic dimensions and social efficiency between economic and social dimensions have developed (Herzig & Schaltegger, 2011).

In the case of businesses, reporting processes, which were initially shaped solely on the basis of monetary indicators, have evolved into a more comprehensive and multidimensional structure over time. This transformation is detailed in Figure 2.4 (Herzig & Schaltegger, 2011).

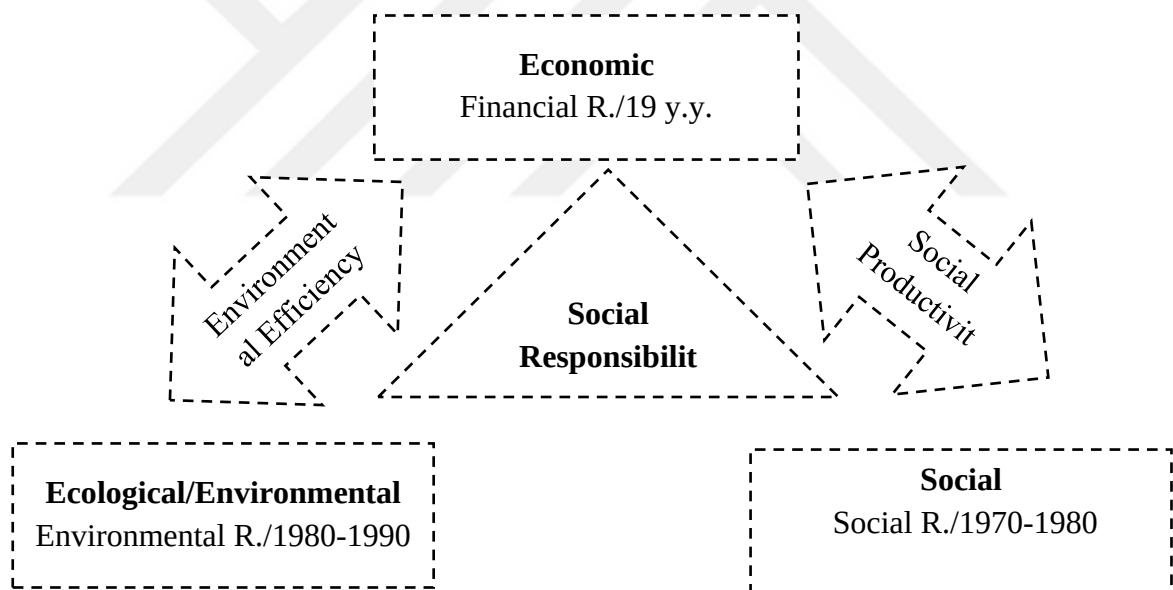


Figure 2.4. Evolution of Reporting

As seen in Figure 2.4, the reporting process in enterprises started in the 19th century with an economic-oriented perspective and formed the basis of financial reporting processes. In the 1970s, changes in societal expectations, the adoption of a social development approach and increased sensitivity to social and political issues led to a greater emphasis on the social dimension in reporting processes. In this period, the concept of social reporting developed and businesses were expected to include elements such as employee rights, contributions to society

and ethical values in their reporting. Environmental reporting started to gain importance in the 1990s with the increasing effects of climate change, environmental pollution and natural disasters. In this period, businesses started to evaluate their environmental impacts more systematically and to develop sustainable environmental policies. This transformation has led to the evolution of sustainability reporting into a holistic approach that addresses economic, social and environmental dimensions together.

The development of sustainability reporting gained momentum with the Triple Bottom Line (TBL) approach introduced by environmental economist John Elkington in 1994. This approach was developed in Elkington's 1997 book *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, published by Elkington in 1997. The triple bottom line approach emphasizes that businesses should evaluate their sustainability performance not only through financial indicators but also through their social and environmental impacts. This model argues that businesses should fulfil their social responsibilities and minimize their environmental impacts while ensuring economic sustainability (Elkington, 1997). In this framework, many businesses published sustainability-oriented reports to inform the public at the time and shaped these reports in line with the triple bottom line approach. The TBL model has made a significant contribution to the popularization of sustainability reporting by demonstrating that businesses should balance their financial success with their social and environmental responsibilities in their long-term value creation processes (Norman & MacDonald, 2004). Today, sustainability reporting has evolved in line with the basic principles of this approach and has been established in global standards and continues to be implemented by many businesses.

In the Elkington approach, the key to measuring the holistic performance of businesses with the perspective of sustainable development goals is considered as profit, people and planet within the dimensions known as the triple bottom line (3P). The approach argues that it will not be possible for businesses to achieve the desired level of economic, social and environmental sustainability (separately) without simultaneously achieving at least the basic level of the three sustainability axes (McKenzie, 2004). More precisely, Elkington's 3P approach is a model for measuring the performance of businesses by incorporating social and environmental dimensions into traditional economic metrics. This framework put forward by Elkington is a critical development in sustainability reporting. In this context, it would be appropriate to

evaluate that the 1990s was a period in which the sustainability approach was adopted in the field of accounting and finance and a conceptual framework was established.

Since the 1990s, businesses have focused on disclosing the interrelationships between economic output and environmental input (environmental efficiency) in their reporting (Herzig & Schaltegger, 2011). The fact that businesses included economic and environmental areas and their interrelationships in their reporting in this period is in line with the importance of the interaction between the three axes (economy, environment, social) in today's sustainability reporting. This period has witnessed a significant increase in the number of companies reporting on economic, social and environmental areas (Kolk, 2004). These developments reveal the general framework of corporate sustainability activities of enterprises and reflect the claims of enterprises to explain to their stakeholders to what extent and how they contribute to sustainable development.

The report published by British Petroleum in 1999 constitutes the first example of the three-dimensional reporting method. In addition to the reporting approach that is independent from financial reporting, a reporting method that integrates environmental and social issues into financial reporting is also among the methods used in this period. Renault was one of the companies that used this method. Apart from these two approaches, there were also companies that published reports in the form of corporate citizenship reports, social reports, corporate responsibility reports and environmental reports. Each of the aforementioned approaches constitutes a type of practice adopted by businesses that aim to explain and inform different stakeholder groups about corporate sustainability (Herzig & Schaltegger, 2011).

The 2000s have been a period when sustainability reporting started to be institutionalized on a global scale and supported by legal regulations. In this process, it is seen that sustainability reporting has moved from being only a voluntary practice for businesses to becoming a necessity within the framework of corporate governance (Kolk, 2004). The development of international standards for sustainability reporting has been an important step of this period. Businesses started to report their social and environmental impacts as well as their financial performance, thus aiming to meet stakeholder expectations (Hopwood et al., 2010). In addition, the European Union introduced the Non-Financial Reporting Directive (NFRD) in 2014, requiring large-scale companies to disclose their sustainability performance (EC, 2014).

In the post-2010 period, the concept of integration in sustainability reporting has come to the forefront and new reporting frameworks that combine financial and non-financial information have started to be developed (Eccles & Krzus, 2010). Environmental, social and governance (ESG) criteria have also become an important factor in investor decisions, leading businesses to more systematize sustainability reporting (Friede, Busch & Bassen, 2015).

In 2020 and beyond, sustainability reporting has become more digitalization and regulation-oriented. In particular, regulatory practices such as the European Union Green Deal, the Corporate Sustainability Reporting Directive (CSRD), IFRS S1 and IFRS S2 have brought more comprehensive reporting obligations to companies (EC, 2023). While topics such as carbon footprint calculations, circular economy practices and climate risk are prominent in sustainability reporting, the number of sustainability reports powered by block chain technology and using advanced analytical methods is increasing day by day.

In the future, sustainability reporting is expected to develop further and become more central to the decision-making processes of businesses. Global policies such as combating climate change, green financing and carbon neutrality targets make the content of sustainability reporting more comprehensive. Increasing pressures on businesses to minimize their environmental impact and fulfil their social responsibilities cause reporting to become a strategic competitive advantage rather than just a compliance tool.

Similarly, digitalization and technological developments are expected to transform sustainability reporting. Big data analytics, block chain-based reporting systems and artificial intelligence-supported analytics will enable businesses to monitor their sustainability performance more transparently and instantly. Reporting processes will become more efficient and verifiable, especially thanks to automated data flows. On the other hand, sustainability reporting is expected to undergo a stakeholder-oriented transformation. As investors, consumers and regulators more closely monitor businesses' fulfilment of their sustainability commitments, it will become increasingly important for companies not only to publish reports but also to support their sustainability practices with concrete actions.

Sustainability reporting has become a necessity for businesses and an integral part of corporate governance. While ESG criteria and international reporting frameworks allow businesses to

report their sustainability performance in a more transparent manner, digitalization and legal regulations pave the way for this process to evolve into a more comprehensive structure in the future.

2.5.8.1. Chronology of Global Regulatory Developments in Sustainability Reporting

The need to include non-financial information in financial reporting has become increasingly important over the last 20 years. Today, information users demand that businesses provide transparent, reliable, comparable and high quality reports on their environmental impacts, climate change, human rights, labour policies, corporate governance structures and strategic plans. This demand has become critical not only for investors, but also for regulators and other stakeholders.

In particular, the rapidly increasing effects of climate change and the COVID-19 pandemic have increased the interest in sustainability reporting, and social issues such as value chain, supply chain, worker health and safety have become more prominent. Sustainability reporting has been at the centre of this transformation as businesses try to direct their activities in line with sustainable development goals.

Global regulations on sustainability reporting started with the adoption of the sustainable development approach and gained momentum with the increase in environmental problems, especially since the 1990s. Various international frameworks and organizations have been established to enable businesses to report their environmental, social and governance (ESG) performance. In this context, the following initiatives have shaped the development of sustainability reporting:

- In 1989, the Coalition for Environmentally Responsible Economies (CERES) was established. CERES is an initiative of labour unions, investment funds and environmental boards, and its main purpose is to improve the environmental, social and corporate governance processes of businesses.
- In 1997, the Global Reporting Initiative (GRI) was established by CERES and the TELUS Institute. The GRI guide for reporting non-financial information aims to guide businesses to prepare their reporting on environmental and social issues within the

framework of certain standards (GRI, 2014:3). Today, the GRI guidelines are the most widely recognized reporting framework for reporting non-financial information.

- In July 2000, the United Nations Global Compact was signed. This is a non-binding initiative that encourages businesses to comply with the principles of sustainable development. This framework, which was created for the business world to fulfil its social responsibilities, is shaped around basic principles such as human rights, labour standards, environmental sustainability and anti-corruption. Companies that sign the Global Compact commit to adopt sustainable business practices and submit regular progress reports.
- In 2000, the Carbon Disclosure Project (CDP) was launched. CDP, a London-based non-profit and international organization, mediates publicly listed companies to report to investors how they use natural capital and natural resources, how their activities affect the reproduction of limited resources and how they manage their risks in this area. CDP's main objective is to help organizations reduce greenhouse gas emissions, better manage water resources and address environmental issues. To this end, CDP collaborates with many organizations around the world. CDP's work plays an important role in promoting transparency and providing more information and mobility in the fight against climate change.
- In 2007, the Climate Disclosure Standards Board was established. The Climate Disclosure Standards Board was established as a partnership between a number of climate change risk standard-setting bodies, including the Carbon Disclosure Project (CDP), the Coalition for Environmentally Responsible Economies (CERES), the California Climate Board and the Greenhouse Gas Protocol. The Board's mandate is to 'provide guidance on integrating climate change-related information into mainstream financial reporting'³ (Thistlethwaite, 2015).
- In 2010, the International Integrated Reporting Council (IIRC) was established. The IIRC is a global organization of businesses, investors, lawmakers, regulators and non-governmental organizations. IIRC provides a general framework for sustainability reporting for businesses whose shares are listed on international stock exchanges.

³ Mainstream reporting refers to 'the annual reporting that businesses and other organizations are required to make on their economic activities, presenting their financial results within the frameworks set by regulatory bodies.

- In 2011, the Sustainability Accounting Standards Board (SASB) was established in the United States. The Board has developed sector-based sustainability reporting standards for publicly listed companies in the United States of America and introduced the obligation to report in accordance with these standards. In addition, performance measurement tools have been developed to enable investors to evaluate the sustainability performance of publicly listed companies (Akarçay, 2014). The Sustainability Accounting Standards Board differs from other sustainability reporting organizations in that it focuses on listed companies and develops sector-specific standards for the preparation of mandatory reports.
- In 2014, the European Union adopted a directive on disclosure of non-financial information, known as Corporate Social Responsibility (CSR) reporting. The Directive aimed to further clarify companies' responsibilities towards society and the environment and to ensure greater accountability for social and environmental sustainability.
- In 2015, the Financial Stability Board (FSB) established the Task Force on Climate-related Financial Disclosures (TCFD). The main objective of the Task Force is to provide recommendations to ensure that climate-related policies, strategies and practices are disclosed to investors and stakeholders as a standardized norm. These recommendations are expected to enable economic actors to make more effective and accurate decisions.
- In 2018, non-financial reporting directives entered into force in European Union countries. The non-financial reporting directives cover the reporting principles on environmental, social and governance areas for enterprises that have more than 500 employees and are defined as public benefit companies (such as banks, insurers and publicly listed companies).

Today's market conditions require reporting that will support information users' information-driven decision-making processes by analysing companies' sustainability-related opportunities and risks, and the establishment of comprehensive, objective and reliable reporting frameworks for reporting sustainability information. This obligation has led to accelerated developments in sustainability reporting on a global scale. This was epitomized by the establishment of the International Sustainability Standards Board by the International Accounting Standards Foundation at the 2021 United Nations Climate Change Conference (COP26).

Under the umbrella of the International Sustainability Standards Board, IFRS has combined the work of the Climate Disclosure Standards Board and the International Integrated Reporting Council. As an umbrella organization, ISSB's main objective is to publish IFRS sustainability disclosure standards that include disclosure of risks and opportunities related to environmental, social and governance issues that should be considered in determining the market value of companies. In this way, it is aimed to remove the current fragmented and complex structure in sustainability reporting. For this purpose, a Technical Preparatory Working Group was established by the IFRS Foundation in 2021. The working group prepared two draft texts, IFRS S1-General Disclosure Requirements for Sustainability Related Financial Information and IFRS S2-Climate Related Disclosures, and published them on March 31, 2022. The final version of the drafts was published by the International Sustainability Standards Board on June 26, 2023. On July 25, 2023, the International Organization of Securities Commissions (IOSCO) announced its endorsement of these standards published by the ISSB. IOSCO's endorsement created a strong image to global regulators that ISSB standards are suitable for use in capital markets, enable the pricing of sustainability-related risks and opportunities, and facilitate analysis by enabling the use of expanded data collection methods (kgk.gov.tr, 2023). To support compliance with the standards, IFRS published a roadmap of strategies to be followed simultaneously with IOSCO's approval. In order to be binding, the details of the standards will be covered separately under a different heading in the study. The latest development regarding sustainability reporting on the ISSB side is the establishment of the Transition Implementation Group (TIG) on September 14, 2023 and the announcement of its members. The TIG was established to support the implementation of IFRS S1 and IFRS S2, to provide a public platform for any stakeholder to raise implementation questions to the ISSB and to follow up on the process for resolving these questions. The TIG consists of 17 members, 13 preparers and four assurance providers. Members are appointed based on their deep technical expertise in sustainability and/or financial reporting (IFRS, 2023).

In 2021, the European Union, an important actor in sustainability reporting processes, entered into a partnership agreement with GRI and the European Financial Reporting Advisory Group (EFRAG) to start working on the European Sustainability Reporting Standards, which will be used by approximately 50,000 enterprises. This process continued with the EU Council's approval of the Corporate Sustainability Reporting Directive (CSRD) prepared by EFRAG in December 2022 (EFRAG, 2023). Following this development, the European Commission

approved the first set of European Sustainability Reporting Standards (European Sustainability Reporting Standards-ESRS) to be used within the scope of the "Corporate Sustainability Reporting Directive" on July 31, 2023 and published the final version (EC, 2023). The relevant publication also includes explanations on harmonization and interoperability with other global reporting standards. Accordingly, The European Commission is working with the International Sustainability Standards Board (ISSB) and the European Financial Reporting Advisory Group (EFRAG) to improve the interoperability of the disclosure provisions in its climate-related standards. As a result of this work, reporting obligations and duplication of disclosures will be reduced for entities that wish to report under both ESRS and ISSB standards by meeting the disclosure requirements in both standards (EFRAG, 2023).

The US Securities and Exchange Commission (SEC) has published a draft for new regulations requiring public companies to disclose their financial risks related to climate change in 2022. As of 2023, the regulations include the requirement for companies to report carbon emissions and disclose climate risks in their financial statements. These regulations of the SEC aim to increase transparency, especially in the decision-making processes of large investors (SEC, 2023). As of 2024, the SEC clarified the implementation schedule and scope of these regulations. Under the new regulations, companies are required to report Scope 1, Scope 2 and, in certain cases, Scope 3 emissions. In addition, large companies are required to provide disclosures on how they manage climate-related risks. The SEC requires companies to detail their climate change-related costs and liabilities in their financial statements so that investors can better assess climate risks. In addition, the SEC's regulations require companies to disclose their climate-related transition risks, physical risks and carbon mitigation strategies. The implementation phases will be staggered depending on the market size and the sector of the company. Some flexibility is envisaged for small and medium-sized enterprises, and the final reporting standards are expected to be fully effective by 2025 (SEC, 2024).

Developments in sustainability reporting have also brought the issue of how and according to which standards the reporting will be audited to the agenda. Standards issued by the International Auditing and Assurance Standards Board (IAASB) are widely used in the audit of sustainability reports worldwide.

In addition to this regulation, the IAASB standard on assurance audits of sustainability reports "International Sustainability Assurance Standard 5000, General Requirements for Assurance Audits of Sustainability Reports" was approved and entered into force in 2024 (IAASB, 2024).

Sustainability reporting is an increasingly regulated practice that enables companies to transparently disclose their environmental, social and governance (ESG) impacts. Global regulations in this area include significant changes that require businesses to measure and share their sustainability performance with stakeholders. IFRS 1 and IFRS 2 are also applied in Türkiye and will be discussed separately under Türkiye. In addition, the European Union's Corporate Sustainability Reporting Directive (CSRD) brings a significant transformation for businesses in Europe by expanding non-financial reporting obligations. The scope and implications of the CSRD are discussed in detail below.

European Union Corporate Sustainability Reporting Directive: On July 31, 2023, the European Commission approved the Corporate Sustainability Reporting Directive (CSRD), which extends the regulations on sustainability reporting and requires companies to report environmental, social and governance (ESG) factors in a more transparent manner (European Commission, 2023). This directive was developed by the European Financial Reporting Advisory Group (EFRAG) and is shaped in line with the European Green Deal and the European Union's 2050 net zero emission targets (EFRAG, 2023). With the entry into force of the CSRD, approximately 49,000 enterprises are expected to be obliged to sustainability reporting. The Corporate Sustainability Reporting Directive adopts the principle of double materiality, which takes into account the financial impacts of sustainability issues on businesses and the impacts of businesses on the environment and society (Christensen, Hail & Leuz, 2021).

Under this principle, companies are required to report not only the impact of sustainability aspects on their financial performance, but also the environmental and social dimensions of their activities. The double materiality approach is in line with the European Union's sustainable finance and responsible investment strategies and aims to enable investors and stakeholders to make more informed decisions (Adams & Abhayawansa, 2022). CSRD is regulated within the framework of the European Sustainability Reporting Standards (ESRS) and these standards determine what information companies should report. The Corporate Sustainability Reporting

Directive consists of 12 directives covering all sustainability issues. Figure 2.5 (<https://ec.europa.eu/>, 2023) details these directives.

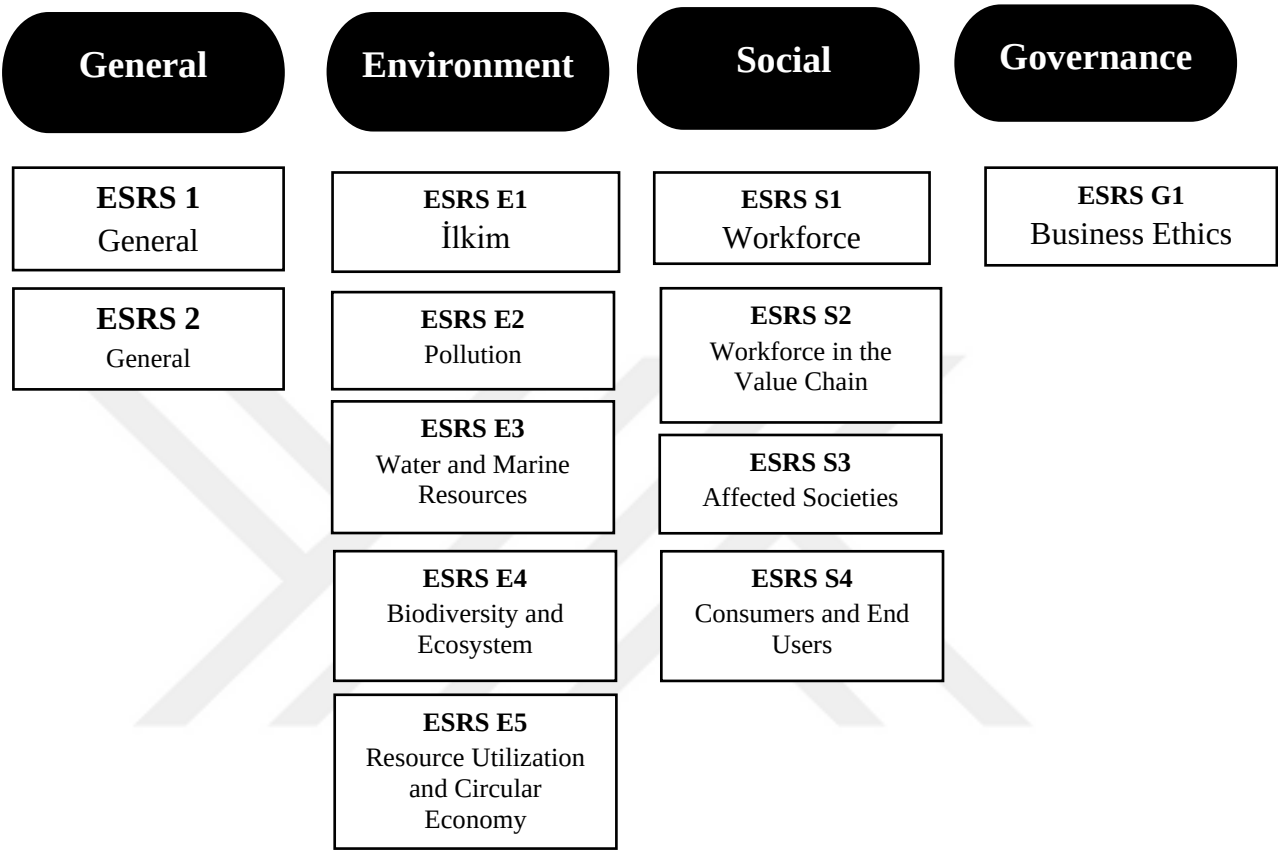


Figure 2.5. EU Corporate Sustainability Standards Directive

ESRS 1 (General Requirements) contains the basic principles to be applied in the reporting process, while ESRS 2 (General Disclosures) covers the basic sustainability information that companies must disclose. ESRS 2 is mandatory for all companies under the CSRD. All other standards and disclosures are based on materiality. This means that entities are only required to report information that is material to their operations, but not immaterial information.

When reporting information that is subject to the materiality principle, entities are obliged to assess the impact of sustainability issues on their activities. Disclosure of information deemed material is mandatory and this assessment process is subject to external audit under the provisions of the Accounting Directive. The standards require undertakings to report

sustainability data through a comprehensive materiality process in accordance with the objectives and requirements of the Accounting Directive. If an entity concludes that climate change is not a material issue for its operations, it is required to disclose in detail the materiality assessment that supports that decision. This requirement reflects the fact that climate change has far-reaching and systemic impacts on the economy and aims to ensure that businesses take a responsible and transparent approach.

The reporting obligations of businesses under the Corporate Sustainability Reporting Directive (CSRD) will enter into force in certain stages.

Table 2.2. Sustainability Reporting Calendar under CSRD

Businesses in Scope	First Fiscal Year	First Reporting Year
Large companies subject to the NFRD (large listed enterprises, large banks, insurance organizations and large non-EU listed companies with more than 500 employees)	2024	2025
Other large enterprises not listed on the EU stock exchange	2025	2026
Listed small and medium-sized enterprises (SMEs)	2026	2027
Exemption period for listed SMEs (optional)	2028	2029
Non-EU businesses operating in the EU with an annual turnover of over €150 million and businesses with a branch in the EU with an annual turnover of over €40 million	2028	2029

The details of the obligation for each type of entity are provided below.

- Large companies subject to the Non-Financial Reporting Directive (NFRD) (large listed companies, large banks and insurance organizations) and large non-EU listed

companies with more than 500 employees will start reporting under the CSRD in 2024 and publish their first sustainability report in 2025.

- Other large enterprises that are not listed on an EU stock exchange will be subject to the CSRD from 2025 and will publish their first sustainability report in 2026.
- EU-listed small and medium-sized enterprises (SMEs) will start reporting in 2026 and publish their first sustainability disclosures in 2027. However, listed SMEs can request an exemption from the reporting obligation for two years, in which case they must start reporting no later than 2028.
- Businesses that are not EU members but operate in the EU and have an annual revenue of more than EUR 150 million, and businesses with branches in the EU and an annual turnover of more than EUR 40 million will be included in the scope of CSRD in 2028 and will publish their first sustainability reports in 2029 (ESG Investing, 2022).

2.5.8.2. Chronology of Regulatory Developments in Türkiye on Sustainability Reporting

Developments in the field of sustainability reporting at the global level are closely monitored by Türkiye and regulations in this field are established in line with international standards. The first regulatory framework for corporate governance and sustainability reporting in Türkiye was established by the Capital Markets Law and the Capital Markets Board (SPK) Communiqué on Corporate Governance Principles.

The first regulatory provisions on corporate governance and corporate sustainability reporting in Türkiye were included in the Capital Markets Law and the Communiqué on Corporate Governance Principles of the Capital Markets Board (Sermaye Piyasası Kurulu [SPK]). In 1999, the Communiqué was prepared on the basis of the corporate governance principles published by the OECD and identified transparency, responsibility, fairness and accountability as corporate governance principles. The "Capital Markets Board Corporate Governance Principles" published by the Board in 2003 were updated in line with international developments (OECD, 1999).

In Türkiye, the process of sustainability reporting regulations continued with the signing of a cooperation agreement between Ethical Investment Research Services Limited and Borsa

Istanbul for the calculation of the BIST Sustainability Index. The main purpose of the index, which is based on the environmental, social and corporate governance performance of businesses, is to increase awareness, knowledge and practices regarding sustainability reporting among Borsa Istanbul companies and Türkiye in general. The index has made it possible to compare⁴ the corporate sustainability performance of businesses at local and global level. Within the scope of the agreement signed between EIRIS and Borsa Istanbul, the companies in the BIST 30 Index were given until June 30, 2014 to disclose their sustainability data to the public (BIST, 2014). Following the completion of the valuation studies, the index started to be calculated as of September 2014. Within the scope of the agreement signed between Borsa İstanbul and Refinitiv Information Limited Company on August 16, 2021, Refinitiv's sustainability valuation results started to be used in determining the companies to be included in the BIST Sustainability Index as of 2021 valuations. Only publicly available data is taken as the basis for sustainability assessments, and only those companies that voluntarily participate among the companies listed on the Stars, Main and Sub-Markets are included in the assessment. Following the development regarding the calculation of the sustainability index, the Sustainability Principles Compliance Framework, the implementation of which is voluntary, entered into force with the Communiqué on the Amendment of the Capital Markets Board's Corporate Governance Communiqué No. II-17.1 (II-17.1.a) published in the Official Gazette dated 02.10.2020. In the regulation regarding sustainability reporting in the aforementioned communiqué;

- Disclosures within the scope of the Sustainability Principles Compliance Framework are included in Corporate Governance Principles compliance reporting,
- In the annual reports, along with other issues related to the activity, the extent to which the sustainability principles are complied with, if not, the justified explanation for this situation, and information on the impacts on environmental and social risk

⁴ A standardized calculation method for measuring sustainability performance has not yet been developed. The Sustainability Accounting Standards Board (SASB) has been working since 2018 to establish sustainability reporting standards. The "Sustainability Reporting Standards", which are expected to be published in the near future, will consist of principles that will guide financial sustainability disclosures to be prepared by businesses for presentation to information users and standards that define the subsets of environmental, social and governance (ESG) issues related to sector-specific financial performance. These standards, which are in the process of preparation, are designed to have principles that are different in approach from previous sustainability guidelines but complementary to each other, especially with the GRI approach (SASB, 2020).

management due to not fully complying with these principles (Official Gazette, 2020).

At the 2021 United Nations Climate Change Conference (COP26), as a parallel development to the establishment of the International Sustainability Standards Board by the International Accounting Standards Foundation (IASB), the Public Oversight, Accounting and Auditing Standards Authority (KGK) was authorized to determine and publish the Turkish Sustainability Reporting Standards in line with international standards in order to ensure unity in practice and international validity of sustainability reporting for the enterprises and organizations it determines (Official Gazette, 2021). In addition, institutions such as the Capital Markets Board, the Insurance and Private Pension Regulatory (Sigortacılık ve Özel Emeklilik Düzenleme ve Denetleme Kurumu [SEDDK]) and Supervisory Authority and the Banking Regulation and Supervision Agency (Bankacılık Düzenleme ve Denetleme Kurumu [BBDK]) are authorized to make detailed regulations in the standards related to their fields in accordance with the Sustainability Reporting Standards to be put into force. Within the scope of its authorization, KGK published the Turkish draft texts of IFRS S1-General Disclosure Requirements for Sustainability-Related Financial Information and IFRS S2-Climate Disclosures published by ISSB and submitted them for public comment. The related standards (TSRS) S1 and S2 entered into force after being published in the Official Gazette dated December 29, 2023 and numbered 1 bis (Official Gazette, 2023a). These standards will be discussed in detail below.

With the decision of the Public Oversight, Accounting and Auditing Standards Authority (KGK) published in the Official Gazette dated September 5, 2024 and numbered 32653, assurance audits on sustainability reporting have become mandatory. In line with this decision, sustainability reports to be prepared for the accounting periods starting from January 1, 2024 will be subject to assurance audits starting from the first year of issuance. It has been decided that assurance audits will initially be conducted at the limited assurance level within the framework of GDS 3000 "Assurance Engagements Other Than Independent Audits or Review Engagements of Historical Financial Information" and GDS 3410 "Assurance Engagements on Greenhouse Gas Disclosures" standards. It is envisaged that the scope of the audit will be expanded over time and the transition to the reasonable assurance level will be evaluated in the following years.

The Draft Regulation on Türkiye Green Taxonomy was published by the Climate Change Directorate under the Ministry of Environment, Urbanization and Climate Change in September 2024 and submitted for public consultation. The draft aims to support economic activities in line with sustainable development goals and to encourage the flow of financing to sustainable investments. The draft regulation envisages a voluntary reporting process until December 31, 2026, and plans to start mandatory reporting and verification processes as of January 1, 2027. Work is ongoing in line with the evaluations of relevant institutions and feedback from the public to finalize the draft and bring it into force (MoECC, 2024).

Turkish Sustainability Reporting Standards (TSRS 1 and TSRS 2): In order to achieve global sustainable development goals, financial markets are moving towards a new reporting paradigm focused on environmental, social and governance (ESG). This transformation is shaped by changes in investor behaviour as well as corporate expectations for transparency, accountability and long-term value creation. In line with this transformation process, Türkiye has adopted the Turkish Sustainability Reporting Standards (TSRS) in order to strengthen its sustainability-oriented reporting infrastructure. In this context, TSRS 1 - General Provisions on Disclosure of Sustainability-Related Financial Information and TSRS 2 - Climate-related Disclosures were published in the Official Gazette dated December 29, 2023 and numbered 1, and entered into force as of January 1, 2024 (Official Gazette, 2023a).

These standards were prepared in full compliance with IFRS S1 and IFRS S2 standards developed by the International Sustainability Standards Board (ISSB) and aim to contribute to Türkiye's integration with the global sustainable finance ecosystem. In this respect, TSRS not only increases corporate transparency, but also facilitates access to sustainable investment flows and supports regulatory alignment with the European Union's Corporate Sustainability Reporting Directive (CSRD).

However, sustainability reporting is not a direct and absolute obligation for every business. According to Article 3 and related regulations published by the Public Oversight, Accounting and Auditing Standards Authority (KGK), in order for an entity to be subject to sustainability reporting, it must first be one of the types of entities listed in the first paragraph of Article 3 of the Board Decision and subject to limits (KGK, 2023). This list is based on organizations of public interest and consists primarily of corporate structures such as banks, insurance

companies, companies whose capital market instruments are listed on the stock exchange and large-scale enterprises.

In the second stage, quantitative criteria are used to determine whether the enterprises in this scope are subject to reporting obligations. Accordingly, exceeding at least two of the following three thresholds for two consecutive reporting periods is sufficient to trigger the reporting obligation:

- **Total assets:** 500 million Turkish Lira
- **Annual net sales revenue:** 1 billion Turkish Lira
- **Number of employees** 250 people

If the thresholds for two of these three criteria are exceeded, the enterprise becomes subject to sustainability reporting. However, if the relevant enterprise does not meet the specified thresholds despite being on the list, then it does not fall within the scope of mandatory reporting. There is a different arrangement for banks. Pursuant to the Banking Law No. 5411, banks subject to the regulation and supervision of the Banking Regulation and Supervision Agency (BDDK) are directly included in the scope of sustainability reporting, regardless of the financial and employment thresholds mentioned above. However, banks under the Savings Deposit Insurance Fund (TMFS) are excluded from this obligation (BDDK, 2024).

On the other hand, it is also possible for enterprises that do not have a reporting obligation under the legislation to voluntarily report in accordance with TSRS. Such practices are important for enterprises to declare their environmental and social responsibilities to the public, strengthen their corporate reputation and provide transparency before potential investors. The decision tree published by the KGK is presented as a guide to facilitate the process of determining the reporting obligations of enterprises (KGK, 2024).

For the entities that fall within the scope of mandatory sustainability reporting, the reporting obligation has started as of the accounting period starting on January 1, 2024. In this framework, the relevant enterprises are required to report and disclose all data and disclosures regarding their sustainability activities throughout 2024 to the public in 2025. This obligation includes not only the disclosure of non-financial information, but also a comprehensive disclosure process covering the strategy, risk management, targets and performance indicators of the

enterprise in the environmental, social and governance areas. In this context, sustainability reporting necessitates a holistic transformation in the corporate governance structure of enterprises in terms of forward-looking risk estimation and strategic planning as well as the evaluation of past activities.

TSRS 1 is a standard that includes general provisions on how businesses should disclose financial information in the context of sustainability. Developed in full compliance with IFRS S1, TSRS 1 requires companies to consider environmental, social and governance (ESG) factors in their business models, operations and financial performance (IFRS, 2023). TSRS 1 allows investors and other stakeholders to evaluate non-financial information from a more holistic perspective. TSRS 1 is based on four key conceptual principles that enable disclosure of sustainability-related financial information. These are:

Faithful Presentation

- Businesses should present their sustainability disclosures in an objective, accurate, complete and transparent manner.
- Measurement uncertainties, estimates and assumptions should be clearly disclosed.
- Disclosures should be consistent with the financial statements and support investors' decision-making processes.

Materiality

- The information disclosed should be material to the entity's financial performance, strategic direction and stakeholder expectations.
- Materiality assessment should not only be based on past and current impacts, but also on future financial impacts.
- Businesses should perform materiality analyses on a sector basis according to their fields of activity.

Reporting Entity

- Disclosures should include the overall scope of the entity's activities and include impacts on subsidiaries and the supply chain.
- Group companies and subsidiaries should also be included in sustainability reporting.

- The corporate governance structure, areas of responsibility and internal control mechanisms should be detailed.

Related Information

- Sustainability information should be consistent with financial reporting and risk management processes.
- Disclosures should be linked to the entity's short, medium and long-term financial performance.
- Businesses should align their sustainability strategies with international reporting standards (GRI, IFRS S1 and S2, TCFD).

Similarly, in TSRS 1, disclosure of sustainability-related financial information is addressed within the scope of the core content. These are:

Governance

- Sustainability-related management structure: The business should define governance mechanisms and responsibilities for sustainability issues.
- Role of the Board of Directors: The board should describe how sustainability-related risks and opportunities are addressed and integrated into strategic decision-making.
- Governance policies and processes: Businesses should describe internal control mechanisms and auditing processes for sustainability strategies.
- Relations with investors and stakeholders: Management should explain how it communicates and manages its sustainability decisions and performance with stakeholders.

Strategy

- Explain how the business approaches sustainability risks and opportunities.
- The integration of sustainability and financial strategy should be detailed.
- The impact of sustainability factors on the business model in the short, medium and long term.
- Explain how climate change, environmental impacts, natural resource use and social issues shape the business strategy.
- Information should be given about the sustainability-oriented investment and innovation processes of the organization.

Risk Management

- Explain how sustainability-related risks are identified and assessed.
- How environmental, social and governance (ESG) risks are monitored and managed should be detailed.
- The methods and internal audit mechanisms used in the risk management process should be explained.
- Analyse the impact of risks on the operations and financial position of the business.
- The measures, insurances and risk mitigation strategies taken by the organization regarding sustainability risks should be explained.

Metrics and Targets

- Businesses should explain the indicators and methodologies they have identified to measure sustainability performance.
- Key metrics used in reporting (carbon emissions, energy consumption, water use, waste management, etc.) should be detailed.
- Sustainability targets (e.g. net zero emissions commitment) and progress should be disclosed.
- How businesses benchmark their performance against industry and global standards.
- Measurement uncertainties and calculation methods should be clearly reported.

TSRS 1 is an important standard that contributes to more informed decision-making by investors and stakeholders by enabling businesses to disclose sustainability-focused financial information in a transparent, consistent and comprehensive manner. In this context, the adoption of TSRS 1 will contribute to a sustainable economic structure by enabling businesses to focus not only on financial success but also on their environmental and social responsibilities.

TSRS 2, published within the scope of the Turkish Sustainability Reporting Standards (TSRS), is a standard that requires businesses to make financial disclosures on climate-related risks and opportunities (KGK, 2024). This standard, developed in line with TSRS 1, requires entities to report on climate risks and opportunities that are likely to affect their financial adequacy in the short, medium and long term. The standard aims to help investors and other stakeholders understand the strategic adaptation, financial risk management processes and long-term resilience of businesses to climate change (IFRS, 2023).

The objective of IFRS 2 is to require entities to provide investors and users of financial reports with reliable, consistent and comparable information about climate-related risks and opportunities (KGK, 2024). Under TSRS 2, entities should establish a transparent and accountable reporting system by assessing the potential impacts of climate change and its consequences on financial performance. The standard covers not only past and current impacts, but also climate risks and opportunities that are reasonably expected to affect an entity's future financial position.

In terms of scope, TSRS 2 addresses two main categories of risks that may affect an entity's financial decisions. The first is physical climate-related risks, which include risks based on direct physical impacts such as extreme weather events, sea level rise and drought. The second risk group is transition risks, which include policy changes, technological transformations and changes in market dynamics during the transition to a low carbon economy (IFRS, 2023). In addition, climate-related opportunities that businesses have should also be included in reporting. These opportunities may arise in areas such as investing in low-carbon technologies, using renewable energy or sustainable supply chain management.

TSRS 2 requires businesses to comprehensively disclose their processes for managing climate risks, their strategic approach and the metrics they have identified. Physical and transition risks that may arise due to climate change should be addressed together with their impact on businesses' business models and financial planning. The board of directors and senior management of businesses should clearly demonstrate how climate risks are monitored and assessed, and how they are integrated into decision-making processes. In addition, entities are expected to provide information about their strategies and plans to transition to a low-carbon economy (KGK, 2024).

TSRS 2 also requires businesses to report the metrics they use to measure their climate-related performance and the targets they set. Businesses are required to report carbon emissions (Scope 1, Scope 2 and Scope 3), energy consumption, water use rates and other environmental indicators. The business's net zero emission targets, sustainability commitments and progress towards them should be detailed. It should also indicate how climate-related risks and opportunities are integrated into financial planning processes and explain how businesses compare their sustainability performance with international standards (IFRS, 2023).

This standard provides more comprehensive and reliable information for investors and financial analysts by enabling businesses to integrate climate change into their financial decision-making processes. Through this standard, businesses can manage the opportunities and risks of climate change in a systematic way and build more solid foundations for their long-term strategies. Identifying measures that can be taken against climate risks using scenario analysis will play a critical role in securing the sustainable growth of businesses. Moreover, the adoption of TSRS 2 will enable transparent reporting on carbon footprint, energy use and environmental impacts, thus supporting sustainability-based decision-making processes for investors.

In general, TSRS 2 ensures the integration of sustainability policies into the financial reporting system by requiring entities to make financial disclosures related to climate change. This standard not only increases financial transparency and accountability of businesses, but also encourages sustainable investment decisions and facilitates access to green finance. TSRS 2, which increases the importance of financial reporting in combating climate change in Türkiye, is a critical step to help businesses adapt to the international sustainability framework.

2.5.9. Sustainability Reporting Frameworks

Today, it is not only a legal obligation for businesses to transparently disclose their economic, environmental and social impacts, but also a strategic necessity in terms of corporate reputation and investor security. Sustainability reporting provides information users with the opportunity to evaluate the impact of financial and non-financial aspects of businesses' activities and to compare them on a sectoral basis.

Accordingly, frameworks for sustainability reporting have been developed and continuously updated by international organizations and regulatory authorities. These frameworks aim to respond to the changing demands and expectations of information users by ensuring that businesses report their sustainability performance in a consistent, comparable and reliable manner.

Sustainability reporting frameworks implemented at the global and local level have become an important factor guiding investor decisions while encouraging businesses to operate in accordance with sustainability principles. In this context, sustainability reporting frameworks

strengthen the integration of corporate sustainability and financial markets by providing businesses with a transparent, accountable and reliable reporting infrastructure.

Table 2.4 presents globally accepted and prominent sustainability reporting frameworks (Önce, Onay and Yeşilçelebi, 2015). These frameworks have been developed to enable businesses to transparently report their environmental, social and governance (ESG) performance and aim to provide comparable and reliable information for investors and other stakeholders.

Table 2.3. Globally Accepted Sustainability Reporting Frameworks

Reporting Framework	Description
1997- Global Reporting Initiative (GRI)	Established in 1997 within CERES. It provides a strong framework for environmental issues and is the most widely used sustainability reporting framework in the world. The framework is a sustainability guide for businesses and addresses economic, environmental and social reporting as a whole.
1999 - AA1000 (Accountability 1000)	Emphasizing the importance of communication with stakeholders, the framework provides principles for organizations on responsibility, accountability and sustainability. The framework emphasizes that businesses should inform all stakeholders about their economic, social and environmental activities and practices and prioritizes social and ethical accountability.
2000 - United Nations Global Compact (UNGC)	The convention includes principles on human and labour rights, labour standards, environment and anti-corruption, acting with the awareness that businesses are responsible to society in their spheres of influence.
2000-OECD Guidelines for Multinational Enterprises	The main approach of the guidelines is to provide guidance on internationally recognized frameworks and to build trust between business, employees and government by avoiding misunderstandings about the frameworks.
2006-IFC Performance Standards	Basically, it has established a framework for risk management in the assessment of environmental and social activities of enterprises. In addition, standards for public health, resource efficiency and the ecosystem were also set, prioritizing working and working conditions for business life.

2008-Carbon Disclosure Project (CDP)	The project basically set out principles for the business world to adopt a sustainable development approach and to protect the ecosystem, especially climate change, at the enterprise scale. Contributing to environmental areas, the project prioritized issues related to greenhouse gas emission reduction, waste disposal and efficient resource use.
2010-Integrated Reporting (IR)	Integrated Reporting (IR) is a relatively new phenomenon in the world of corporate reporting that has gained momentum over the last decade. The International Integrated Reporting Council (IIRC) defines Integrated Reporting as "the reporting of how an organization's management, strategy, performance and future prospects create value in the short, medium and long term in the context of its external environment"
2010-ISO 26000 Social Responsibility Guidelines	The standard has been established to guide activities and practices in the context of social responsibility for organizations of all structures.

Source: (Önce, Onay and Yeşilçelebi, 2015)

Different reporting frameworks have been developed to ensure that businesses globally report their sustainability performance in a transparent and comparable manner. These frameworks help investors, regulators and other stakeholders make informed decisions by assessing the environmental, social and governance (ESG) performance of businesses.

In this context, the Global Reporting Initiative (GRI) Standards stand out as one of the most widely accepted and comprehensive frameworks in sustainability reporting. GRI aims to increase corporate transparency by systematically measuring and reporting the economic, environmental and social impacts of businesses. GRI standards provide a comprehensive guide for businesses to make their sustainability performance traceable at global and local levels, respond to stakeholder expectations and ensure governance in line with sustainable development goals.

GRI standards enable businesses operating in different sectors to present sustainability data in a comprehensive and comparable manner. In addition, these standards are compatible with international regulatory frameworks. In particular, GRI, which can be integrated into global reporting systems such as IFRS S1-S2, TCFD, CDP and European Sustainability Reporting Standards (ESRS), helps companies comply with international reporting requirements more easily.

Since a significant portion of the companies operating in Türkiye and Germany, which constitute the sample of the study, are based on the GRI framework in their sustainability reporting, the structure, basic principles and application principles of this reporting standard are detailed in this section (Afolabi et al., 2023).

2.5.10. GRI and Reporting Frameworks

The Global Reporting Initiative (GRI) was established in Boston in 1997 by the Coalition for Environmentally Responsible Economies and the TELUS Institute⁵. CERES is an initiative of labour unions, investment funds and environmental boards and its main purpose is to improve the environmental, social and corporate governance processes of businesses (Yamak, 2009). GRI has defined its mission as "*empowering decision makers to mobilize for a more sustainable economy and world through sustainability standards and a multi-stakeholder network*" (Ernst & Young, 2014).

The GRI Guidelines, developed by GRI for reporting non-financial information, aim to guide businesses to prepare their reports on environmental and social issues within the framework of certain standards (GRI, 2015a). Today, the GRI Guidelines stand out as one of the most widely accepted reporting frameworks in the field of social reporting. This framework consists of principles and indicators that businesses should follow in order to measure and report their economic, environmental and social performance. Due to its standardized structure, GRI has been a pioneer in the field of sustainability reporting since the early 2000s.

The process initiated in the field of sustainability reporting with the establishment of GRI within CERES has progressed with the publication of the G1 guidelines in 2000. G1 is the first sustainability reporting framework developed at the global level. The GRI framework, which is constantly updated in line with changing expectations and demands, published the second

⁵ The Tellus Institute was founded in 1976 by Paul Raskin and colleagues as a non-profit research organization to conduct research in the fields of resource and environmental policy. Originally called the Energy Systems Research Group (ESRG), the institute changed its current name in 1990 to reflect its expanding focus on social-ecological systems from local to global levels. The institute has conducted more than 3,500 studies worldwide. The methodology of Tellus projects has been the development of alternative scenarios of the future to generate and evaluate alternative courses of action. To this end, the institute has developed a family of widely used scenario planning tools for comprehensive sustainability planning. These include the Long Range Energy Alternatives Planning system (LEAP), which facilitates energy-environment planning; the Water Evaluation and Planning System (WEAP); and the Polar Star. The aim of the projects is to take a holistic view on issues such as energy, water, sustainable communities, corporate responsibility and climate change.

version of sustainability reporting, G2, at the World Summit on Sustainable Development held in Johannesburg in 2002. At the summit, the cooperation between GRI and the United Nations Environment Program (UNEP) for the development and publication of the guide was also announced to the public. In the same year, GRI moved its headquarters to Amsterdam, separated from CERES and became an independent organization.

GRI continues its activities as an independent organization and has opened regional offices in strategic regions such as Brazil, Colombia, Hong Kong, India, Indonesia, Peru, Philippines, Singapore and South Africa. The third version of the sustainability reporting framework, G3, was published in 2006. Approximately 3,000 experts from the business world as well as non-governmental organizations and the public sector contributed to the development of the G3 guidelines. In the guide, reporting topics are grouped under three main categories: economic, environmental and social performance. However, over time, these headings did not adequately respond to current conditions, and the guide was updated in March 2011 as G3.1. The updated version expanded the scope and added new topics such as gender equality, human rights and social issues. Within the scope of the updates, the G4 guideline was published in June 2013 and it was decided to enter into force as of December 31, 2015 (Aksoy, 2013).

GRI sustainability reporting guidelines are constantly reviewed and revised in order to enable reliable and effective reporting. In this context, instead of creating guidelines on sustainability reporting, GRI established the "GRI Standards Series" in 2016 and started to be implemented as of 2018.

The 2018 Sustainable Development Report drew attention to the necessity of reporting sector-based impacts within the framework of the sustainable development approach. Accordingly, the GRI Sector Program was announced in 2019. The program aims to report sector-specific impacts in a transparent, accountable and consistent manner. The GRI Sector Program aims to develop standards for a total of 40 sectors, starting with the sectors with the highest impact. In this context, standards for the oil and gas (GRI 11), coal (GRI 12) and agriculture, aquaculture and fisheries (GRI 13) sectors published in 2021 entered into force on January 1, 2023 (GRI, 2023). In addition, the GRI 14 standard developed for the mining sector was published in February 2024 and is planned to enter into force on January 1, 2026. Work to develop standards for the financial services and textile and apparel sectors is still ongoing (GRI, 2024). In addition,

GRI published a new Biodiversity Standard in 2024, encouraging companies to report more comprehensively and transparently on their impacts on biodiversity. This standard enables business to more clearly articulate their responsibilities to prevent biodiversity loss.

The most widely used framework for sustainability reports published by businesses in Türkiye is the Global Reporting Initiative (GRI) Standards. As of 2021, 82% of Turkish companies engaged in sustainability reporting use GRI Standards (KGK, 2023). In line with this, detailed information on the G3, G3.1 and G4 guidelines is provided below.

2.5.10.1. G3 and G3.1 Reporting Frameworks

Published in 2006 as the third update by GRI, the G3 guide was prepared with multi-stakeholder participation. The first part of the G3 reporting framework includes principles, guidelines and protocols on how to report; the second part includes standardized explanations and sector annexes on which activities to report (GRI, 2006). Details on the sections in the G3 reporting framework are as follows.

Chapter One Principles and Guidelines;

- Guidance for determining the content of the report,
- Principles for determining the content of the report,
- Principles for ensuring the quality of the report,
- It consists of guidance sections for setting the boundary of the report.

Protocols

- Technical
- Indicator protocols.

Part Two Standard Disclosures;

- Strategy and profile,
- Management approach.
- Performance indicators.

Sector Annexes;

Indicators related to sector-specific performance and provide complementarity in terms of reporting principles.

When the structure of the G3 reporting framework is examined; it is seen that the first section includes information on the reporting framework, and the second section includes information

on the structure of the information to be presented in the reporting. A schematic illustration of the second part of the G3 reporting framework is presented in Figure 2.6.

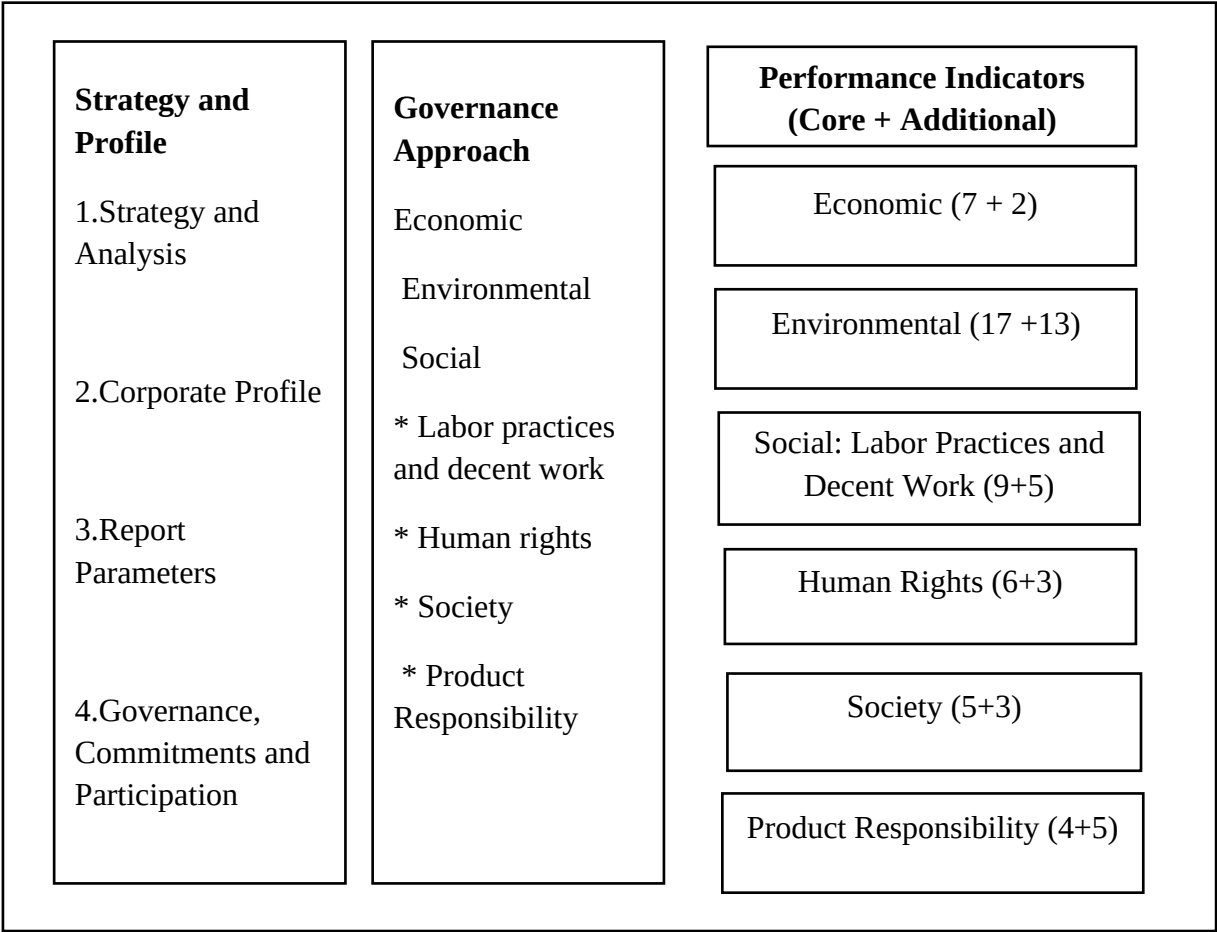


Figure 2.6. G3 Reporting Framework Standard Disclosures Section

The G3 Guidelines were updated in 2011 and G3.1 was published. G3.1 contains a structure similar to the framework of the G3 guidelines. In the updated version, performance indicators have been expanded to include gender, human rights and community issues. In the G3.1 reporting framework, the first section of the G3 framework has not changed, while the performance indicators in the second section have been updated. The first section of G3.1 and the updated performance indicators are as follows.

Chapter One Principles and Guidelines;

- Guidance for determining the content of the report,
- Principles for determining the content of the report,
- Principles for ensuring the quality of the report,

- It consists of guidance sections for setting the boundary of the report.

Protocols

- Technical
- Indicator protocols.

Part Two Standard Disclosures;

- Strategy and profile,
- Management approach.
- Performance indicators

Performance Indicators Added to G3.1 Version

LA15: Return to work and retention rates after maternity leave by gender.

SO1: Percentage of activities, impact assessment and development programs with local community participation.

SO9: Activities with significant, potential or actual impact on the community.

SO10: Measures to prevent and mitigate activities with significant, potential or actual impact on society.

HR10: Total number and percentage of activities related to human rights reviews and/or impact assessments.

HR11: Number of closed human rights complaints resolved through formal complaints.

The G3.1 reporting framework provides a more comprehensive approach to sustainability reporting than the G3 framework, covering indicators for gender equality, community relations and human rights (e.g. LA15, SO1, SO9, SO10, HR10, HR11).

2.5.10.2. G4 Reporting Framework

The G4 reporting framework was published by GRI in June 2013 and decided to be implemented as of 31.12.2015. The G4 reporting framework offers practitioners two alternatives for sustainability reporting. The first alternative is defined as the basic level and covers the absolute components of sustainability reporting. In other words, it includes the components that must be included in a sustainability reporting. The second alternative is the comprehensive reporting method. In this reporting method, disclosures are made on issues such as governance and ethical values, corporate strategy. This disclosure enables a more

comprehensive communication of the organization's performance to stakeholders and information users (GRI, 2013).

The G4 sustainability reporting framework basically has five objectives. These include;

- Providing guidance in a user-friendly way,
- Improve the technical quality of guideline content to eliminate ambiguities and different interpretations,
- To harmonize as much as possible with other internationally recognized standards,
- Develop guidance on identifying priority issues,
- Providing guidance on how to link the sustainability reporting process with Integrated Reporting (Jones et al., 2016).

The G4 guidelines include 58 standards and 91 indicators for sustainability reporting and performance measurement of businesses. Offering a broader scope than previous versions, the G4 guidelines provide a basic and detailed alternative to organizations in terms of criteria to guide the reporting process. Businesses reporting on sustainability according to the GRI reporting framework present their activities and results during the reporting period in the context of the management approach and strategies they have adopted.

Indicators and Aspects in GRI Special Standard Disclosures are shown in Table 2.5

Table 2.4. G4 Indicators and Aspects

CATEGORIES		ESSENTIALS
Economic		Economic Performance, Market Presence, Indirect Economic Effects, Procurement Practices
Environmental		Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste, Products and Services, Compliance, Transportation, General, Supplier Environmental Assessment, Environmental Grievance Mechanisms
Social	Subcategories	
	Workforce Practices and Decent Work	Employment, Labour/Management Relations, Occupational Health and Safety, Education and Training, Diversity and Equal Opportunity, Equal Remuneration for Women and Men, Supplier Assessment of Labour Practices, Labour Practices Grievance Mechanisms.
	Human Rights	Investment, Non-discrimination, Right to Organize and Collective Bargaining, Child Labour, Forced or Compulsory Labour, Safety Practices, Rights of Indigenous Peoples, Evaluation, Suppliers Evaluation in terms of Human Rights, Human Rights Complaint Mechanisms.
	Society	Local Communities, Anti-Corruption, Compliance, Public Policy, Supplier Assessment of Impact on Society, Competition Disorderly Behaviour, Impacts on Society Grievance Mechanisms.
	Product Responsibility	Marketing Communications, Customer Health and Safety, Customer Privacy, Product and Service Labelling, Compliance.

Source: (GRI- G4, 2015a)

2.5.10.3. GRI Standards Series

In 2016, the Global Reporting Initiative (GRI) created the GRI Standards Series, which consists of modular and interrelated standards, instead of preparing a guide for sustainability reporting. These standards, which entered into force in 2018, aim to provide a more flexible and comprehensive framework for sustainability reporting. The standards were updated in 2021 to adapt to global developments and reporting needs. The GRI Standards Series is a modular

system consisting of three series: GRI Universal Standards, GRI Sector Standards and GRI Topic Standards. Each standard begins with a detailed explanation of how to use it.

Table 2.5. GRI Standards Series

UNIVERSAL STANDARDS	
Universal Standards	
-Basic Principles (GRI 1: Requirements and Principles)	
- Disclosures (GRI 2: Disclosures)	
- Material Issues (GRI 3: Guidance about the Organization's Material Topics)	
SECTOR STANDARDS	
- GRI 11: Oil and Gas Sector	- GRI 15: Mining Sector
- GRI 12: Coal Sector	- GRI 16: Metal Production Sector
- GRI 13: Agriculture, Forestry and Fishing Sector	- GRI 17: Electricity Utilities Sector
- GRI 14: Food and Beverage Sector	- GRI 18: Gas, Water and Services Sector
SUBJECT STANDARDS	
- GRI 201: Economic Performance This standard enables organizations to report on their economic performance.	
- GRI 202: Market Presence This standard enables organizations to report on market assets.	
- GRI 205: Anti-Corruption This standard requires organizations to report on their anti-corruption policies and practices.	
- GRI 303: Water and Wastewater This standard enables organizations to report on water use and wastewater management.	
- GRI 304: Biodiversity This standard enables organizations to report on their biodiversity impacts and related management approaches.	
- GRI 305: Emissions This standard enables organizations to report on greenhouse gas emissions and other air emissions.	
- GRI 403: Occupational Health and Safety This standard enables organizations to report on their occupational health and safety management systems and performance.	
- GRI 415: Public Policy This standard requires organizations to report on their public policy engagement and lobbying activities.	

Source: (GRI, 2025, <https://www.globalreporting.org/media/wtaf14tw/a-short-introduction-to-the-gri-standards.pdf>)

GRI Universal Standards

They are standards that cover all businesses and consist of three components (GRI 1, GRI 2, GRI 3). These are;

GRI 1: Core Principles (GRI 1) defines the purpose of the GRI Standards, clarifies key concepts and details how to use the standards. It also lists the mandatory requirements that an organization must comply with in order to report in accordance with the GRI Standards. It also includes principles that underpin quality reporting, such as accuracy, objectivity and verifiability.

GRI 2: Includes disclosures on the structure, reporting practices, activities, employees, governance structure, strategy, policies, practices and stakeholder engagement processes. These elements contribute to a contextual framework for understanding the impacts of business activities by providing a comprehensive view of the profile and scale of the organization.

GRI 3: Describes the process for identifying the most material issues (material topics) in terms of the impacts of business operations. It also provides guidance on how the Sector Standards should be used in this process. This standard includes a list of material topics that the organization includes in its reporting, the process for identifying these topics, and a description of how each topic is managed.

GRI Sector Standards

The GRI Sector Standards aim to improve the quality, integrity and consistency of organizations' reporting. In this context, standards will be developed for a total of 40 sectors, starting with high-impact sectors such as oil and gas, agriculture, aquaculture and fisheries. These standards list issues that are likely to be material for most organizations operating in a given sector and specify the disclosures that should be reported on these issues. If the relevant Sector Standard is available for an organization reporting under the GRI Standards, the organization is required to use that standard. Each Sector Standard starts with a general assessment of the main characteristics of the sector. This assessment addresses the sector's areas of activity and business relationships and identifies the underlying environmental, social and economic impacts of the sector in question. The main section of the Standards includes a list of issues likely to be important for the sector.

In this section of the thesis, significant sector-related impacts are presented on a topic-by-topic basis and explanations are also provided for each topic. In addition, each topic disclosure

includes references to the relevant disclosures in the GRI Topic Standards for organizations' reporting. Some Sector Standards may include additional disclosures that are not included in the Topic Standards. This is the case when existing disclosures on the topic do not provide sufficient information about the organization's impacts.

GRI Topic Standards

GRI Topic Standards include disclosures that enable the reporting of information on specific topics. Examples include standards for areas such as waste management, occupational health and safety, and taxation. Each standard provides a comprehensive assessment of the topic and includes explanations of how organizations manage their impacts related to that topic. Businesses are obliged to select the Topic Standards that correspond to the material topics they have identified and use them in their reporting.

As the first standard established for sustainability reporting at the global level, GRI is the most widely used framework by businesses. The main reason for this is that it can be applied for businesses of all sizes. According to the 2022 KPMG sustainability reporting report, 68% of N100 businesses and 78% of G250 businesses use GRI standards (KPMG, 2022).

While GRI Standards allow businesses to comprehensively report on the impacts of their activities, in some cases it is also possible to report by focusing only on specific topics. In this context, the GRI Content Index enables organizations to transparently present which standards they use, their reporting scope and missing information, along with their justifications.

Sustainability reporting, development processes and reporting frameworks have been discussed in detail above. However, in order to conceptually internalize sustainability reporting, which does not have a deep-rooted literature history, it is essential to define the concept of Integrated Reporting and to emphasize its differentiating aspects from sustainability reporting. For this reason, integrated reporting is included below under a separate heading.

2.5.11. Integrated Reporting

Today, as the business world transforms, stakeholders' expectations of businesses are also changing. Investors in particular need more information on how a business's environmental, social and governance (ESG) performance shapes its impact on financial value creation in the

short, medium and long term. This development has made it imperative for businesses to integrate not only their financial performance but also environmental, social and governance risks into their corporate strategies and operations. As a natural consequence, the scope of corporate reporting has expanded and the Integrated Reporting process has emerged. Integrated reporting was developed in response to the challenges faced by businesses in their value creation processes and the demands of corporate report users for objective and rational information on the future value creation potential of the company. In this context, integrated reporting allows businesses to provide a more transparent and comprehensive flow of information to their stakeholders by addressing both financial and non-financial elements in a holistic manner.

Integrated reporting is defined by the International Integrated Reporting Council (IIRC) as a reporting process that reveals how an organization's management, strategy, performance and future prospects create value in the short, medium and long term in its external environment (IIRC, 2013). Integrated reporting not only supports the sustainability performance of businesses, but also allows stakeholders and information users to more comprehensively assess the actual performance of businesses and the risks they face (Eccles & Krzus, 2010). In this context, integrated reporting serves as an important resource for stakeholders who provide capital, explaining how the business creates value in the short, medium and long term (Flower, 2015). Sustainability reporting, on the other hand, addresses a broader stakeholder audience and provides a reporting framework that details the economic, environmental and social impacts of businesses (GRI, 2021). The differences between these two reporting approaches are clearly differentiated in terms of target audience, scope and purpose.

Table 2.6. Differences between Sustainability Reporting and Integrated Reporting

	Sustainability Reporting	Integrated Reporting
Scope	- Economic - Environmental - Social (Labour policies, human rights and broader social issues and governance)	- Business overview and external environment - Management - Business model - Risks and opportunities - Strategy and resource allocation - Performance - View - Preparation and presentation principles
Target Audience	Diverse stakeholder groups	Stakeholders providing financial capital and other parties interested in the business' ability to create value
Objective	Reporting to all stakeholder groups on the economic, social and environmental impacts, strategies and objectives of the business	Reporting to parties providing financial capital how the business has created and will create value now and over time to come.

Source: <https://www.integratedreporting.org/faqs/>, 2023

Integrated reporting aims to present financial and non-financial information in an integrated structure by revealing how the business creates value in the short, medium and long term. This approach links the strategy, governance, risk management and performance of businesses with a long-term value creation perspective. Sustainability reporting, on the other hand, addresses the economic, environmental and social impacts of the business and analyses the impact of its activities on sustainable development. In particular, these reports detail the environmental impacts, social responsibilities and corporate ethics policies of businesses.

Integrated reporting is prepared for stakeholders who provide capital (investors, shareholders and financial institutions). For these stakeholders, it is critical to understand the long-term value creation potential of the business. Sustainability reporting, on the other hand, addresses a wide range of stakeholders (employees, customers, suppliers, non-governmental organizations, government agencies and the general public). The main purpose of the report is to increase transparency regarding the sustainability performance of the business and to strengthen the accountability relationship with stakeholders.

Integrated reporting shows how the business integrates financial and non-financial information into strategic decision-making processes by combining them in a single report. These reports focus on elements such as the business model, risk management, value creation process and performance indicators. Sustainability reporting, on the other hand, includes detailed metrics and indicators to measure the environmental, social and governance (ESG) performance of the business, usually based on standards such as Global Reporting Initiative (GRI), SASB or CDP. To summarize, while integrated reporting offers an investor-focused, integrated reporting approach that focuses on the value creation process of the business, sustainability reporting is a reporting system that addresses the environmental, social and governance impacts of the business for a wide range of stakeholders. While integrated reporting details the long-term sustainable value creation process of the enterprise, sustainability reporting focuses more on the impacts of the enterprise on society and the environment.

2.6. Previous Research on the Relationship between Financial Reporting Quality and Sustainability Reporting

This section presents academic studies on the relationship between FRQ and sustainability reporting. In the literature, the impact of sustainability reporting on the reliability, transparency and accuracy of financial statements has been evaluated within the framework of different theoretical approaches and empirical findings.

While some studies suggest that sustainability reporting improves FRQ, others argue that there is no direct and consistent relationship between these two factors. Recent studies have focused on analysing the indirect effects of sustainability reporting through issues such as corporate governance, information asymmetry, earnings management and financial manipulation.

Global studies reveal that this relationship may differ between developed and emerging markets. In this context, in the relevant section of this thesis, recent empirical studies reflecting different approaches to sustainability reporting are analysed in chronological order. In the evaluation process, both studies in the international literature and studies specific to Türkiye were analysed in a comparative manner.

2.6.1. International Research

Clarkson et al. (2008) examined the relationship between environmental performance and the level of voluntary environmental disclosures using a content analysis approach based on the Global Reporting Initiative (GRI). Within the scope of the study, firms operating in environmentally intensive sectors in the USA were analysed. The study found a positive relationship between firm performance and environmental disclosures. The study indicates that voluntary disclosures sincerely reflect the environmental responsibilities of businesses in line with economic-based disclosure theories. However, the same study also emphasized that socio-political disclosure theories are more explanatory in explaining legitimization tendencies. This shows the potential for environmental disclosures to reflect not only actual performance but also symbolic actions to manage external pressures.

Matsumura, Prakash, and Murioz (2014) analysed the carbon emission data voluntarily disclosed by firms in the S&P 500 index between 2006 and 2008 under the Carbon Disclosure Project (CDP). The study empirically tests the impact of carbon emissions on firm value by taking into account the self-selection bias that may arise from managers' disclosure decisions. The findings of the study suggest that capital markets value firms by taking carbon emissions into account and that firms that exhibit transparency are relatively less penalized, whereas firms that do not disclose emission information are evaluated more negatively. The results suggest that investors consider both the level of emissions and disclosure behaviour and that markets reward voluntary disclosures.

Herbohn, Walker, and Loo (2014) examined whether there is a relationship between sustainability disclosures and sustainability performance of companies operating in the mining and energy sectors in Australia. In the study, 339 companies with data from 2006 were evaluated and a performance index was created based on IFC's (2001) "Measuring Sustainability" approach. The results obtained from the regression analysis indicate that there is a strong link between disclosures and performance. This suggests that sustainability reports have the potential to reflect actual performance not only in form but also in content.

Hogevold et al. (2015) evaluated the reasons that influence companies to adopt sustainable business practices within the framework of the Triple Bottom Line (TBL) model. Within the scope of the study, the view that economic, environmental and social dimensions should be

evaluated as a whole rather than separately from each other draws attention. In the study, it is hypothetically accepted that factors such as stakeholder pressures, legal regulations and competitive advantage are determinant in the implementation of sustainability practices by businesses. The findings show that the relationships formed by companies through collaborations play an important role in the success of their sustainability strategies. Overall, the study analyses the transition processes of businesses to sustainable business models and discusses the impact of these processes on companies as well as the implications for the broader business ecosystem.

Charlo, Moya, and Munoz (2015) analysed the financial performance of firms listed on the Spanish stock exchange between 2008 and 2013 and compared the financial performance of firms with and without a sustainability index. The findings reveal that firms included in the sustainability index achieve higher profitability and adapt faster to market fluctuations compared to non-index firms at the same risk level. However, it is concluded that corporate social responsibility activities do not have a significant effect on financial performance.

Michelon, Pilonato, and Ricceri (2015) draw attention to the growing distrust of corporate social responsibility reporting and analyse companies' practices such as preparing independent CSR reports, obtaining assurance, and using reporting guidelines (e.g. GRI). The findings show that, in general, companies using these practices do not provide higher quality information, suggesting that these practices are used for symbolic purposes. The study uses data from companies listed on the London Stock Exchange between 2005 and 2007.

Marti, Rovira-Val, and Drescher (2015) analysed the companies included in the Stoxx Europe 600 Index and the Stoxx Europe Sustainability Index between 2007 and 2010 to examine the impact of corporate sustainability strategies on financial performance. In the study conducted with panel data analysis method, it was determined that companies that implement sustainability activities exhibit higher financial performance and companies that contribute to the sustainable development of the country have higher return on assets.

Saeidi, Sofian, Saeidi et al. (2015) evaluated the impact of corporate social responsibility on financial performance in terms of competitive advantage, customer satisfaction and corporate reputation. The study, which included 205 manufacturing and retail businesses operating in

Iran, found that corporate social responsibility practices do not have a direct positive impact on firm performance, but have an indirect positive impact through competitive advantage and customer satisfaction.

DiSegni, Huly, and Akron (2015) examined US-based companies listed in the Dow Jones Index to analyse the relationship between social, environmental and corporate factors and financial performance. The results show that firms that support environmental sustainability and adopt social responsibility practices have higher profitability and stronger management performance compared to the industry average.

Muttakin, Khan, and Azim (2015) examined the relationship between corporate social responsibility (CSR) disclosures and earnings quality. Regression analysis was conducted using data from 135 non-financial companies listed on the Bangladesh Stock Exchange. In the study, discretionary accruals are taken as an indicator of earnings management and CSR disclosures are used as the independent variable. The findings suggest that while CSR disclosures are expected to constrain earnings management practices, due to Bangladesh's weak institutional structure and lack of awareness, CSR disclosures may be used by managers to conceal earnings management.

Han, Kim, and Yu (2016) examined the relationship between sustainability performance and financial profitability by analysing the ESG (environmental, social, and governance) scores of firms listed on the South Korean stock exchange between 2008 and 2014. In the study, a negative relationship was found between environmental sensitivity score and financial performance, while a positive relationship was found between corporate governance score and financial performance. No statistically significant link was found between social factors and financial performance.

Hummel and Schlick (2016), focusing on the theoretical and empirical uncertainties regarding the relationship between sustainability performance and sustainability disclosures, aimed to integrate voluntary disclosure theory and legitimacy theory to explain this relationship. They emphasized the need to focus on disclosure quality rather than quantity, which is common in the traditional literature. Consistent with the voluntary disclosure theory, the empirical findings suggest that firms with high sustainability performance prefer high-quality disclosures to signal

this performance to capital markets. On the other hand, in line with the predictions of legitimacy theory, firms with low sustainability performance tend to cover up their poor performance and preserve their corporate legitimacy through low-quality disclosures. These findings are reinforced by testing them with different additional analyses. Thus, the study demonstrates that these two theoretical approaches are complementary rather than contradictory and that the motivations underlying sustainability disclosures can be more clearly understood when focusing on the disclosure quality dimension.

Wang and Sarkis (2017) evaluated the effects of ESG scores on financial performance and corporate social responsibility management by analysing 1980 firms operating in the US between 2009 and 2013. The study finds that companies with higher ESG performance are more financially successful, but this relationship is directly linked to the effectiveness of corporate social responsibility management.

Laskar, Chakraborty, and Maji (2017) examined the relationship between corporate sustainability and financial performance of firms in India and Japan. GRI (Global Reporting Initiative) sustainability scores of 28 Indian and 35 Japanese firms were calculated and analysed between 2009-2014. According to the results of the study, it was determined that sustainability activities have a positive and significant impact on financial performance in both countries.

Velte (2017) analysed the impact of environmental, social and governance performance (ESG) on financial performance (FINP). A total of 412 firm-year data from the DAX30, TecDAX and MDAX indices in 2010-2014 were analysed. The results show that ESGP has a positive effect on ROA, but has no significant effect on Tobin's Q. Moreover, governance performance is found to have the strongest effect on financial performance. The study is one of the first studies to examine the impact of ESG on financial performance in the German context by considering its components separately.

Perez, Lopez, and Garcia-De los Salmones (2017) examined the impact of corporate social responsibility (CSR) reporting on corporate social responsibility reputation (CSRR). Regression analysis with data from 84 companies shows that overall reporting intensity does not always increase CSRR. Reputation is found to depend on the intensity of reporting to

specific stakeholders such as investors, regulators and the media. The study contributes to the literature on understanding the impact of stakeholder-oriented CSR reporting on reputation.

Kim, Kim, and Qian (2018) assessed the impact of corporate social responsibility on financial performance from a competitive action perspective. The study, which examined 113 US based software companies between 2000 and 2005, found that companies with competitive social responsibility practices had higher financial performance.

Hasan, Kobeissi, Liu, and Wang (2018) evaluated the impact of corporate social responsibility on financial performance through the productivity factor by analysing manufacturing firms operating in the US between 1992 and 2009. Using regression analysis, the study shows that firms' investments in social responsibility activities improve their financial performance and reduce their risks.

Hristov and Chirico (2019), in their study examining how sustainability reporting can be integrated with corporate strategy, investigated how companies integrate their environmental and social responsibilities into their performance management systems (PMS). The researchers assessed companies' sustainability-oriented strategic transformation in four stages: identifying key sustainability-related themes, analysing the current situation, implementing the strategy at the corporate level, and reporting sustainability performance. The findings show that the effectiveness of sustainability reporting is determined not only by the production of reports but also by the integration of these reports with corporate governance. The study reveals that high reporting quality depends not only on compliance with regulatory requirements, but also on placing sustainability principles at the centre of corporate strategy. In this respect, it draws attention to the importance of managerial and governance structures that increase the contextual strength of sustainability disclosures and reveals that reporting is used as a strategic tool rather than a formal one, especially in developed economies.

Schönborn et al. (2019) examined the relationship between corporate social sustainability culture and the financial success of companies. In the study, multiple regression analysis was conducted using data from two surveys conducted in Europe. The results show that four dimensions of social sustainability culture are associated with financial success; sustainability strategy and leadership, mission and communication, social care and work life balance, loyalty

and corporate identity. The study contributes to the literature that effective management of social sustainability culture can support the financial performance of companies.

Wang, Zhou, and Wang (2020) examined the impact of corporate governance mechanisms on integrated reporting quality and credibility enhancing mechanisms. Regression analysis was conducted using integrated report data of companies listed on the Johannesburg Stock Exchange for the years 2012-2015. The findings show that the board of directors and audit committee are positively associated with integrated reporting quality and the use of credibility mechanisms. Moreover, sustainability-oriented governance mechanisms have a positive impact on both report quality and the scope of credibility mechanisms. The study concluded that credibility enhancing mechanisms such as independent external audit, internal control systems and stakeholder engagement are directly related to the effectiveness of corporate governance.

Al-Shaer (2020) investigated whether businesses with high sustainability reporting quality increase the level of transparency and reliability in financial reporting processes. The study also evaluated the impact of sustainability reporting quality on post-audit FRQ. The study, which analysed the enterprises in the FTSE 350 index between 2007-2018, found that there is a negative and statistically significant relationship between enterprises with high quality sustainability reporting and economic indicators. This finding suggests that the quality of sustainability reporting may not be a direct determinant of the financial performance of enterprises and that the economic effects of sustainability reporting are shaped by more complex factors.

Albuquerque et al. (2020) examined the impact of economic instability caused by the COVID-19 pandemic on the resilience of firms with high environmental and social (ES) performance during the crisis. Using US data, the study finds that in the first quarter of 2020, firms with high ES scores have higher stock returns, lower return volatility and higher trading volumes compared to other firms. Moreover, firms with both high ES scores and high advertising expenditures performed particularly strongly during the crisis period. COVID 19 revealed that companies with high ESG performance were more resilient in the eyes of investors during the crisis period; however, firms were not always able to respond to these demands with ESG disclosures of high content quality.

Andrew and Baker (2020) conducted a comprehensive literature review on corporate social responsibility (CSR) reporting and aimed to map the existing studies in this field. 245 academic articles were analysed and CSR reporting was evaluated within the framework of descriptive, instrumental and normative approaches. The findings show that CSR reporting illuminates the impact of CSR reporting on corporate accountability, but issues such as tax avoidance strategies, political donations and democratic participation are not sufficiently examined. The study emphasizes that CSR reporting cannot be addressed from a single perspective and that more comprehensive research is needed in the future.

Velte (2020) examined how the relationship between environmental, social and governance (ESG) performance and financial performance is influenced by the power of the chief executive officer (CEO). In the study, 775 firm-year observations in HDAX and SDAX indices between 2010-2018 were analysed. According to the results of fixed effects panel regression analysis, ESG performance has a positive impact on financial performance (ROA). Moreover, CEO power has a strengthening effect on this relationship. The study suggests that CEO incentives can support the link between corporate social responsibility (CSR) and business success. The results contribute to the literature by emphasizing that ESG and corporate governance should be considered as interactive elements.

Okafor, Adeleye, and Adusei (2021) analysed the impact of social responsibility spending on firm growth in the long run on 100 US-based technology firms listed in the S&P 500 Index during the 2017-2019 period. The results of the study show that corporate social responsibility expenditures increase corporate revenues and profitability and contribute to growth in the long run.

Chouaibi, Chouaibi, and Rossi (2021) examined the direct and indirect impact of environmental, social, and governance (ESG) practices on financial performance through the mediating role of green innovation. In the study, the data of 115 companies from the United Kingdom and 90 companies from Germany included in the ESG index between 2005 and 2019 were evaluated by panel data regression analysis using Thomson Reuters ASSET4 and Bloomberg databases. The findings show that the strengths of ESG practices increase firm value while the weaknesses decrease it. Moreover, green innovation fully mediates the relationship

between ESG practices and financial performance. The study contributes to the literature on the interaction between ESG scores, financial performance and green innovation.

Dao, Phung, and Cheng (2020) examined the relationship between corporate social responsibility (CSR) disclosures and financial performance (CFP) and the impact of economic policy uncertainty (EPU) on this relationship. The data of 592 companies listed on the Vietnam Stock Exchange in 2013-2017 were evaluated by regression analysis. The results show that CSR disclosures positively affect financial performance and all CSR components contribute significantly. Moreover, the negative impact of EMU on financial performance is mitigated by CSR disclosures. The study emphasizes that businesses should pay more attention to CSR.

Nuber, Velte, and Hörisch (2021) examined the relationship between sustainability performance (ESGEP) and financial performance (FP) for large companies in Germany. The study analysed 385 firm-year observations from companies in the DAX30, MDAX and TecDAX indices for the period 2008-2017. The study tests the impact of ESGEP on FP within the framework of the Triple Bottom Line model through time-dependent and curvilinear regression analyses. The results show a U-shaped curvilinear relationship instead of a linear relationship. While the FP of companies with high ESGEP levels increases, moderate ESGEP practices may negatively affect financial performance. Based on the stakeholder-agency theory, the study emphasizes that ESGEP can contribute to long-term financial success. However, the time-lagged effects are not significant. In this context, the impact of ESGEP on FP may vary according to institutional structure, regulations and market conditions.

Mohammadi and Saeidi (2022) examined the impact of corporate social responsibility on financial accounting indicators by analysing 150 companies listed on the Iran Stock Exchange in the period 2012-2018. The results of the study revealed that corporate social responsibility practices have a positive effect on stock return and information asymmetry, but have no significant effect on real earnings management.

Atz, Van Holt, Liu, and Bruno (2022) conducted a literature review covering 1,141 peer-reviewed articles and 27 meta-analyses to examine the impact of sustainability and ESG investments on financial performance. Based on the analysis of studies published between 2015 and 2020, the research found that ESG investments are generally no different from traditional

investments in terms of financial performance, but one-third of the studies found that ESG investments exhibited superior performance. The research draws three main conclusions about ESG investments. First, ESG integration yields better results than merely excluding or eliminating certain investments from the portfolio. Second, ESG investments provide more advantages in times of social and economic crisis. Third, carbon mitigation strategies have the potential to benefit from a climate risk premium. The study provides a comprehensive overview of the academic debate on the financial implications of ESG investments.

Erin, Adegboye, and Bamigboye (2022) examined the relationship between corporate governance and sustainability reporting quality by analysing 120 companies listed on the Nigerian Stock Exchange using regression. In the study, sustainability reporting quality was measured with a scoring system ranging from 0 to 4, with the highest score given when sustainability reporting was subjected to an independent assurance process. The lowest score refers to the cases where the enterprises do not report sustainability. Research findings reveal that board of directors and audit committee variables have a significant relationship with sustainability reporting quality. In addition, corporate governance is found to enhance the credibility of sustainability reporting through independent external audit mechanisms.

Agoraki, Giaka, Konstantios, and Patsika (2023) examined the relationship between ESG reputation risk and financial performance of companies operating in Europe within the framework of EU regulatory policy changes and the COVID-19 process. By analysing the data of 1,816 European companies between 2007 and 2021, it was found that firms with lower ESG reputational risk reduce information asymmetry, face less financial constraints and perform better. The study tests causality using a quasi-natural experiment that takes into account exogenous variables such as the 2014/95/EU directive and the economic shock caused by COVID-19. The results show that ESG risk management positively affects companies' financial stability and performance.

Yousef et al. (2023) examined the impact of sustainability reporting (environmental, social and governance - ESG) on operational, financial and market performance by comparing its level in the manufacturing and banking sectors. The study was conducted using pooled data analysis with a total of 11,705 observations from 932 manufacturing firms and 530 banks operating in 80 countries between 2008 and 2017. The findings of the study revealed that ESG reporting in

the manufacturing sector positively affects the operational and financial performance of businesses. However, in the banking sector, ESG reporting has a negative impact on these performance indicators. By providing a comparative analysis of the level and impact of sustainability reporting between the manufacturing and banking sectors, this study contributes to the limited literature evaluating the approaches of two important sectors in global financial markets towards sustainability reporting.

Almashhadani and Almashhadani (2023) conducted a quantitative study on financial firms listed on the Bahrain Stock Exchange (BSX) to examine the relationship between sustainability reporting and firm performance. In the study, data of 20 financial companies for the year 2021 were collected from secondary sources and analysed using PLS software. The findings of the study show that sustainability reporting has a significant impact on firm performance. Sustainability reporting has a positive impact on return on assets (ROA) and return on equity (ROE).

Ebaid (2023) examined the relationship between sustainability reporting and financial performance of 67 firms listed on the Saudi Arabian Stock Exchange. According to the results of the study, sustainability reporting is positively correlated with firm profitability, but there is no strong correlation between financial performance and sustainability reporting in general.

Wagenhofer (2024) examined sustainability reporting from the perspective of financial reporting and analysed the main differences between these two types of reporting and the effects of regulations. The study evaluated the mandatory sustainability reporting standards proposed by the European Union, the United States and the IFRS Foundation, and discussed how sustainability reporting affects management decisions as a transparency regulation tool. The research found that although sustainability reporting provides large data sets, unlike financial reporting, it does not include aggregate measures and is not based on accruals. It also emphasized the need to disclose long-term strategies, targets and supply chain information. Wagenhofer argues that sustainability reporting provides limited benefits in performance monitoring and comparisons, while the application of generally accepted accounting concepts can make this reporting more effective.

Saeed et al. (2025) examined the impact of corporate environmental reporting on financial performance in publicly listed manufacturing companies operating in Ghana. The study analysed the annual reports of 20 manufacturing firms for the years 2012-2021 and used panel regression and content analysis methods. The findings show that environmental sustainability disclosures have a positive and significant impact on return on equity (ROE) and net profit margin. In addition, health, safety and community development disclosures have a strong impact on ROE. The study recommends the development of more comprehensive guidelines for environmental reporting and the collaboration of accountants with environmental experts. This research provides a valuable framework for policy makers and businesses by providing important findings on the effects of environmental reporting on firm performance in Sub-Saharan Africa.

Hristov and Searcy (2025) examine the relationship between sustainability and performance management systems (PMS), exploring how companies can implement the requirements of the Corporate Sustainability Reporting Directive (CSRD) through the Sustainability Balanced Scorecard (SBSC) model. The study presents a four-stage framework for integrating sustainability and corporate governance: identification of key themes, initial assessment, strategic implementation, and sustainability reporting. This model guides managers in linking sustainability to strategic decision-making. As one of the first studies to integrate CSRD requirements with corporate governance, it makes a significant contribution to the more effective implementation of sustainability reporting in businesses.

A review of global studies reveals that the relationship between sustainability reporting, FRQ and corporate social responsibility (CSR) disclosures has been addressed within the framework of different theoretical approaches and empirical analyses. Studies generally examine the effects of sustainability and CSR disclosures on companies' financial performance, corporate governance practices and market capitalization, and confirm that these effects may vary depending on contextual factors. Research emphasizes that sustainability reporting quality plays an important role on the reliability and transparency of financial reporting, but this relationship is influenced by factors such as regulatory framework, market structure and corporate governance dynamics. Stakeholder theory studies suggest that sustainability disclosures do not always enhance corporate reputation and investor confidence, but strategic disclosures targeted at specific stakeholder groups can strengthen this effect. Research on

carbon disclosures and sustainability strategies suggests that transparent reporting processes may encourage companies to improve their environmental performance, but this effect may vary depending on industry and market conditions.

In general, the literature suggests that the relationship between sustainability reporting and financial performance is multidimensional and that this relationship is significantly affected by factors such as corporate structures, market dynamics and regulatory environment.

2.6.2. Studies in Türkiye

Özçelik, Öztürk and Gürsakal (2014) evaluated the link between corporate social responsibility (CSR) and financial performance of enterprises. In the study, the data of the firms in the BIST100 Index between 2010 and 2012 were analysed using logistic regression method. While CSR is taken as the dependent variable, firm size, financial performance measures, ownership type and risk factors are determined as independent variables. As a result of the study, it was found that firm size has a significant relationship with CSR. However, financial performance, ownership structure and risk factors do not have a significant relationship with CSR.

Başar (2014) examined the relationship between social responsibility activities of enterprises and their financial performance. Within the scope of the study, companies listed in the BIST Chemicals, Petroleum, Plastics Index between 2010-2012 were selected as a sample and their social responsibility levels were determined according to Global Reporting Initiative (GRI) criteria. Earnings per share ratio is used as a financial performance indicator and correlation analysis is applied. As a result of the analysis, it was found that there is an inverse and low level relationship between past financial performance and social responsibility activities, and there is a negative relationship between social responsibility activities and average earnings per share.

Sakarya, Yıldırım and Aytekin (2014) investigated the impact of corporate social responsibility disclosures on the financial performance of enterprises. In the study, six manufacturing firms listed in the BIST30 Index between 2011 and 2012 were analysed and ratio analysis and content analysis methods were used. The findings show that the society is generally sensitive to corporate social responsibility disclosures.

Şişman, Doğan, and Ağca (2016) evaluated the impact of corporate sustainability activities on financial performance in the context of supply chain management. Within the scope of the study, the sustainability reports of 50 firms included in the BIST Sustainability Index were examined and the impact of 2013 reports on 2014 financial performance was analysed. The results show that economic supply chain management practices have a significant and positive relationship with return on assets (ROA) and return on equity (ROE). On the other hand, no significant relationship was found between environmental and social supply chain management activities and financial performance.

Çelik, Zeytinoğlu, and Akarım (2016) examined the link between financial performance and corporate social responsibility reporting. In the study, financial performance was measured through return on assets (ROA) and market capitalization/ book value (M/BV) ratios. As a result of the regression analysis, it was found that whether or not to publish a corporate social responsibility report does not have a significant effect on the financial performance of firms.

Çıtak and Ersoy (2016) used the event study method to analyse the investor reaction on the stock returns of firms included in the BIST Sustainability Index. They compare the PD/DD ratio and stock returns and find that the PD/DD ratios of firms included in the sustainability index are higher than those of firms not included in the index. However, in the event study analysis, it was determined that there was no significant change in the excess return ratios of non-indexed firms in the 10-day period before and after the announcement.

Duran, Karahan, Güler, and Budak (2017) examined the impact of financial performance on corporate social responsibility success. In the study, corporate social responsibility success was taken as the dependent variable, while the current ratio, the ratio of cash equivalents to average expenses, the ratio of short-term debt to total debt and the ratio of total debt to assets were determined as independent variables. According to the regression analysis results, the ratio of short-term debt to total debt and the ratio of cash equivalents to average expenses positively affect corporate social responsibility success. On the other hand, the effect of current ratio on corporate social responsibility success is found to be negative.

Soytaş, Denizel, Uşar, and Ersoy (2017) conducted a study covering various sectors to examine the impact of sustainability investments on the financial performance of enterprises in Türkiye.

A total of 214 firms from mining and construction, manufacturing, transportation, retail trade, finance and insurance, and real estate sectors were selected as the sample. In the study, return on assets (ROA), return on equity (ROE) and Tobin's Q ratio are used as financial performance indicators, and whether the firms are included in the BIST Sustainability Index is considered as an independent variable. The results reveal that there is a significant and positive relationship between sustainability investments and financial performance.

Yıldırım, Altan, and Gemici (2018) used the TOPSIS Method with Entropy Weighting to examine the relationship between corporate governance practices and financial performance of firms. Within the scope of the study, financial performance data and corporate governance scores of five beverage and food companies listed in the BIST Corporate Governance Index between 2013-2016 were analysed. The results of the study revealed that there is no significant relationship between corporate governance ratings and financial performance.

Özkan, Tan and Taşdemir (2018) investigated the impact of corporate social responsibility activities in sustainability reports on the financial performance of enterprises. In the study, annual reports and financial performance data of 35 firms listed in the BIST Sustainability Index between 2011-2016 were analysed. Panel data analysis results reveal that corporate social responsibility activities have a positive impact on profitability ratios.

Acar and Temiz (2018) conducted a study to analyse how the market reacts to the announcement of the firms included in the Borsa Istanbul Sustainability Index. In this context, the data of 44 companies listed in the BIST Sustainability Index were analysed. According to the findings of the study, there is limited evidence that the entry of firms into the BIST Sustainability Index causes an overreaction in stock returns. However, similar limited effects were observed in average total excess returns. Moreover, the analysis based on total asset size, debt ratio, earnings per share and Tobin's Q values revealed no significant difference between firms in terms of excess returns.

Yıldırım, Kocamış and Tokur (2018) investigated whether there is any change in the operating and financial performance of firms included in the BIST Sustainability Index before and after their inclusion in the index. In this context, the data of the firms for the five quarters before their inclusion in the index and the two quarters after their inclusion in the index are compared.

As a result of t-test analyses, it was found that there were significant differences in return on equity (ROE), financial leverage ratio and asset turnover ratio before and after index inclusion.

Yüksel (2018) compared the integrated reporting scores of participation banks operating in Türkiye and South Africa and examined the relationship between these scores and financial performance indicators. Within the scope of the study, the reporting scores of participation banks operating in both countries between 2014 and 2016 were calculated and their relationship with financial performance indicators such as ROA, ROE, asset turnover, firm size, net profit/sales ratio, financial leverage and debt/equity ratios were analysed. The study finds that there are differences between Türkiye and South Africa in terms of integrated reporting. In particular, it was found that there was a positive relationship between integrated reporting scores and firm size in 2015 and 2016, and a positive relationship with asset turnover in 2016.

Düzer and Önce (2018) evaluated the impact of sustainability reporting on the financial performance of firms. In the study, 30 BIST companies that published sustainability reports in accordance with GRI criteria between 2008 and 2014 and 26 companies of similar size that did not publish reports were analysed. The level of sustainability information is determined by considering environmental, social and economic factors and ROA, ROE, price/earnings ratio and PD/DD ratio are used as financial performance indicators. The results of the panel data analysis reveal that the level of disclosure of environmental performance information has a positive effect on ROA and ROE, while the level of social performance information has a significant effect only on ROA.

Gülcan (2019) conducted a study to examine the impact of environmental social responsibility practices of enterprises on their financial performance. In the study, the green management practices of the firms listed in the BIST 50 Index within the scope of environmental sustainability and their financial ratios were compared. According to the results of regression analysis, a positive relationship was found between environmental social responsibility activities and financial performance of enterprises.

Gülcan and Dalgar (2019) evaluated the impact of social responsibility activities of enterprises on financial performance. 45 firms registered in the BIST 100 index between 2007-2016 were selected as the sample. The results of the panel data regression analysis revealed that workplace

practices, consumer relations, environmental and community involvement, and development-based social responsibility activities have a positive impact on return on assets.

Önder (2019) aimed to analyse the bidirectional interaction between social performance and financial performance of enterprises. Accordingly, the social performance levels of the firms were determined using the scores obtained from the GRI sustainability reports of 2016. In the study, return on equity (ROE) is taken as a financial performance indicator, while firm size is measured by total assets as a control variable. As a result of the Multiple Linear Regression Analysis, it was determined that there is no direct interaction between corporate social responsibility and business performance.

Şeker (2020) examined the impact of environmental, social and corporate governance (ESG) performance of enterprises on FRQ. In the study, data based on 14,063 firm-year and 12,054 firm-year observations of 2,009 firms selected from 35 countries excluding the banking sector between 2010 and 2017 were analysed. ESG performance consists of five separate indicators: ESG score, environmental score, social score, corporate governance score and combined ESG score. FRQ is measured by four different models based on earnings management. As a result of the models used in the panel data analysis, it is found that firms' ESG performance has a significant and positive effect on FRQ.

Sak and Dalgar (2020) evaluated the impact of corporate sustainability activities on financial performance. In the study, 16-quarter financial data of 35 firms operating outside the banking sector and included in the Borsa Istanbul Corporate Sustainability Index between 2013-2016 were analysed. Driscoll-Kraay robust estimator is used in the panel data analysis and the results show that corporate sustainability activities have a significant and positive effect on firms' financial performance.

Çokmutlu and Kılıç (2020) examined the relationship between corporate sustainability and financial performance. A performance score was created by evaluating the sustainability and financial performance of manufacturing sector companies listed in the Borsa Istanbul Industrial Index between 2015-2017 with various criteria. Content analysis and entropy TOPSIS ratio analysis methods were used in the study. The results suggest that ESG (environmental, social

and governance) performance and overall sustainability performance are not fully reflected in financial success.

Dinçer and Altınay (2020) conducted a study to analyse the impact of disclosures in sustainability reports on financial performance in the banking sector. In the study, seven banks included in the Borsa Istanbul Sustainability Index between 2010-2017 were analysed. In the study, human resources, environmental sustainability, social participation and product responsibility were determined as sustainability criteria, while financial performance indicators were selected as return on assets (ROA), return on equity (ROE) and net interest margin. The results of panel data analyses and nonparametric statistical tests reveal that sustainability reports have a significant effect only on return on assets (ROA), but not on return on equity (ROE) and net interest margin. In addition, disclosures about environmental factors and human resources have a negative impact on return on assets.

Önce and Çavuş (2020) examined the relationship between FRQ and sustainability reporting for 178 enterprises operating in the BIST Manufacturing sector. The study revealed that the financial reports of enterprises that publish sustainability reports have higher quality and there is a significant positive relationship between the two variables. In addition, it is stated that sustainability reporting improves decision-making processes in the markets by reducing information asymmetry and contributes positively to enterprise value.

Emir and Kıymık (2021) investigated the impact of sustainability performance on financial performance. In the study, the sustainability levels of companies listed in the Borsa Istanbul Metal Goods and Machinery Index between 2014-2018 were evaluated in accordance with GRI standards. The results of panel data regression analysis prove that sustainability performance indicators have a significant and positive relationship with ROE, ROA, operating profit (EBIT) and return on capital employed. However, there is a negative relationship between the growth rate in total assets and sustainability performance.

Sevim (2021) examined the impact of environmental investment expenditures of enterprises on financial performance. In the study, the data obtained from the sustainability reports and financial statements of the companies included in the Borsa Istanbul Sustainability Index were

evaluated by multiple linear regression analysis. The results revealed that environmental investment expenditures have a negative impact on firms' financial performance.

Dinçer, Dinçer, and Keskin (2021) examined the companies listed on Borsa Istanbul to analyse the relationship between sustainability and financial performance. Financial and market data of 165 firms in the BIST 100 and BIST Sustainability Index for the period 2016-2018 were used. The results of the regression analysis revealed that sustainability activities positively affect financial performance through leverage, company size and volatility variables.

Köse and Ak Kuran (2021) examined the relationship between environmental performance and financial performance of companies in the Borsa Istanbul 30 Index. Sustainability reports published in the 2014-2018 period were analysed, waste, emission and water consumption data were used as environmental performance indicators, and ROA, ROE and equity/assets ratio were used as financial performance indicators. According to the panel regression analysis, environmental performance has no significant effect on financial performance. However, it is determined that waste and emission amounts affect financial performance positively, while water consumption affects financial performance negatively.

Öcek, Ünlübulduk and Karadeniz (2021) conducted a study to analyse the financial risks of companies in the hospitality sector with high and low corporate social responsibility (CSR) performance. Within the scope of the study, accommodation companies listed on Borsa Istanbul between 2014-2019 were evaluated. The Altman Z Score model was used to calculate the financial failure risks of these companies for the years 2015-2020. The results of the study revealed that firms with high CSR performance have lower risks of financial failure.

Öcal and Kamil (2021) aimed to examine how sustainability (ESG) and broad indices are affected by risk indicators such as VIX, CDS and currency volatility index. The study analysed Germany ESG-X, CDAX, France ESG-X, CAC All, Indonesia SRI-KEHATI, IDX Composite, Borsa Istanbul Sustainability Index and BIST All Price Indices. Between November 4, 2014 and December 5, 2019, vector auto regression (VAR), Granger causality and impulse response tests were applied. The results of the study show that companies in Germany ESG-X, France ESG-X and SRI-KEHATI are less affected by financial shocks compared to companies in each country's comprehensive index. However, companies in the Borsa Istanbul Sustainability Index

are found to be more sensitive to shocks than companies in the BIST All Index. In addition, it is concluded that stocks with higher ESG scores tend to have lower risk levels and the VIX indicator has more impact than other risk factors.

Akbulut (2021) examined the relationship between the concept of prudence in accounting and debt covenants, sustainability reporting and credit capacity of banks during crisis periods. By analysing 3,931 company-year observations of 290 companies outside the financial sector in Borsa Istanbul, prudence levels were measured with Basu (1997) and Khan and Watts (2009) models. The study evaluates the relationship between Prudential Financial reporting and corporate social responsibility reporting within the framework of stakeholder and agency theories, and tests the relationship between debt restructuring disclosures and prudence levels based on 222 firm-year data from 40 firms. In addition, the relationship between banks' credit capacity and prudence levels during crisis periods is analysed with 175 bank-year data of 9 banks for the period 1999-2019. The findings show that prudent accounting practices are associated with debt covenants and sustainability reporting and affect banks' lending capacity during crisis periods.

Korga and Aslanoğlu (2022) investigated the impact of financial performance on sustainability performance. manufacturing industry firms registered in the BIST Sustainability Index between 2018-2020 were included in the study. In the study, the dependent variable was determined as sustainability performance, while the independent variable was financial performance and leverage ratio, firm size and asset turnover were taken as control variables. Sustainability performance is measured based on the scores calculated by the TOPSIS method. ROA (return on assets) and P/E (price/earnings) ratios are used to evaluate financial performance. In the study where panel data analysis was applied, no significant relationship was found between sustainability performance and financial performance, while a positive and significant relationship was found between sustainability performance and firm size.

Özevin (2022) measured the effects of social, environmental and economic factors on corporate sustainability performance. For this purpose, certain criteria consisting of social, environmental and financial factors were established to determine corporate sustainability performance and these criteria were evaluated using entropy and TOPSIS method. Within the scope of the study, the data of 12 companies included in the BIST Sustainability Index between 2017-2019 were

analysed. The findings show that financial factors are 42%, social factors are 32% and environmental factors are 26% effective in the distribution of criteria that constitute sustainability performance.

Kılıç, Gürler, Kaya, and Lee (2022) investigated the impact of sustainability performance on financial performance in developed and developing countries and the role of firm size in this relationship. In the study, BIST Sustainability Index for Türkiye and Dow Jones Sustainability Korea Index for South Korea are used as sustainability performance indicators. ROE (return on equity), ROA (return on assets), ROS (return on sales) and PD/DD (market capitalization/book value) ratios are used to measure financial performance. Firms in the BIST 100 index in Türkiye and KOSPI 100 index in South Korea are selected as the sample and panel data regression analysis and Generalized Method of Moments (GMM) are applied. The results reveal that the impact of sustainability performance on financial performance differs between Türkiye and South Korea. Moreover, firm size has a significant effect only on ROA in Türkiye, but on ROE and ROS in South Korea. According to the GMM analysis, past ROA and ROE values have a statistically positive effect on current values in South Korea. For Türkiye, past ROE, ROS and Market Value/Book Value (MV/BV) positively affect current values.

Yaşar and Yalçın (2023) analysed the relationship between voluntary Scope 3 greenhouse gas emission disclosures and earnings management (both accrual-based and actual activity-based) using data from 420 listed companies in the United Kingdom between 2016 and 2020. The findings reveal that voluntary disclosure of Scope 3 emissions is not statistically significantly associated with earnings management practices. This result paves the way for questioning the dual approach in the literature on whether voluntary environmental disclosures are made for legitimacy-based or opportunistic purposes.

Dağtaş and Seçme (2023) investigated the financial performance of the automotive industry during extraordinary periods and the impact of inclusion in the sustainability index on financial performance. In the study, the balance sheets and financial reports of 23 firms operating in the automotive sector between 2018-2021 were analysed. Current ratio, ROA, ROE, financial leverage and net profit margin variables were used to measure financial performance. According to the results of independent samples t-test and Mann-Whitney U test, it was

determined that the financial performance of the firms included in the sustainability index was higher.

Güneş and Yalçın (2023), in their study examining the relationship between sustainability performance and earnings management at the level of OECD countries, used data between 2016-2020. In the study, companies' sustainability levels were measured by ESG (environmental, social and governance) scores, while earnings management was measured by both accrual-based and activity-based methods. The results show that there is no statistically significant relationship between sustainability performance and earnings management. Based on the findings, it is concluded that sustainability reporting is not limiting in earnings management and firms make such disclosures mostly for legitimacy seeking and reputation building.

Korga and Aslanoğlu (2024) aimed to determine the importance levels of environmental, economic and social sustainability indicators in the sustainability reports of enterprises based on Global Reporting Initiative (GRI) sustainability reporting standards. In the study, the sustainability reports of 23 companies in the BIST Sustainability Index for the period 2017-2021 were analysed. In the study, sustainability indicators were determined according to GRI standards and the weighting process was carried out with the Enhanced Entropy method. The findings revealed that the indicator with the highest weight value is the ratio of female managers and the indicator with the lowest weight value is the amount of waste. This shows that the highest difference between the enterprises within the scope of the analysis is in the ratio of female managers and the least difference is in the amount of waste. In addition, when the sub-dimensions of sustainability were analysed, it was determined that the dimension with the highest weight value was the social dimension, followed by economic and environmental dimensions, respectively.

Uğurlu and Özbingöl (2024) conducted a bibliometric analysis in the Web of Science (WoS) database to examine the development of academic studies on sustainability reporting. The study analysed 1,025 articles published in the field of business economics between 2000 and 2023. The findings show that sustainability reporting was the subject of a limited number of studies in the early 2000s, but there has been a significant increase in this field after 2015. According to the results of the analysis, most articles are published in the field of management and business finance, while there are fewer studies in public administration. The most cited author is Peter

M. Clarkson with 1,885 citations and the author who published the most articles is Charl De Villiers with 11 articles. While the most cited country is Australia, the most cited journal is Journal of Business Ethics and the most cited journal is Sustainability Accounting Management. The most frequently used keywords in the study were "sustainability reporting", "sustainability" and "corporate social responsibility". The results of the bibliometric analysis were visualized using VOSviewer 1.6.20 software.

Studies in Türkiye have examined the relationship between FRQ and sustainability reporting over different sectors and financial variables. These studies analyse the effects of companies' sustainability practices on financial performance and market reactions. Most of the studies analysed in the Turkish context reveal that sustainability reporting contributes directly or indirectly to the financial success of companies. However, this relationship is found to vary depending on company size, sectoral differences and market dynamics.

In particular, studies on Borsa Istanbul (BIST) address the relationship between sustainability reporting and financial performance within the framework of financial indicators such as market capitalization, return on assets (ROA), return on equity (ROE), PD/DD ratio and stock returns. For example, Düzer and Önce (2017) found that the ROA and ROE ratios of firms that publish sustainability reports are higher than those that do not. Soytaş et al. (2017) found that sustainability investments have a positive impact on financial performance. However, Çelik et al. (2016) and Başar (2014) have shown that social responsibility activities and reporting do not always lead to positive financial results, and in some cases may show an inverse relationship due to market fluctuations or cost factors.

A significant portion of the research in Türkiye focuses on the Borsa Istanbul Sustainability Index. Studies examining the differences in financial performance between firms included in this index and firms that are not included in this index generally show that there is a significant difference in the market capitalization and financial indicators of firms included in the index. Çıtak and Ersoy (2016) find that firms included in the sustainability index have higher PD/DD ratios, but there is no significant difference in terms of stock returns. Acar and Temiz (2018), on the other hand, find that the market responds to index listing announcements to a limited extent.

Compared to global studies, studies in Türkiye mostly analyse the impact of sustainability reporting on variables such as firm size, sector differences and stock returns. Global studies, on the other hand, approach this issue from a broader perspective and address corporate governance, information asymmetry, investor reactions and regulatory factors in more detail. For example, European studies suggest that sustainability reporting contributes to market stability and increases investor confidence (Agoraki et al., 2022). Studies in the US, on the other hand, show that ESG investments create long-term value, but the impact on financial performance varies depending on market conditions and sectoral factors (Atz et al., 2022). While ESG reporting is found to reduce information asymmetry and increase the reliability of financial reporting in developed countries, this effect is more limited in emerging economies (Dao, Phung, & Cheng, 2020).

As a result, studies examining the relationship between sustainability reporting and financial performance in Türkiye largely focus on financial indicators such as firm size, market capitalization and stock returns. Global studies have examined the effects of information asymmetry, governance structure and regulatory framework in more detail. Future studies in Türkiye should adopt a broader theoretical perspective and analyse how ESG disclosures are shaped by governance quality and regulatory changes, which will help us understand the impact of sustainability reporting on FRQ more comprehensively.

3. RESEARCH METHODS

In this section, the data structure, sample selection criteria, variable definitions and the methodological framework for panel data analysis, which constitute the empirical foundations of the research, are explained in a systematic and detailed manner.

3.1. Research Question and Hypotheses

The main research question of this study is; “**Is there a significant and systematic relationship between information disclosures in firms' sustainability reports and financial reporting quality?**”. In this framework, the study analyses the direction and statistical significance of the effect of sustainability report disclosures on FRQ.

In order to address this relationship in a multidimensional manner, hypotheses are developed between eight different ESG subcomponents representing sustainability performance and two separate indicators measuring financial reporting quality (FRQ1 and FRQ2). Thus, each ESG indicator is paired separately with both FRQ measures, and sixteen testable hypotheses are formulated in total.

For the purpose of testing hypotheses in empirical analyses, the following alternative (H_1) hypotheses have been formulated.

1. **H_{1a}**: There is a significant relationship between FRQ1 and ESG score.
2. **H_{1b}**: There is a significant relationship between FRQ2 and ESG score.
3. **H_{1c}**: There is a significant relationship between FRQ1 and environmental score.
4. **H_{1d}**: There is a significant relationship between FRQ2 and environmental score.
5. **H_{1e}**: There is a significant relationship between FRQ1 and social score.
6. **H_{1f}**: There is a significant relationship between FRQ2 and social score.
7. **H_{1g}**: There is a significant relationship between FRQ1 and governance score.
8. **H_{1h}**: There is a significant relationship between FRQ2 and governance score.
9. **H_{1i}**: There is a significant relationship between FRQ1 and management score.
10. **H_{1j}**: There is a significant relationship between FRQ2 and management score.
11. **H_{1j}**: There is a significant relationship between FRQ1 and CSR Strategy score.
12. **H_{1k}**: There is a significant relationship between FRQ2 and CSR Strategy score.

13. **H₁₁**: There is a significant relationship between FRQ1 and emission score.
14. **H_{1m}**: There is a significant relationship between FRQ2 and emission score.
15. **H_{1n}**: There is a significant relationship between FRQ1 and emissions trading.
16. **H_{1o}**: There is a significant relationship between FRQ2 and emissions trading.

Through these hypotheses, the effects of different dimensions of sustainability performance on FRQ are analysed separately and comparatively.

3.2. Research Method and Model

This study was structured within the framework of the relational survey model, one of the scientific research methods. The relational survey model is an approach to determine the level of relationship between two or more variables, which is not causal but allows for relationship-based inferences (Karasar, 2012).

In this framework, the research was designed on the basis of quantitative research approach and regression models based on panel data analysis were used. Panel data structure makes it possible to analyse the relationships between variables in a more reliable and dynamic way, since it contains information on both time series and cross-sectional dimensions of the same observation units (Baltagi & Baltagi 2008). This method increases the explanatory power of the model by taking into account both time-dependent effects and firm-level fixed effects.

During the analysis process, statistical controls specific to the panel data structure (stationarity tests, cross-sectional dependence tests, etc.) were also performed. These checks aimed to increase the validity and reliability of the model.

Although the modelling approach used in the study aims at a correlational analysis, it also includes the assumption of causality due to the structural setup between the dependent and independent variables. In this respect, although the study is evaluated within the framework of a correlational survey model, it also presents a methodological structure based on an explanatory and comparative panel data analysis.

The basic regression model tested in the study is as follows:

$$\text{FRQ}_{it} = \alpha + \beta_1 \text{ESG}_{it} + \beta_2 \text{ROA}_{it} + \beta_3 \text{FirmSize}_{it} + \beta_4 \text{FinancialLeverage}_{it} + \beta_5 \text{AuditTenure}_{it} + \beta_6 \text{Duality}_{it} + \epsilon_t$$

In Model;

FRQ_{it}: FRQ1 and FRQ2 variables representing financial reporting quality,

ESG_{it}: Represents eight separate ESG score variables reflecting sustainability disclosures.

Within the scope of the model, the eight sustainability variables are tested separately for each FRQ indicator and thus, sixteen regression models are analysed in total. This methodological structure enables a systematic and comparative assessment of the relationship between sustainability disclosures and FRQ.

3.3. Data Set and Sample Selection

In this section, the scope of the data set used in the research and the sample selection process are explained in detail.

3.3.1. Data Collection Process

All data used in this study are secondary in nature and were obtained from the Refinitiv (LSEG) database, which provides comprehensive financial and sustainability data at the international level. Access to the relevant database was granted under the institutional licence provided by Alparslan Türkeş Science and Technology University and was granted in December 2024. The data are structured on an annual basis, and no primary data collection methods were employed during the research process. The globally recognised structure of the Refinitiv database supports the validity and comparability of the data used in this study (Dorfleitner, 2015).

3.3.2. Sample and Selection of Sample Countries

The sample of the study consists of 75 Turkish company listed on the BIST between 2019 and 2022 and 140 German companies listed on GSE. Forty of the companies in the Turkish sample represent the main sample that prepares sustainability reports, while 35 represent the control group that does not prepare such reports. All companies in the German sample are companies that report on sustainability.

The sample selection process was conducted in three principal stages: (1) the selection of the main sample countries, (2) the determination of the sample scope, and (3) the identification of the control group.

1. The Selection of the Main Sample Countries: Two main reasons influenced the selection of Turkey and Germany as sample countries for this study:

a. Local and International Representativeness of the Analysis: Turkey was selected as the basic unit of analysis due to its data accessibility and the level of development of sustainability reporting practices, as it is the country where the study was conducted. As a developing economy, Turkey provides a suitable ground for monitoring the relationship between sustainability reporting and financial reporting quality.

b. Importance of Germany in Terms of Economic Relations and Institutional Comparison: Germany was included in the sample for comparative analysis due to its strong trade relations with Turkey and its institutional infrastructure related to sustainability reporting. According to 2024 TUIK data, Turkey's highest exports were to Germany, amounting to 18.79 billion US dollars (TUIK, 2024). This trade volume increases the guiding effect of European Union policies on Turkey, while Germany's practices provide a strategic reference framework for Turkey. Indeed, according to KPMG's 2022 Global Sustainability Reporting Survey, Germany is among the countries with the highest percentage of companies reporting on sustainability and plays a leading role in shaping global standards in this area (KPMG, 2022). In addition, regulations such as the Carbon Border Adjustment Mechanism (CBAM), which is planned to come into force in 2026 under the European Green Deal, make Germany's inclusion in the sample more meaningful at the policy level.

In this context, the selection of Germany as a sample country supports the comparative analysis dimension of the study with both methodological justifications and the policy context, thereby increasing the conceptual and practical depth of the analysis.

Another key factor supporting the selection of Germany as a sample country is the institutionalised development of sustainability reporting in the country, which is aligned with European Union policies. This institutional structure provides a conceptual advantage for comparative analysis.

c. Sustainability Reporting in Germany: Evolutionary Process, Legislation and Implementation Structure: Sustainability reporting in Germany has undergone a gradual transformation process shaped by European Union regulations and institutionalised in line with the country's corporate governance culture. This evolutionary process can be assessed in three main phases: voluntary reporting, legal obligation period and transition to integrated reporting.

Voluntary Reporting Period (2000–2016): In the early 2000s, large-scale businesses in Germany began to adopt voluntary sustainability reporting practices in line with international standards such as the GRI, UN Global Compact, and OECD Guidelines. During this period, reporting was used in strategic areas such as corporate reputation management, investor relations, and brand positioning (Loew et al., 2004). The practices established during this period facilitated the implementation of the legal obligation process. In 2010, the German Sustainability Council (Rat für Nachhaltige Entwicklung - RNE), affiliated with the German Federal Government, published the Deutscher Nachhaltigkeitskodex (DNK), an accessible, simplified, and structured reporting standard specifically designed for small and medium-sized enterprises. The DNK systematises reporting processes in the environmental, social, and governance (ESG) areas within a framework of 20 criteria (RNE, 2023).

Legal Requirement Phase (2017–2021): Following the European Union's 2014 Non-Financial Reporting Directive (NFRD), Germany enacted the CSR-Richtlinie-Umsetzungsgesetz (CSR-RUG) legal regulation in 2017. This regulation requires companies with over 500 employees and certain financial thresholds to disclose information on environmental impacts, social issues, human rights, anti-corruption, and employee rights (KPMG, 2022).

Integrated Reporting and Strategic Alignment (2022–Present): Following the European Green Deal, the CSRD came into effect in 2022, reshaping reporting practices in Germany. Under this directive, the scope of reporting has been expanded to include all large companies, SMEs, and publicly traded companies with more than 250 employees. Reports are based on the principle of double materiality, meaning that both the company's impact on sustainability and the impact of sustainability on the company's financial situation are taken into account. The ESRS have become binding, and Germany has transposed these standards into national law, specifically through the Commercial Code (Handelsgesetzbuch – HGB) (EFRAG, 2023). Reports must now be in XHTML format, digital, and machine-readable, and are subject to audit.

Implementation Profile and Challenges: Large companies in Germany (e.g. DAX40 companies) have adopted integrated reporting and publish ESG performance indicators in line with TCFD, GRI and SASB standards. However, for medium-sized family businesses known as *Mittelstand*, deficiencies in digital infrastructure, expert human resources, and a sustainability vision create significant compliance challenges (Bassen & Kovács, 2020). Additionally, applications that fail to go beyond formal compliance are criticised, and it is emphasised that sustainability reporting should be viewed not as a legal requirement but as a strategic transformation tool.

2. Determination the Sample Scope: When determining the sample scope of the research, the ‘purposive sampling’ method was adopted to identify observation units consistent with the purpose and data structure of the study. This non-probability-based approach focuses on selecting observation units that are appropriate for the research objective and provide the necessary data for analysis (Yıldırım & Şimşek, 199). In order to compare the relationship between sustainability reporting and financial reporting quality, only companies with high analysability and methodological integrity were included in the sample. In this context, the sample scope was determined by identifying the main population and determining the inclusion and exclusion criteria.

a. Determination of the Main Population

The main universe of the research consists of all companies listed on the Borsa Istanbul (BIST) and Germany's main stock exchange, in the period 2019–2022.

- **Turkey Universe:** A total of 575 companies traded on BIST
- **Germany Universe:** 1,268 companies listed on GSE

However, not all companies in the main universe were included in the sample. Companies that did not meet the necessary qualifications for analysis, had incomplete data access, or were methodologically unsuitable were excluded. In this context, a selection process based on certain criteria was followed to determine the companies to be sampled from the universe, and the sample scope was systematically narrowed down.

a.1. Inclusion Criteria

The following criteria were used to select the companies to be included in the scope of the research:

- 1. Sustainability Reporting and Availability of ESG Data:** Companies to be included in the study must have prepared sustainability reports for the 2019–2022 period and must have presented their data on environmental sub-components, such as their ESG overall score and, in particular, their emissions score and emissions trading status, in a complete and accessible manner in the Refinitiv (LSEG) database.
- 2. Financial Data Integrity:** Data related to balance sheet and income statement items used in financial reporting quality calculations must be fully accessible for all analysis years.
- 3. Sectoral Suitability and Structural Homogeneity:** The company's business activities and balance sheet structure should be comparable to other companies in the sample. This minimises cross-sector accounting differences and measurement deviations.

The number of companies that meet these criteria and provide complete data is as follows:

- 60 for Turkey
- 181 for Germany

a.2. Exclusion Criteria

Within the scope of the research, companies that did not meet certain criteria were excluded in order to ensure sample integrity and increase the reliability of the analysis results. In this regard, some companies were systematically excluded from the sample based on the reasons stated below:

- 1. Data Deficiency:** Incomplete or irremediably missing data on ESG scores and their sub-components or key financial reporting items were found to be limiting to the extent that they could distort the analysis structure. Therefore, companies with missing sustainability or financial data sets in the Refinitiv (LSEG) database were excluded.
- 2. Operating in the Financial Sector:** Financial institutions such as banks, insurance companies, investment partnerships, factoring companies, financial leasing institutions, securities companies and venture capital companies were excluded from the sample because their business structures are largely based on cash and financial assets and their

accounting standards differ from those of real sector companies. This distinction is consistent with the sampling approach used in similar studies in the literature.

3. **Holding Status:** Data complexity arising from intra-group transactions, the multi-sectoral nature of their activities, and structural differences resulting from consolidation processes make it methodologically difficult to evaluate holding companies within the scope of the analysis. For this reason, holding companies were also excluded from the sample.
4. **Other Special Status Sectors:** Real estate investment partnerships and certain other types of companies with special status were excluded from the sample due to reasons such as the high content of fixed assets in their balance sheet structures, revaluation practices, and high speculative transaction volumes.

This exclusion process aimed to increase the validity of the analysis results by ensuring both sectoral comparability and data consistency among the companies included in the sample. As a result of this exclusion process.

- In Turkey, 20 companies consisting of financial institutions and holding companies were excluded from the 60 companies covered, and 40 companies were included in the analysis sample.

The data structure for the Turkish sample presents a structurally narrow universe due to both the limited number of companies listed on the BIST and the small number of companies reporting sustainability data. However, this limited universe has been thoroughly screened, and all companies that fully meet the analysis criteria have been included in the sample. In this respect, the data set for the Turkey sample is the most comprehensive and representative available.

- In Germany, out of 181 companies with complete ESG and financial data, 41 companies consisting of financial institutions and holding companies were excluded and 140 companies were included in the analysis sample.

3. Control Group Sample Selection: This was created to enable a comparison of the financial reporting quality of companies that and that did not report on sustainability in Turkey for the

2019–2022 period. In this regard, 35 companies traded on the BIST that do not prepare sustainability reports but are similar to the companies in the main sample in terms of asset size and sector of activity and whose financial data can be accessed in full were included in the study as the control group.

3.3.3. Descriptive Statistics of the Sample

This section presents the basic descriptive statistics of the variables used in the study.

Table 3.1. Descriptive Statistics for Türkiye Sample

Variable	Centre	SS	Min	Maximum
EBIT	329895700	532509600	-369000000	5064820000
CFO	366275100	670992100	-512554000	5616678000
TA	-36379340	495742200	-2860678000	2194760000
A_{t-1}	3237720000	4245348000	159272100	26537000000
D-REV _t	830297100	3619235000	-6554608000	37603110000
PPE _t	2633544000	5231329000	32382080	32381000000
D-REC _t	71220890	236227600	-552292500	1439872000
ROA _{t-1}	0.02777	0.26499	-0.37495	3.22619
ROA	0.07372	0.07145	-0.12675	0.31991
FS	21.47167	1.16106	18.92427	24.15544
FL	0.32897	0.18577	0.00000	0.69568
AT	2.85000	1.37909	1.00000	6.00000
ESGS	63.30838	21.66761	0.00000	94.38791
GOVS	53.11054	22.64953	0.00000	91.03616
SOCS	70.50848	24.77819	0.00000	97.04593
ENVS	62.26150	24.98776	0.00000	99.26021
MGMTS	53.54663	28.27948	0.00000	99.40476
CSRS	50.19424	28.40551	0.00000	98.33333
EMISS	68.44827	27.92940	0.00000	99.43820

An analysis of the descriptive statistics of the Turkish sample firms in Table 3.1 reveals that the variables related to financial indicators and sustainability performance have a wide range of

distribution. Key financial variables such as operating profit (EBIT) and cash flow from operating activities (CFO) have positive mean values, but show negative values at minimum levels. This indicates that some firms experienced operational losses or cash outflows in the relevant period. An analysis of the accrual levels of the firms in the Türkiye sample reveals that the average value of total accruals is negative. This finding indicates that firms adopt a precautionary approach in their financial reporting processes. Within the framework of accounting prudence proposed by Givoly and Hayn (2000) and Vardar (2018), a net profit below operating cash flow is interpreted as a high degree of prudence. In this context, it can be said that a significant portion of the sample firms in Türkiye make prudence-based entries in non-operational items, which may affect the quality of financial reporting.

In the variables related to performance and structural characteristics, ROA averaged around 7%, while firm size and financial leverage variables exhibited a balanced distribution. The average audit period was calculated as 2.85 years.

The average ESG scores reflecting sustainability performance are generally at medium-high levels. The Social Score (SOCS) is the component with the highest average in the sample, while environmental and governance indicators are close to each other. The zero score in some ESG subcomponents is associated with the inadequacy of the disclosures made in the relevant areas according to the evaluation criteria. The maximum values of ESG variables indicate that some firms are relatively advanced in their sustainability practices. This general structure reveals that the sample has a heterogeneous structure in terms of financial and sustainability.

Table 3.2. Descriptive Statistics for the Germany Sample

Variable	Centre	SS	Min	Max
EBIT	1133132000	3234872000	-10548390000	21886770000
CFO	1416954000	4360383000	-15571000000	38631000000
TA	-283822000	2084199000	-19165630000	11513850000
A_{t-1}	22942280000	66398110000	86150330	607125100000
$D-REV_t$	930662400	8374795000	-44919880000	123015300000
PPE_t	12908440000	37985730000	4790000	312993700000
$D-REC_t$	111578000	1851226000	-17879330000	19924700000
ROA_{t-1}	-0.00215	0.06328	-0.38312	0.47008
ROA	0.03939	0.06979	-0.25813	0.56317
FS	9.60887	0.79111	7.82647	11.78328
FL	0.24128	0.14830	0.00124	0.69364
AT	5.39107	3.29833	1.00000	16.00000
ESGS	59.00450	19.59835	3.96983	93.65460
GOVS	57.19359	21.81582	3.96516	97.39713
SOCS	63.29799	21.89829	1.14212	97.50334
ENVS	53.63282	24.29208	0.00000	98.54625
MGMTS	57.68655	26.37873	0.76142	99.82079
CSRS	55.94371	28.41987	0.00000	99.59677
EMISS	56.77173	27.76269	0.00000	99.78355

When the descriptive statistics of the German sample firms are analysed in Table 3.2, a remarkable heterogeneity is observed in terms of both financial performance and sustainability scores. The high averages of EBIT and CFO variables suggest that firms generally exhibit strong operational structures. However, the negative minimum values of these variables indicate that some firms experienced operational losses or negative cash flows during the analysis period. The standard deviation calculated for operating profit (EBIT) in the German sample is quite high. This high standard deviation indicates that there are significant differences in the operational performance of the analysed firms and that EBIT values show a wide dispersion. This may be due to the fact that the firms in the German sample operate in different sectors or the differences in operational structure between large-scale and small-scale firms. As a result, this high heterogeneity in the EBIT variable adds significant depth to the analysis of the study, but stands out as an issue that needs to be handled with caution in comparative evaluations.

The negative average value of total accruals indicates that net profits lagged behind cash flows in the relevant period, which may indicate prudent accounting practices in terms of the direction

of accruals. Considering the Negative Accruals method developed by Givoly and Hayn (2000), it can be assessed that this corresponds to a financial reporting behaviour in which economic gains are postponed and economic losses are recorded quickly through non-operational items. This structure provides an indication that the degree of prudence in accounting processes may be high.

On the other hand, ROA averaged 3.9%, which is lower compared to the Türkiye sample. While firm size and financial leverage variables exhibit a relatively balanced distribution, the average audit tenure of 5.39 years is approximately twice that of the Türkiye sample, indicating a relatively more stable audit structure.

The subcomponents of ESG scores related to sustainability performance are generally at medium-high levels. While the social score (SOCS) and management score (MGMTS) stand out as the subcomponents with the highest averages, the minimum values of some ESG components are close to zero, indicating limited information disclosure in these areas. Maximum values above 90 points indicate that some firms in the sample have advanced sustainability practices. Overall, the German sample shows a high level of diversity in terms of financial structure and sustainability practices, which adds analytical depth to the comparative analysis perspective of the study.

These findings indicate that there are significant differences between the Turkish and German samples in terms of financial structure, sustainability practices and accounting behaviours, and these differences allow for more in-depth interpretation of comparative analyses.

3.4. Research Variables

In this section, the dependent, independent and control variables used in the study are explained and the definition and calculation method of each variable are detailed.

3.4.1. Dependent Variables

The dependent variable in the study is the FRQ of firms. This concept, which cannot be directly observed, is generally measured indirectly through earnings quality in the empirical literature. Earnings quality is considered as an indirect indicator of the reliability of financial information that assesses whether firms present their periodic profits in accordance with economic reality.

In this context, accrual-based models that aim to identify managers' earnings management practices are widely used to measure earnings quality.

In this context, the study utilizes two different models to measure FRQ: Modified Jones Model (Dechow, Sloan & Sweeney, 1995) and Performance-Matched Modified Jones Model (Kothari, Leone & Wasley, 2005). Both models analyse whether managers deliberately manipulate financial reporting by decomposing total accruals into discretionary and non-discretionary components. This allows for the identification of earnings management practices and the evaluation of FRQ through the lens of earnings quality.

The Modified Jones Model (FRQ1) will be used as the first measurement tool of financial reporting quality. The model is mathematically expressed as follows:

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - \hat{\alpha}_i \left[\left(\frac{1}{A_{ip-1}} \right) + \hat{\beta}_{1i} \left(\frac{\Delta REV_{ip} - \Delta REC_{ip}}{A_{ip-1}} \right) + \hat{\beta}_{2i} \left(\frac{PPE_{ip}}{A_{ip-1}} \right) \right]$$

The definitions of the variables in the model are as follows

DA_{it} : Discretionary accruals of entity i at time t

A_{it-1} : Total assets of enterprise i at time t-1

TA_{it} : Total accruals of enterprise i at time t

ΔREV_{ip} : The change in revenue of firm i in period t ($REV_t - REV_{t-1}$)

ΔREC_{ip} : Change in receivables of enterprise i at time t compared to the previous period

PPE_{ip} : 's gross value of property, plant and equipment in period t.

In the model, i denotes the firm and t denotes the year. Total accruals are calculated as operating profit minus cash flows from operating activities.

The residuals obtained from the regression are used as an indicator of discretionary accruals. The absolute distance to zero is taken into account rather than the sign of these residuals. This is because this distance provides a meaningful measure of FRQ (Şeker, 2020). The FRQ1 model aims to identify managers' discretionary interventions regarding reporting. Therefore, it provides an indirect but powerful measure of FRQ.

As an alternative to the FRQ1 model, the Performance-Matched Modified Jones Model (FRQ2) which aims to control the effect of differences in firm performance, is applied in the study.

The relevant model is mathematically expressed as follows:

$$\frac{DA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} - [\hat{\alpha}_i (\frac{1}{A_{ip-1}}) + \hat{\beta}_{1i} (\frac{\Delta REV_{ip} - \Delta REC_{ip}}{A_{ip-1}}) + \hat{\beta}_{2i} (\frac{PPE_{ip}}{A_{ip-1}}) + \hat{\beta}_{3i} ROA_{ip-1}]$$

In this model, ROA refers to the return on assets ratio and is calculated by dividing profit after tax by total assets. This ratio, which reflects the extent to which the firm effectively converts its assets into profit, aims to control the differences in firm performance within the scope of the FRQ2 model. Other variable definitions are the same as in the previous model. The residual values estimated as a result of the regression are used as an indicator of earnings management in this model.

3.4.2. Independent Variables

In this study, eight ESG (Environmental, Social and Governance) scores that reflect firms' sustainability performance are included in the model as independent variables. These scores assess companies' environmental responsibility, social sensitivity and corporate competence in governance structures in a multidimensional framework. All ESG score data are obtained from the LSEG database.

The definitions of ESG scores, which are included in the model as independent variables in the study, are presented in detail in the table below.

Table 3.3. Independent Variables and Definitions

Core Dimensions	Score Name	Model Variable	Description
ESG	ESG Score	ESGS	It is an indicator representing the overall sustainability performance of the company, obtained by the combined weighted average of environmental,
Environmental	Environment Score	ENVS	It covers policies and practices to reduce the environmental impacts of the business.
	Emissions Trading	EMISTR	It is a dummy variable indicating whether the company is included in the carbon emission trading system or not.
	Emission Score	EMISS	Reflects the level of performance in measuring, reporting and reducing greenhouse gas emissions.
Social	Social Score	SOCS	It covers social sustainability dimensions such as employee rights, occupational safety, social participation and gender equality.
Corporate Governance	Corporate Governance	GOVS	It measures the level of compliance with governance principles such as board structure, transparency, internal audit mechanisms and investor rights.
	Management Score	MGMTS	Assesses operational governance practices such as the quality of senior management decision-making, leadership structure, and capacity to guide corporate
	CSR Score	CSRS	It represents the level of strategic planning of the firm regarding social responsibility.

3.4.3. Control Variables

In scientific research, control variables are frequently used in order to analyse the relationship between dependent and independent variables in a healthier and more reliable manner. Control variables help to minimize deviations that may arise in the model due to external influences, while allowing the basic relationship to be isolated. The control variables used in this study were determined in line with the current and qualified literature review on the subject. These variables consist of variables that are predicted to affect FRQ and are frequently used in previous empirical studies. The following table presents the definitions, calculation methods and the purpose of the control variables used in the model.

Table 3.4. Control Variables and Definitions

Variable	Model Variable	Calculation Method	Description
Return on Assets	ROA	Profit After Tax ÷ Total Assets	ROA is a profitability ratio that shows the extent to which a business uses its total assets effectively and generates profit from these assets.
Firm Size	FS	LOG_TA	Firm size is one of the key indicators of a firm's economic and operational capacity. It is usually measured by taking the natural logarithm of total assets (log(TA)).
Financial Leverage	FL	Total Debt ÷ Total Assets	Financial leverage is a proportional indicator of the extent to which an entity uses debt to finance its operations.
Audit Tenure	AT	Number of years of continuous employment of the independent auditor	Audit tenure refers to the number of years a firm has worked continuously with its current audit firm.
Duality	DUAL	Coded as 1 if the chairman of the board and the CEO are the same person and 0 otherwise	Duality refers to the fact that the positions of chairman of the board of directors (Chairman) and chief executive officer (CEO) in a company are held by the same person.

The control variables in Table 3.4, their place in the literature and the rationale for their use in the model are detailed below.

Return on Assets (ROA) is a key performance indicator that reflects the profitability level of the firm. In the literature, there is a preponderance of evidence that firms with higher profitability tend to be more transparent in their financial reports and have stronger motivation to adopt sustainability practices (Francis et al. 2005; Clarkson et al. 2008). Therefore, controlling for profitability is important to isolate the relationship.

Firm Size (LOG_TA) is an important factor affecting the firm's disclosure pressure and governance structure. It is frequently emphasized in the literature that larger firms tend to make more comprehensive and higher quality disclosures because they are more visible to investors

and regulatory authorities (Lang & Lundholm, 1993; Barako et al. 2006). In this context, firm size is a variable that directly affects sustainability reporting and financial report quality.

Financial Leverage (FL) indicates a firm's dependence on debt financing. A high level of leverage may lead to a greater demand for information from investors and lenders, which in turn may encourage managers to report more transparently (Ahmed et al. 2002). Therefore, leverage ratio is also a variable that should be taken into account in the model.

Audit Tenure (AT) indicates how long the firm has worked with the same audit firm. While long audit relationships may provide advantages in terms of knowledge and audit quality, they may also increase the risk of loss of independence. This dual effect can be decisive for FRQ (Geiger & Raghunandan, 2002; Myers et al. 2003).

Duality (DUAL) refers to whether the CEO and the chairman of the board are held by the same person. It is argued that this situation, which implies concentration of power, may weaken the firm's governance structure and expose managers to profit conflicts (Finkelstein & D'Aveni, 1994; Dechow et al., 1996).

Therefore, these control variables are chosen on the basis of both the theoretical foundation and the empirical literature and aim to increase the internal consistency of the model.

3.5. Data Analysis

In this section, econometric methods based on panel data analysis applied to test the hypotheses developed in this thesis are explained in detail and the empirical findings are presented.

The data set used in the study consists of annual observations of forty (N=40) Turkish and one hundred and forty (N=140) German firms operating between 2019 and 2022. In addition, thirty-five (N=35) Turkish firms without sustainability reporting are included in the analysis as a control group. In the Modified Jones and Performance-Matched Jones models, which are used to measure the quality of accrual-based financial reporting, lagged and change values are calculated using 2018 data on net sales and receivables.

In econometric analyses, accrual-based indicators (FRQ1 and FRQ2) calculated to represent FRQ are used as dependent variables. As an independent variable, ESG sub-scores consisting

of environmental, social and governance components reflecting the sustainability performance of firms are included in the model. In this context, the variables considered in the analysis are as follows: esg score (ESGS), environmental score (ENVS), emissions trading status (EMISTR), emissions score (EMISS), social score (SOCS), governance score (GOVS), management score (MGMTS) and CSR strategy score (CSRS).

As control variables, variables reflecting the financial and managerial characteristics of firms are added to the model. These variables are return on assets (ROA), firm size (FS), financial leverage (FL), audit tenure (AT) and duality (DUAL), which is defined as whether the Chairman of the Board of Directors and the CEO are the same person. All these variables are selected in line with similar studies in the literature and included in the modelling process.

FRQ for Turkish and German firms is calculated using the Modified Jones Model and the Performance-Matched Modified Jones Model. The values obtained within the scope of the Modified Jones Model are defined as FRQ1 and the values obtained within the scope of the Performance Matched Modified Jones Model are defined as FRQ2. In the estimation process of both models, linear regression models were created separately for each year to estimate the regression coefficients.

The FRQ1 and FRQ2 calculated within the scope of the study are used as dependent variables representing FRQ and panel regression models are constructed accordingly. In order to analyse the relationship between FRQ and sustainability reporting more clearly, a separate control group of Turkish firms is defined. The firms included in the control group were selected among the firms that did not publish sustainability reports in the relevant period. Accordingly, the financial reporting quality levels (FRQ1, FRQ2) of firms with and without sustainability reports, calculated by the Modified and Performance-Matched Modified Jones models, are compared.

Following the panel regression analyses, a comparison of the FRQ values between Turkish firms in the sample, German firms and Turkish firms in the control group was conducted. For mean comparisons, independent samples t-test was applied since the data conformed to normal distribution. Levene's test was used to assess the homogeneity of variance, in cases where the homogeneity assumption was not met, correction was made with Welch's t-test. In the normality

analysis, in order to test the appropriateness of the distribution, it was evaluated whether the skewness and kurtosis (skewness-kurtosis) values of the variables were within the range (± 3).

In the first stage of the study, descriptive statistics of the variables used are presented. Since the panel data structure is $N > T$, Pesaran (2004) CD test is applied to test whether there is dependence between horizontal sections. The test results show that there is cross-sectional dependence among the variables. Therefore, Hansen's Covariance Extended Dickey-Fuller (CADF) test, which is one of the 2nd generation panel unit root tests, was used in the stationarity analysis (Pesaran, 2007; Lupi, 2009). In addition, Pearson correlation analysis was performed to assess the relationships between dependent and independent variables at the pairwise level.

In order to determine the most appropriate panel regression model for each dependent variable, three different models, namely pooled least squares (PLS), fixed effects model and random effects model, were applied. F-test, Breusch-Pagan Lagrange Multiplier (LM) test and Hausman test were used to select the appropriate model, respectively. The results of these three tests are evaluated together in deciding the type of effect. In addition, autocorrelation, heteroscedasticity and cross-sectional dependence are analysed in panel regression models within the scope of diagnostic tests. Breusch-Godfrey (BG) test was applied for autocorrelation and Breusch-Pagan (BP) test was applied for changing variance (Torres-Reyna, 2010).

In the panel regression models of Turkish and German firms, cross-sectional dependence, autocorrelation and heteroscedasticity problems are detected. In order to mitigate the impact of these structural problems and to increase the reliability of the estimates, the Driscoll-Kraay (2008) estimator was used in the analyses and significance levels were calculated based on robust standard errors.

Econometric findings are evaluated based on 1%, 5% and 10% margins of error. All of the econometric findings of the study were obtained using the R program (R Core Team, 2025) and the plm, lmtest and CADFtest packages included in this program (Croissant & Millo, 2018; Lupi, 2009; Zeileis & Hothorn, 2002).

3.6. Ethical Considerations

Within the scope of this research, no primary data collection process (interviews, questionnaires, observations, etc.) was used, only secondary data was used. All data used in the study were obtained from Refinitiv (LSEG) database, one of the internationally trusted data providers, and accessed through the institutional license of Alparslan Türkeş Science and Technology University. Since the data used are anonymous, firm-level and publicly accessible, they do not contain personal data and do not require participant consent.

Therefore, there was no situation that required ethics committee permission, and the generally accepted ethical principles in scientific research (data security, objectivity, avoiding plagiarism, correct citation of sources, etc.) were meticulously observed. In addition, all sources used in the study were properly cited and data was used for academic purposes only, without any commercial profit motive.

4. FINDINGS AND DISCUSSION

In this section, within the framework of the main research question " **Is there a significant and systematic relationship between information disclosures in firms' sustainability reports and financial reporting quality?**", the findings of the econometric analysis that constitutes the empirical aspect of the study will be presented. The findings of the analysis will then be discussed in the light of the theoretical approaches in the literature and previous studies on the relationship between information disclosures in sustainability reports and FRQ quality. The findings will be systematically evaluated and discussed according to the sample groups.

Table 3.5. Modified Jones Models Estimated for Türkiye Sample

Modified Jones Model									
Year	$\alpha 0$	$p(\alpha 0)$	$\beta 1$	$p(\beta 1)$	$\beta 2$	$p(\beta 2)$	F(Model)	p(Model)	Adjusted R ²
2019	-3268000	0.68780	0.03967	0.53120	-0.06532	0.05430	1.32400	0.28200	0.02429
2020	-697000	0.92350	0.06048	0.09491	-0.10710	0.00283	5.37000	<0.01	0.25200
2021	1357000	0.87800	0.05433	0.19400	-0.00787	0.80100	0.65330	0.58600	0.00700
2022	1599000	0.95867	-0.01814	0.52021	-0.08523	0.02391	2.47800	0.07700	0.10200

***p<0.01, **p<0.05, *p<0.1

Table 3.6. Performance-Matched Modified Jones Models Estimated for Türkiye Sample

Performance-Matched Modified Jones Model											
Year	$\alpha 0$	$p(\alpha 0)$	$\beta 1$	$p(\beta 1)$	$\beta 2$	$p(\beta 2)$	$\beta 3$	$p(\beta 3)$	F(Model)	p(Model)	Adjusted R ²
2019	-3764000	0.57781	0.17320	<0.01	-0.04869	0.08589	-0.08934	<0.01	5.74700	<0.01	0.32700
2020	4082000	0.56023	0.13090	<0.01	-0.12230	<0.01	-0.55450	0.01359	6.36000	<0.01	0.35500
2021	-1223000	0.89400	0.06809	0.12000	-0.00086	0.97800	-0.24820	0.27200	0.80400	0.53100	0.00900
2022	-717300	0.98100	-0.00184	0.94960	-0.08929	0.01610	-0.52340	0.09700	2.68400	0.04732	0.14700

***p<0.01, **p<0.05, *p<0.1

Tables 3.5 and 3.6 present the econometric results of the annually constructed Modified and Performance-Matched Modified Jones Models, used for estimating the coefficients required to identify discretionary accruals indicators of accrual-based earnings management for Turkish firms.

When the Modified Jones Model estimation results presented in Table 3.5 are analysed, it is seen that the overall significance of the model varies by years. In 2020, the model yielded a statistically significant result ($p(\text{Model}) < 0.01$) and explained 25.20% of the variance in the dependent variable (Adjusted R^2). Similarly, in 2022, the model is statistically significant ($p(\text{Model}) = 0.07700$) and explains 10.20% of the variance. In other years, the overall significance level of the model was $P(\text{Model}) > 0.10$.

When the findings of the model are analysed at the coefficient level, the constant term (α_0) does not seem to have a statistically significant effect in all years. The coefficient β_1 (change in trade receivables), one of the main variables of the model, is statistically significant in 2020 ($p=0.09491$). Another important coefficient, β_2 (tangible fixed assets), has a significant effect in the model and yielded statistically significant results in 2019 ($p=0.05430$), 2020 ($p=0.00283$) and 2022 ($p=0.02391$).

Table 3.6 presents the results of the Performance-Matched Modified Jones Model for the Türkiye sample. In this model, the ROA variable (β_3), which represents the performance level of firms, is included in the model. When the overall significance level of the model is analysed, statistically significant results are obtained in 2019 ($p < 0.01$), 2020 ($p < 0.01$) and 2022 ($p = 0.04732$). The adjusted R^2 values for these years were calculated as 32.70%, 35.50% and 14.70%, respectively. These ratios indicate that the model explains a significant portion of the variance in the dependent variable in these years.

When the findings are evaluated at the coefficient level, the constant term (α_0) is not statistically significant in all years. The coefficient β_1 (change in receivables) reached a very strong level of significance in 2019 and 2020 with performance matching ($p < 0.01$ for both years), suggesting that the change in receivables made a significant contribution to the explanatory power of the model in these years. The coefficient of β_2 (tangible fixed assets) was significant in 2019 ($p = 0.08589$), 2020 ($p < 0.01$) and 2022 ($p = 0.01610$), suggesting that this variable makes periodic contributions to the explanatory power of the model. The performance variable (β_3) added to the model yielded statistically significant results in 2019 ($p = 0.08934$), 2020 ($p = 0.01359$) and 2022 ($p = 0.09700$).

Table 3.7. Correlation Matrix between Variables for Türkiye Sample

	FRQ1	FRQ2	ROA	FS	FL	AT	ESGS	GOVS	SOCs	ENVS	MGMTS	CSRS
FRQ1	1											
FRQ2	0.984***	1										
ROA	0.038	-0.015	1									
FS	0.135*	0.132*	-0.031	1								
FL	-0.104	-0.120	-0.171**	0.148*	1							
AT	0.204***	0.210***	-0.014	0.134*	0.068	1						
ESGS	-0.096	-0.097	-0.014	0.380***	0.381***	0.226***	1					
GOVS	-0.154*	-0.131*	-0.018	0.326***	0.292***	0.103	0.774***	1				
SOCs	-0.058	-0.071	-0.018	0.318***	0.395***	0.245***	0.950***	0.596***	1			
ENVS	-0.080	-0.087	0.011	0.374***	0.291***	0.204***	0.910***	0.565***	0.852***	1		
MGMTS	-0.126	-0.106	-0.059	0.237***	0.260***	0.141*	0.672***	0.947***	0.489***	0.463***	1	
CSRS	-0.167**	-0.168**	-0.057	0.321***	0.347***	0.073	0.698***	0.532***	0.664***	0.640***	0.401***	1
EMISS	-0.092	-0.102	-0.028	0.386***	0.314***	0.232***	0.880***	0.556***	0.842***	0.919***	0.448***	0.613***

***p<0.01, **p<0.05, *p<0.1

Table 3.7 presents the results of the correlation analysis between the dependent and independent variables used in the modelling for the Türkiye sample.

According to the results of the analysis, there is a very strong and statistically significant positive correlation between FRQ1 and FRQ2 at 98.4% level ($p < 0.01$). There is no significant correlation between ROA and firm size (FS). Financial leverage (FL) shows a significant negative correlation with firm size at 14.8% level and with ROA at 17.1% level.

Audit tenure (AT) has a positive and significant correlation with FRQ1 at 20.4%, FRQ2 at 21.0% and firm size at 13.4%. ESG score has a moderate positive and significant relationship with firm size (38.0%), financial leverage (38.1%) and audit tenure (22.6%). Similarly, governance score (GOVS) shows positive and significant relationships with firm size (32.6%) and financial leverage (29.2%). In addition, there is a very strong and positive and significant 77.4% correlation between the GOVS variable and ESG score.

On the other hand, there is a weak and negatively significant correlation between GOVS and FRQ1 (-15.4%) and FRQ2 (-13.1%). Social score (SOCS) has moderate and positive significant relationships with firm size (31.8%), financial leverage (39.5%) and audit tenure (24.5%). This variable also has strong positive correlations with ESG score (95.0%) and GOVS (59.6%).

Environmental score (ENVS) has moderate and positive significant correlations with firm size (37.4%), financial leverage (29.1%) and audit tenure (20.4%). It also shows strong and significant correlations with ESG score (91.0%), SOCS (85.2%) and GOVS (56.5%). Management score (MGMTS) is positively and weakly correlated with firm size (23.7%), financial leverage (26.0%) and audit tenure (14.1%). In addition, this variable has 94.7% very strong positive and significant correlations with GOVS, 67.2% with ESG score, 48.9% with SOCS and 46.3% with ENVS.

CSR strategy score (CSRS) shows moderately positive and significant relationships with firm size (32.1%) and financial leverage (34.7%). This score has significant positive correlations with ESG score (69.8%), SOCS (66.4%), ENVS (64.0%), GOVS (53.2%) and MGMTS

(40.1%). On the other hand, weakly negative and significant correlations were found with FRQ1 (-16.7%) and FRQ2 (-16.8%).

Finally, emission score (EMISS) has moderately significant positive correlations with firm size (38.6%), financial leverage (31.4%) and audit tenure (23.2%). This variable also has strong and significant positive correlations with ESG score (88.0%), SOCS (84.2%), ENV5 (91.9%), GOVS (55.6%), MGMTS (44.8%) and CSRS (61.3%).

Table 3.8. Horizontal Cross-Sectional Dependence Results for Variables in Türkiye Sample

Variable	Statistics	p	Dependency
FRQ1	27.20743	<0.01	There is
FRQ2	22.32733	<0.01	There is
ROA	4.03960	<0.01	There is
FS	43.89102	<0.01	There is
FL	7.45405	<0.01	There is
AT	10.09531	<0.01	There is
ESGS	20.20926	<0.01	There is
GOVS	-5.14560	<0.01	There is
SOCS	30.27012	<0.01	There is
ENV5	27.27383	<0.01	There is
MGMTS	-8.16011	<0.01	There is
CSRS	-9.54787	<0.01	There is
EMISS	14.53508	<0.01	There is

Table 3.8 presents the results of the cross-sectional dependence of the research variables for the Türkiye sample obtained by Pesaran (2004) CD test. According to the test findings, there is a statistically significant level of cross-sectional dependence in all variables used in the analysis ($p < 0.01$).

This indicates the existence of dependence relationships that arise due to common shocks or similar trends among firms in the panel data structure. Therefore, in the stationarity analysis of the relevant variables, CADF test, which is one of the second generation panel unit root tests that takes into account horizontal cross-section dependence, is preferred instead of the first generation unit root tests.

Table 3.9. Stationarity Test Results for Variables in Türkiye Sample

Variable	Fixed			Constant + Trend		
	Statistics	p	Conclusion	Statistics	p	Conclusion
FRQ1	-5.52485	<0.01	Stationary	-5.50269	<0.01	Stationary
FRQ2	-5.61611	<0.01	Stationary	-5.62313	<0.01	Stationary
ROA	-5.42780	<0.01	Stationary	-5.61551	<0.01	Stationary
FS	-5.83365	<0.01	Stationary	-6.06006	<0.01	Stationary
FL	-5.17926	<0.01	Stationary	-5.56036	<0.01	Stationary
AT	-9.52663	<0.01	Stationary	-9.49686	<0.01	Stationary
ESGS	-5.91185	<0.01	Stationary	-5.88688	<0.01	Stationary
GOVS	-6.39935	<0.01	Stationary	-6.43066	<0.01	Stationary
SOCS	-5.86335	<0.01	Stationary	-5.83876	<0.01	Stationary
ENVS	-6.14529	<0.01	Stationary	-6.12848	<0.01	Stationary
MGMTS	-6.33024	<0.01	Stationary	-6.37063	<0.01	Stationary
CSRS	-5.95387	<0.01	Stationary	-5.94615	<0.01	Stationary
EMISS	-6.07085	<0.01	Stationary	-6.05128	<0.01	Stationary

Table 3.9 presents the results of the panel unit root analysis applied to test the stationarity properties of the variables of the Türkiye sample. The analysis is conducted under two different model specifications: a model with only a constant term and a model with a constant term and a trend.

The test statistics for all variables, including financial performance indicators and all ESG scores, are negative and p-values are below the 1% significance level. Consistent results are obtained in both model specifications and the significance results reveal that all of these variables in the Türkiye sample are stationary at the 1% level. These results indicate that the variables in the Türkiye sample do not contain unit roots and exhibit a stable behaviour over time.

Table 3.10. Effect Type Selections for Panel Regression Models for Türkiye Sample

Dependent variable	Impact type tests	Statistics	p	Conclusion	Decision
FRQ1	F-test	3.09408	<0.01	Fixed effect	Fixed effect
	Breusch-Pagan LM test	1.88489	0.16978	Pooled OLS	
	Hausman test	87.11692	<0.01	Fixed effect	
FRQ2	F-test	3.14624	<0.01	Fixed effect	Fixed effect
	Breusch-Pagan LM test	2.31748	0.12793	Pooled OLS	
	Hausman test	82.63833	<0.01	Fixed effect	

Table 3.10 presents the results of the effect type selection for the panel regression models constructed to assess the FRQ of the firms in the Türkiye sample. The F-tests for both FRQ1 and FRQ2 dependent variables are statistically significant ($p < 0.01$) and accordingly, the fixed effects model is preferred over the pooled OLS model.

On the other hand, the Breusch-Pagan LM tests for both models were not statistically significant ($p > 0.10$), indicating that the pooled model is more appropriate than the random effect model in terms of the relevant tests. However, in the final Hausman tests, the results for both models are statistically significant ($p < 0.01$), indicating that the fixed effects model is more appropriate than the random effects model.

In conclusion, the holistic evaluation of the tests in terms of both panel regression models requires the fixed effects model to be preferred. Therefore, the panel data analyses for the Türkiye sample were conducted within the framework of the fixed effects model.

Table 3.11. Diagnostic Tests for Panel Regression Models for Türkiye Sample

Dependent variable	Test	Statistics	p	Conclusion
FRQ1	Breusch-Godfrey test	17.84082	<0.01	Autocorrelation detected
	Breusch-Pagan test	22.64487	0.04614	Heteroskedasticity detected
	Pesaran CD test	0.15327	0.87820	No horizontal cross-section dependency
FRQ2	Breusch-Godfrey test	17.51233	<0.01	Autocorrelation detected
	Breusch-Pagan test	20.64769	0.08020	Heteroskedasticity detected
	Pesaran CD test	0.77261	0.43980	No horizontal cross-section dependency

Table 3.11 presents the results of the diagnostic tests performed to test the basic econometric assumptions regarding the panel regression models for the Türkiye sample. These tests were applied to assess the presence of possible structural problems in the models.

The results of the diagnostic tests indicate that there are various econometric problems in both models. Breusch-Godfrey tests indicate an autocorrelation problem with Statistics=17.84082, $p < 0.01$ for the FRQ1 model and Statistics=17.51233, $p < 0.01$ for the FRQ2 model. When Breusch-Pagan tests are analysed, it is seen that there is a problem of heteroscedasticity in the FRQ1 model (Statistics=22.64487, $p=0.04614$) and FRQ2 model (Statistics=20.64769, $p=0.08020$). Pesaran CD tests, which test for horizontal cross-sectional dependence, reveal that

there is no significant dependence in both models (FRQ1: Statistic=0.15327, p=0.87820; FRQ2: Statistic=0.77261, p=0.43980).

Although cross-sectional dependence is observed at the variable level, Pesaran CD tests on the residuals of the panel regression model show that the error terms are not cross-sectional dependent. This suggests that dependence may manifest itself in different ways depending on the level of analysis. Therefore, it suggests that firms in the Türkiye sample act independently of each other and do not respond similarly to common shocks.

However, due to the presence of autocorrelation and variance problems, the panel regression models for Turkish firms use the Driscoll-Kraay estimator, which is robust to these problems. This approach contributes to the econometric robustness and reliability of the estimation results.

Table 3.12. Panel Regression Estimation Results for Türkiye Sample

Variable	Coefficient	Dependent variable = FRQ1		Dependent variable = FRQ2	
		B	p	B	p
Control variables	ROA	-0.36769	<0.01	-0.45795	<0.01
	FS	0.20878	<0.01	0.19549	<0.01
	FL	-0.08071	0.38317	-0.18245	0.08656
	AT	0.00169	0.41610	0.00459	0.05952
	DUAL(Exists)	0.00053	0.96114	-0.00122	0.92529
Independent variables	ESGS	0.00149	0.87845	0.00158	0.86110
	GOVS	-0.00541	0.24111	-0.00494	0.29342
	SOCS	0.00208	0.63465	0.00153	0.71381
	ENVS	-0.00061	0.77787	-0.00069	0.73132
	MGMTS	0.00333	<0.01	0.00338	0.01271
	CSRS	0.00012	0.79645	0.00017	0.66493
	EMISS	-0.00061	0.08387	-0.00018	0.43819
	EMIST(Exist)	-0.00798	0.72803	-0.00758	0.74895
Performance metrics		F = 8.723, p<0.01		F = 9.102, p<0.01	
		AdjustedR ² = 0.279		AdjustedR ² = 0.294	

Table 3.12 presents the estimation results of the panel regression models constructed to analyse the FRQ for the Türkiye sample. Since econometric problems such as autocorrelation, and heteroscedasticity are found in the panel data models for the Türkiye sample, Driscoll-Kraay estimator is preferred in the analysis.

The panel regression model results for the Türkiye sample exhibit statistically strong significance levels for both FRQ measures. The F statistic of the Modified Jones Model-based model for FRQ1 is 8.723 and the p value is less than 0.01. Similarly, the F statistic of the model for FRQ based on the Performance-Matched Modified Jones Model (FRQ2) is 9.102 and the p value is also less than 0.01. These results indicate that both models are statistically significant in explaining the dependent variable. Adjusted R² values are calculated as 27.9% for the FRQ1 model and 29.4% for the FRQ2 model.

For the Türkiye sample, the analysis findings regarding the effects of both control variables and independent variables representing sustainability performance on FRQ are as follows.

- The effect of ROA variable on FRQ is one of the remarkable findings of the study. In both models, the coefficient of ROA is found to be negative and statistically significant (FRQ1: $\beta = -0.36769$, $p < 0.01$; FRQ2: $\beta = -0.45795$, $p < 0.01$).
- Firm size variable has positive and statistically significant coefficients in both models (FRQ1: $\beta = 0.20878$, $p < 0.01$; FRQ2: $\beta = 0.19549$, $p < 0.01$).
- The financial leverage variable is statistically insignificant in the FRQ1 model ($\beta = -0.08071$, $p = 0.38317$), while it is significant in the FRQ2 model ($\beta = -0.18245$, $p = 0.08656$).
- While the Audit tenure variable is not statistically significant in the FRQ1 model ($\beta = 0.00169$, $p = 0.41610$), it is significant at the 10% significance level in the FRQ2 model ($\beta = 0.00459$, $p = 0.05952$).
- The duality variable is not statistically significant in both models (FRQ1: $\beta = 0.00053$, $p = 0.96114$; FRQ2: $\beta = -0.00122$, $p = 0.92529$).
- ESG score variable is not statistically significant in both models (FRQ1: $\beta = 0.00149$, $p = 0.87845$; FRQ2: $\beta = 0.00158$, $p = 0.86110$).

- Governance score is not statistically significant (FRQ1: $\beta=-0.00541$, $p=0.24111$; FRQ2: $\beta=-0.00494$, $p=0.29342$).
- Social score and environmental score variables are also not significant in both models.
- The management score variable was found to be positive and statistically significant in both models (FRQ1: $\beta=0.00333$, $p<0.01$; FRQ2: $\beta=0.00338$, $p=0.01271$).
- The emission score variable has a negative effect at the 10% significance level in the FRQ1 model ($\beta=-0.00061$, $p=0.08387$), but does not retain its significance in the FRQ2 model ($\beta=-0.00018$, $p=0.43819$).
- CSR strategy score and emissions trading status variables are not statistically significant in both models.

Table 3.13. Modified Jones Models Estimated for the German Sample

Modified Jones Model									
Year	$\alpha 0$	$p(\alpha 0)$	$\beta 1$	$p(\beta 1)$	$\beta 2$	$p(\beta 2)$	F(Model)	p(Model)	Adjusted R ²
2019	-10790000	0.07050	0.15020	0.01780	-0.03569	0.19640	3.40400	0.01958	0.04934
2020	-4176000	0.23260	-0.03061	0.01520	-0.00214	0.87120	2.47500	0.06415	0.03086
2021	948000	0.82000	0.02452	0.21700	-0.00451	0.76000	0.53370	0.65990	0.01017
2022	3843000	0.21940	0.06190	0.02020	-0.01201	0.36420	2.50200	0.06199	0.03140

***p<0.01, **p<0.05, *p<0.1

Table 3.14. Performance-Matched Modified Jones Models Estimated for Germany Sample

Performance-Matched Modified Jones Model											
Year	$\alpha 0$	$p(\alpha 0)$	$\beta 1$	$p(\beta 1)$	$\beta 2$	$p(\beta 2)$	$\beta 3$	$p(\beta 3)$	F(Model)	p(Model)	Adjusted R ²
2019	-14190000	0.02626	0.18780	0.00593	-0.04502	0.11104	-0.34790	0.13621	3.13900	0.01668	0.05797
2020	-3988000	0.25472	-0.03782	0.00929	-0.00265	0.84082	0.08311	0.31108	2.11500	0.08226	0.03110
2021	602200	0.88400	0.02349	0.23100	-0.01440	0.34840	0.16930	0.04010	1.48400	0.21060	0.01373
2022	3449000	0.26650	0.06105	0.02080	-0.01190	0.36380	-0.16380	0.05520	2.85000	0.02629	0.05055

***p<0.01, **p<0.05, *p<0.1

Table 3.13 and Table 3.14 present the econometric estimation results of the Modified Jones Model and the Performance-Matched Modified Jones Model on an annual basis to determine

discretionary accruals representing accrual-based earnings management for the firms in the German sample.

First, when the results of the Modified Jones Model in Table 3.13 are analysed, it is seen that the statistical significance level of the model is higher and more stable compared to the Türkiye sample. In 2019, the model showed strong significance ($p=0.01958$) and explained 4.93% of the variance in the dependent variable (Adjusted R^2). Similarly, the model produced significant results in 2020 and 2022 ($p=0.06415$ and $p=0.06199$, respectively). However, in 2021, the model lost its significance level ($p=0.65990$) and its explanatory power dropped below 1%.

At the individual level, the constant term (α_0) is not statistically significant in all years in the German sample as in the Turkish sample. However, the coefficient β_1 , which represents the change in trade receivables, has a more stable and significant structure for German firms. This coefficient is statistically significant in 2019 ($p=0.01780$), 2020 ($p=0.01520$) and 2022 ($p=0.02020$). This suggests that the coefficient β_1 , which is significant only in 2020 for Turkish firms, has a more consistent effect in the German sample. On the other hand, the coefficient β_2 , which expresses the change in tangible fixed assets, did not show a statistically significant effect in any of the years analysed in the German sample.

The results of the Modified Jones Model with Performance- Matched in Table 3.14 show that the addition of the ROA variable (β_3) also improves the model performance for German firms. The model is statistically significant in 2019 ($p=0.01668$) and 2022 ($p=0.02629$). The adjusted R^2 values for these significant years are 5.80% and 5.06%, respectively, which are lower than for Turkish firms (32.70%, 35.50%, 14.70%) and suggest that the model can explain a more limited variance in the dependent variable in the German sample.

In the performance-matched model, the coefficient β_1 has strong statistical significance in 2019 ($p=0.00593$), 2020 ($p=0.00929$) and 2022 ($p=0.02080$). This is similar to the strong β_1 effect observed for Turkish firms. In this model, the β_2 coefficient for German firms is again not significant in all years. Unlike Turkish firms, the performance matching variable (β_3) added to the model has a statistically significant effect in 2021 ($p=0.04010$) and 2022 ($p=0.05520$).

The explanatory power of the model for the German sample is significantly lower than for the Turkish sample, but the coefficient β_1 performs more consistently. This suggests that

accounting quality and earnings management practices between the two countries may have different dynamics.

Table 3.15. Correlation Matrix between Variables for Germany Sample

	FRQ1	FRQ2	ROA	FS	FL	AT	ESGS	GOVS	SOCS	ENVS	MGMTS	CSRS
FRQ1	1											
FRQ2	0.994***	1										
ROA	-0.135***	-0.119***	1									
FS	-0.174***	-0.184***	-0.168***	1								
FL	-0.065	-0.072*	-0.213***	0.274***	1							
AT	-0.005	-0.003	-0.010	0.004	0.029	1						
ESGS	-0.178***	-0.190***	-0.101**	0.663***	0.207***	-0.035	1					
GOVS	-0.130***	-0.136***	-0.086**	0.459***	0.197***	-0.075*	0.788***	1				
SOCS	-0.183***	-0.196***	-0.053	0.626***	0.207***	-0.035	0.912***	0.579***	1			
ENVS	-0.138***	-0.149***	-0.113***	0.612***	0.091**	0.012	0.856***	0.508***	0.721***	1		
MGMT	-0.141***	-0.145***	-0.081*	0.372***	0.157***	-0.034	0.707***	0.954***	0.494***	0.430***	1	
CSRS	-0.168***	-0.182***	-0.072*	0.601***	0.137***	-0.024	0.721***	0.582***	0.662***	0.613***	0.436***	1
EMISS	-0.136***	-0.143***	-0.068	0.540***	0.110***	-0.062	0.732***	0.465***	0.644***	0.778***	0.384***	0.567***

***p<0.01, **p<0.05, *p<0.1

Table 3.15 shows the results of the correlation analysis between the variables used in the modelling phase for the German sample.

According to these results, a very strong and positively significant relationship at 99.4% level between FRQ1 and FRQ2 is found for the German sample. The FRQ1 variable exhibits weak and negatively significant correlations with ROA at the level of -13.5%, with firm size at the level of -17.4%, and with ESG score at the level of -17.8%. There are weak and negatively significant correlations with governance score at the -13.0% level, social score at the -18.3% level, and environmental score at the -13.8% level.

The FRQ1 variable exhibits a significant negative correlation with the management score at the level of -14.1%, with the CSR strategy score at the level of -16.8% and with the emission score at the level of -13.6%. The FRQ2 variable shows a weak and negatively significant relationship with ROA at the level of -11.9%, with firm size at the level of -18.4%, and with financial leverage at the level of -7.2%.

There are weak and negatively significant correlations between ESG score and FRQ2 at -19.0%, governance score at -13.6%, and social score at -19.6%. The FRQ2 variable in the German sample has weak and negatively significant correlations with the environmental score at the level of -14.9%, with the management score at the level of -14.5%, with the CSR strategy score at the level of -18.2% and with the emission score at the level of -14.3%.

There are weak and negatively significant correlations between ROA and firm size at -16.8% and financial leverage at -21.3%. In addition, there are weak and significant negative correlations with ESG score at -10.1%, governance score at -8.6%, environmental score at -11.3% and CSR strategy score at -7.2%.

The firm size variable exhibits a weak and significant positive relationship with financial leverage at the level of 27.4%. Strong positive correlations are observed with ESG score at 66.3%, social score at 62.6% and environmental score at 61.2%. In addition, there are moderate correlations with the governance score at 45.9% and the management score at 37.2%, and strong positive and significant correlations with the emission score at 54.0%.

In the German sample, there are weak and positive significant correlations between the financial leverage variable and ESG score at the level of 20.7%, governance score at the level of 19.7%, and Social Score at the level of 20.7%. There are weak and positive significant correlations with CSR strategy score at the level of 13.7% and with emission score at the level of 11.0%.

The audit tenure variable only shows a weak and negatively significant correlation with the governance score at the level of 7.5%. ESG score has a strong correlation with governance score at 78.8%, a very strong and positively significant correlation with social score at 91.2%, environmental score at 85.6%, and governance score at 90.7%.

There are strong and positively significant correlations with CSR strategy score at the 72.1% level and with emission score at the 73.2% level. Governance score has moderate positive significant relationships with social score at the level of 57.9%, environment score at the level of 50.8%, CSR strategy score at the level of 58.2% and emission score at the level of 46.5%, and shows a very strong and positively significant correlation with management score at the level of 95.4%.

The social score variable exhibits strong and positively significant relationships with the environment score at 72.1%, with the CSR strategy score at 66.2% and with the emission score at 64.4%, while it has a moderate and positively significant correlation with the management score at 43.0%. The environment score has a moderate and positively significant correlation with the management score at 39.4%, a strong and positively significant correlation with the CSR strategy score at 61.3%, and a strong and positively significant correlation with the emission score at 77.8%.

There are moderate and positively significant correlations between the management score and the CSR strategy score at 43.6% and between the emission score at 38.4%. Finally, for the Germany sample, there is a moderately significant positive correlation between CSR strategy score and emission score at 56.7% level.

Table 3.16. Horizontal Cross-Sectional Dependence Test Results for Variables in Germany Sample

Variable	Statistics	p	Dependency
FRQ1	11.15796	<0.01	There is
FRQ2	7.28491	<0.01	There is
ROA	22.90968	<0.01	There is
FS	46.97200	<0.01	There is
FL	15.63616	<0.01	There is
AT	18.15069	<0.01	There is
ESGS	36.77360	<0.01	There is
GOVS	31.83030	<0.01	There is
SOCS	5.77517	<0.01	There is
ENVS	21.10667	<0.01	There is
MGMTS	24.40021	<0.01	There is
CSRS	60.63736	<0.01	There is
EMISS	10.71553	<0.01	There is

Table 3.16 shows the results of the horizontal cross-section dependence test of the research variables for the German sample. According to the horizontal cross-section dependence results, there is a significant horizontal cross-section dependence in all variables to be used in panel regression analyses. Since horizontal cross-section dependence problem is detected in the data, CADF test, one of the second generation unit root tests, will be applied to test the stationarity of the variables belonging to the Germany sample.

Table 3.17. Stationarity Analysis of Variables in Germany Sample

Variable	Fixed			Constant + Trend		
	Statistics	p	Conclusion	Statistics	p	Conclusion
FRQ1	-19.24708	<0.01	Stationary	-19.23026	<0.01	Stationary
FRQ2	-19.36159	<0.01	Stationary	-19.34424	<0.01	Stationary
ROA	-15.96034	<0.01	Stationary	-15.94779	<0.01	Stationary
FS	-9.91569	<0.01	Stationary	-9.93970	<0.01	Stationary
FL	-11.05116	<0.01	Stationary	-11.04276	<0.01	Stationary
AT	-15.44282	<0.01	Stationary	-15.44724	<0.01	Stationary
ESGS	-11.22514	<0.01	Stationary	-11.21591	<0.01	Stationary
GOVS	-12.11731	<0.01	Stationary	-12.12197	<0.01	Stationary
SOCS	-10.71774	<0.01	Stationary	-10.72573	<0.01	Stationary
ENVS	-11.07143	<0.01	Stationary	-11.07149	<0.01	Stationary
MGMTS	-12.36243	<0.01	Stationary	-12.35328	<0.01	Stationary
CSRS	-11.99183	<0.01	Stationary	-12.00516	<0.01	Stationary
EMISS	-10.88924	<0.01	Stationary	-10.98458	<0.01	Stationary

In Table 3.17, the stationarity properties of the variables of the Germany sample are tested with panel unit root analysis. The analyses are performed under two different model specifications: with a constant term only and with a constant and trend term.

The test statistics obtained for all variables, including financial performance indicators and environmental, social and governance scores, have negative values and p-values are below the 1% significance level. Consistent results are obtained in both models, indicating that all variables in the German sample are stationary at the level. Therefore, it is concluded that the variables do not contain unit roots and exhibit a stable behaviour over time.

Table 3.18. Effect Type for Panel Regression Models for Germany Sample

Dependent variable	Impact type tests	Statistics	p	Conclusion	Decision
FRQ1	F-test	1.49853	<0.01	Fixed effect	
	Breusch-Pagan LM test	7.90117	<0.01	Random effect	Random effect
	Hausman test	11.06452	0.60541	Random effect	
FRQ2	F-test	1.51217	<0.01	Fixed effect	
	Breusch-Pagan LM test	7.23830	<0.01	Random effect	Random effect
	Hausman test	14.43266	0.34409	Random effect	

Table 3.18 presents the results of the effect type selection for the panel regression models established to evaluate the FRQ of the firms in the German sample. In both models, the F-test result is statistically significant and according to this test, fixed effect is selected instead of pooled OLS. The p-values of the Breusch-Pagan LM test are also statistically significant in both models, and according to this test, random effect is preferred instead of pooled OLS. Finally, the Hausman test result is statistically insignificant, indicating that fixed effect is chosen instead of random effect. In these panel regression models for the German sample, since the majority of the tests are in favour of the random effect type, the models are estimated according to the random effect type.

Table 3.19. Diagnostic Tests for Panel Regression Models for Germany Sample

Dependent variable	Test	Statistics	p	Conclusion
FRQ1	Breusch-Godfrey test	12.12688	0.01643	Autocorrelation detected
	Breusch-Pagan test	26.41492	0.01495	Heteroscedasticity detected
	Pesaran CD test	0.48394	0.62840	No horizontal cross-section dependency
FRQ2	Breusch-Godfrey test	12.05895	0.01692	Autocorrelation detected
	Breusch-Pagan test	27.24713	0.01151	Heteroskedasticity detected
	Pesaran CD test	3.92170	<0.01	Horizontal cross-sectional dependency exists

Table 3.19 presents the results of diagnostic tests conducted to test the econometric assumptions of the panel regression models for the German sample. Diagnostic tests reveal the presence of various econometric problems in the models. Breusch-Godfrey tests for both models indicate the presence of autocorrelation problem (FRQ1: Statistic=12.12688, $p=0.01643$; FRQ2: Statistic=12.05895, $p=0.01692$). Similarly, Breusch-Pagan tests reveal that there is a problem of heteroscedasticity in both models (FRQ1: Statistic=26.41492, $p=0.01495$; FRQ2: Statistic=27.24713, $p=0.01151$). When the Pesaran CD tests for horizontal cross-sectional dependence are analysed, while no horizontal cross-section dependence problem is detected in the FRQ1 model (Statistic=0.48394, $p=0.62840$), this problem is observed in the FRQ2 model (Statistic=3.92170, $p<0.01$).

These test results necessitated the use of the Driscoll-Kraay estimator, which is robust to autocorrelation, heteroscedasticity and cross-sectional dependence problems, in panel regression analyses for the German sample.

Table 3.20. Panel Regression Models for Germany Sample

Variable	Coefficient	Dependent variable = FRQ1		Dependent variable = FRQ2	
		B	P	B	p
Control variables	ROA	-0.14487	0.05755	-0.13152	0.08663
	FS	-0.00921	0.33006	-0.00924	0.33334
	FL	-0.02181	0.30685	-0.02199	0.28341
	AT	0.00002	0.97397	0.00009	0.89515
	DUAL(Exists)	-0.00923	0.26100	-0.00914	0.32570
Independent variables	ESGS	0.00018	0.66554	-0.00009	0.83733
	GOVS	0.00161	<0.01	0.00172	0.00207
	SOCS	-0.00029	0.38350	-0.00021	0.54191
	ENVS	0.00001	0.96860	0.00007	0.77242
	MGMTS	-0.00134	<0.01	-0.00135	0.00626
	CSRS	-0.00037	0.08992	-0.00040	0.08409
	EMISS	-0.00005	0.72451	-0.00004	0.77115
	EMIST(Exists)	-0.00444	0.09070	-0.00660	0.05482
Performance metrics		Chi-square=43.292, p<0.01		Chi-square=44.865, p<0.01	
		AdjustedR ² = 0.051		AdjustedR ² = 0.053	

Table 3.20 presents the econometric results of the panel regression models constructed to assess the FRQ of firms in the German sample. Since autocorrelation, heteroscedasticity or cross-sectional dependence problems are detected in the models of the German sample, the Driscoll-Kraay estimator is used as in the Turkish sample.

The Chi-square statistic of the model for FRQ1 based on the Modified Jones Model is 43.292 and the p value is less than 0.01. The Chi-square statistic for the model based on the Performance-Modified Jones Model (FRQ2) is 44.865 and the p-value is also less than 0.01. These results indicate that both models are statistically significant in general. However, the adjusted R² values of these models for the German sample are 5.1% for FRQ1 and 5.3% for FRQ2. These ratios are lower compared to the explanatory power of the models in the Turkish sample. In the Türkiye sample, the adjusted R² value for the FRQ1 model was calculated as 27.9% and 29.4% for the FRQ2 model.

For the German sample, the analysis findings regarding the effects of both control variables and independent variables representing sustainability performance on FRQ are as follows.

- The effect of the ROA variable in the German sample shows a similar trend compared to the Turkish sample, but at a different level. In the FRQ1 model, the ROA variable has a negative coefficient ($\beta = -0.14487$) with a p-value of 0.05755, which shows borderline statistical significance at the 10% significance level. In the FRQ2 model, ROA has a higher absolute coefficient ($\beta = -0.3152$) and the p-value is significant at the 1% level with 0.00663.
- The firm size (FS) variable exhibits a different pattern in the German sample compared to the Turkish sample. Although the coefficient of the variable is negative in both models (FRQ1: $\beta = -0.00921$, $p = 0.33006$; FRQ2: $\beta = -0.00924$, $p = 0.33334$), it is not statistically significant.
- Although the coefficient of the financial leverage variable is negative in both models, it is not statistically significant (FRQ1: $\beta = -0.02181$, $p = 0.30685$; FRQ2: $\beta = -0.02199$, $p = 0.28341$).
- Although the audit tenure variable has positive coefficients in both models, it is not statistically significant (FRQ1: $\beta = 0.00002$, $p = 0.97397$; FRQ2: $\beta = 0.00009$, $p = 0.89515$).
- Although the duality presence variable has negative coefficients in both models, it is not statistically significant (FRQ1: $\beta = -0.00923$, $p = 0.26100$; FRQ2: $\beta = -0.00914$, $p = 0.32570$).
- The ESG score variable is positive but not statistically significant in both models (FRQ1: $\beta = 0.00018$, $p = 0.66554$; FRQ2: $\beta = -0.00009$, $p = 0.83733$). Although the social score variable has negative coefficients in both models, it is not significant (FRQ1: $\beta = -0.00029$, $p = 0.38350$; FRQ2: $\beta = -0.00021$, $p = 0.54191$). The environment score variable has positive coefficients but is not statistically significant (FRQ1: $\beta = 0.00001$, $p = 0.96860$; FRQ2: $\beta = 0.00007$, $p = 0.77242$).
- Remarkably, the governance score variable is positive and statistically significant in both models (FRQ1: $\beta = 0.00161$, $p < 0.01$; FRQ2: $\beta = 0.00172$, $p = 0.00207$).
- In contrast to Turkish firms, the management score variable has negative coefficients and is statistically significant in both models (FRQ1: $\beta = -0.00134$, $p < 0.01$; FRQ2: $\beta = -0.00135$, $p = 0$). The CSR strategy score variable has negative coefficients in both models

and is significant in both models (FRQ1: $\beta=-0.00037$, $p=0.08992$; FRQ2: $\beta=-0.00040$, $p=0.08409$).

- Although the emission score variable has negative coefficients in both models, it is not statistically significant (FRQ1: $\beta = -0.00005$, $p = 0.72451$; FRQ2: $\beta = -0.00004$, $p = 0.77115$). On the other hand, the emissions trading status (EMIST) variable is negative and statistically significant in both models (FRQ1: $\beta = -0.00444$, $p = 0.09070$; FRQ2: $\beta = -0.00660$, $p = 0.05482$).

Table 3.21. Hypothesis Results of Panel Regression Models

Hypothesis	Decision	
	Turkish companies	German companies
H _{1a} : There is a significant relationship between FRQ1 and ESG score.	Rejected	Rejected
H _{1b} : There is a significant relationship between FRQ2 and ESG score.	Rejected	Rejected
H _{1c} : There is a significant relationship between FRQ1 and environmental score.	Rejected	Rejected
H _{1d} : There is a significant relationship between FRQ2 and environmental score.	Rejected	Rejected
H _{1e} : There is a significant relationship between FRQ1 and social score.	Rejected	Rejected
H _{1f} : There is a significant relationship between FRQ2 and social score.	Rejected	Rejected
H _{1g} : There is a significant relationship between FRQ1 and governance score.	Rejected	Irrefutable
H _{1h} : There is a significant relationship between FRQ2 and governance score.	Rejected	Irrefutable
H _{1i} : There is a significant relationship between FRQ1 and management score.	Irrefutable	Irrefutable
H _{1j} : There is a significant relationship between FRQ2 and management score.	Irrefutable	Irrefutable
H _{1j} : There is a significant relationship between FRQ1 and CSR Strategy score.	Rejected	Irrefutable
H _{1k} : There is a significant relationship between FRQ2 and CSR Strategy score.	Rejected	Irrefutable
H _{1l} : There is a significant relationship between FRQ1 and emission score.	Irrefutable	Rejected
H _{1m} : There is a significant relationship between FRQ and emission score.	Rejected	Rejected
H _{1n} : There is a significant relationship between FRQ1 and emissions trading.	Rejected	Irrefutable
H _{1o} : There is a significant relationship between FRQ2 and emissions trading.	Rejected	Irrefutable

Table 3.21 presents the hypothesis results of the panel regression models applied separately for Türkiye and Germany samples. According to these results, among the alternative hypotheses that the independent variables have a significant relationship with FRQ1 and FRQ2 variables, H_{1i}, H_{1j} and H_{1l} for Türkiye sample could not be rejected. All hypotheses except these three

hypotheses are rejected for Turkish firms. For the German sample, all hypotheses except H_{1g}, H_{1h}, H_{1i}, H_{1j}, H_{1k}, H_{1n} and H_{1o} cannot be rejected. All hypotheses except these eight hypotheses are rejected for the German sample. In general, while 50% of the hypotheses for the German sample were rejected, 81.25% of the hypotheses for the Turkish sample were rejected. According to the findings obtained from panel regression analyses, there is no significant relationship between overall ESG score, environmental score, social score and financial reporting quality (FRQ1 and FRQ2) for both Turkish and German firms. Accordingly, hypotheses H_{1a}, H_{1f} are rejected for both countries. In the Türkiye sample, since the relationships with the governance score, CSR strategy score and emissions trading variable are not statistically significant, these hypotheses are also rejected. However, the management score (MGMTS) is considered as "non-negative" in both models and the emission score (EMISS) is considered as "non-negative" only in the FRQ1 model. This suggests that sustainability performance in Türkiye, especially with respect to governance structures, may have a limited impact on FRQ. In the German sample, there are statistically irrefutable relationships between governance score, CSR strategy score, management score and emission trading variables and FRQ. These findings suggest that corporate governance practices and regulatory framework in Germany reflect the integration of sustainability components into financial reporting processes more strongly than in Türkiye.

Although the statistical significance level for some hypotheses in the panel regression analyses is not below the classical 5% confidence level, these hypotheses are considered as "non-refutable". This approach is based on the need for a multidimensional assessment of theoretical rationales, previous empirical findings and practical contexts, rather than pure statistical significance. For example, the impact of governance scores and emission trading variables on FRQ tended to show a consistent direction and borderline significance in both country samples.

These findings are consistent with the theoretical assumptions that corporate governance practices and regulation-based carbon trading mechanisms can affect firms' transparency policies (see Dechow et al., 2010; Matsumura et al., 2014). Accordingly, the hypotheses that are deemed "irrefutable" point to potential relationships that are consistent with the predictions of the existing literature and need to be deepened in further analysis. Such findings are important for providing a theoretical framework for relationships that may become more

evident in advanced models (e.g. with fixed effects, interaction terms or sectoral decompositions).

Table 3.22. Comparison of Financial Reporting Quality between Türkiye and Germany

Year	Score	Country	Centre	SS	t	p
2019	FRQ1	GRMY	0.05747	0.10344	0.62700	0.53100
		TRKY	0.04693	0.04468		
	FRQ2	GRMY	0.06340	0.10283	0.94700	0.34500
		TRKY	0.04738	0.05424		
2020	FRQ1	GRMY	0.04080	0.04684	-2.99400	<0.01
		TRKY	0.06536	0.04164		
	FRQ2	GRMY	0.04108	0.04636	-3.67800	<0.01
		TRKY	0.07137	0.04440		
2021	FRQ1	GRMY	0.03892	0.04691	-2.04600	0.04200
		TRKY	0.05561	0.03994		
	FRQ2	GRMY	0.03878	0.04654	-2.29000	0.02300
		TRKY	0.05726	0.03906		
2022	FRQ1	GRMY	0.03909	0.03306	-6.84400	<0.01
		TRKY	0.23398	0.17922		
	FRQ2	GRMY	0.03914	0.03308	-6.95300	<0.01
		TRKY	0.22749	0.17043		
General	FRQ1	GRMY	0.04407	0.06392	-5.57478	<0.01
		TRKY	0.10047	0.12332		
	FRQ2	GRMY	0.04560	0.06388	-5.64903	<0.01
		TRKY	0.10087	0.11897		

Table 3.22 presents the results of the independent sample t-test for the comparison of Germany and Türkiye samples in terms of FRQ by years and at the overall level.

In 2019, while there is no statistically significant difference between the countries for both models (FRQ1: $t=0.62700$, $p=0.53100$; FRQ2: $t=0.94700$, $p=0.34500$), it is observed that the FRQ levels of Turkish firms are higher (i.e. lower in terms of quality) compared to German firms as of 2020. In 2020, differences at strong significance level were detected for both models (FRQ1: $t=-2.99400$, $p<0.01$; FRQ2: $t=-3.67800$, $p<0.01$), and this difference continued in 2021 (FRQ1: $t=-2.04600$, $p=0.04200$; FRQ2: $t=-2.29000$, $p=0.02300$). In 2022, this difference increased significantly and reached a very strong level of significance for both models (FRQ1: $t=-6.84400$, $p<0.01$; FRQ2: $t=-6.95300$, $p<0.01$). Overall, the average financial reporting

quality values of Turkish firms (FRQ1: 0.10047; FRQ2: 0.10087) are statistically significantly higher than those of German firms (FRQ1: 0.04407; FRQ2: 0.04560). This indicates that the FRQ of German firms is higher than that of Turkish firms. (FRQ1: $t=-5.57478$, $p<0.01$; FRQ2: $t=-5.64903$, $p<0.01$).

In 2019, for both models, there is no statistically significant difference between countries in terms of financial reporting quality (FRQ1: $t=0.62700$, $p=0.53100$; FRQ2: $t=0.94700$, $p=0.34500$). However, starting from 2020 onwards, the FRQ values of Turkish firms have increased significantly compared to German firms. In other words, firms in the Turkish sample have a lower FRQ, whereas firms in the German sample have a higher FRQ. In 2020, differences at strong significance level were found in both models (FRQ1: $t=-2.99400$, $p<0.01$; FRQ2: $t=-3.67800$, $p<0.01$) and this difference continued in 2021 (FRQ1: $t=-2.04600$, $p=0.04200$; FRQ2: $t=-2.29000$, $p=0.02300$). In 2022, the difference became more pronounced and reached a very strong level of significance for both models (FRQ1: $t=-6.84400$, $p<0.01$; FRQ2: $t=-6.95300$, $p<0.01$).

Overall, over the 2019-2022 period, Turkish firms have higher average FRQ values (FRQ1: 0.10047; FRQ2: 0.10087) compared to German firms (FRQ1: 0.04407; FRQ2: 0.04560). Since the FRI value close to 0 means higher FRQ, this indicates that the reporting quality of German firms is stronger than that of Turkish firms.

Table 3.23. Modified Jones Models Estimated for the Control Group

Modified Jones Model									
Year	$\alpha 0$	$p(\alpha 0)$	$\beta 1$	$p(\beta 1)$	$\beta 2$	$p(\beta 2)$	F(Model)	p(Model)	Adjusted R ²
2019	428600	0.06660	0.07249	0.30170	-0.04733	0.37610	8.56000	<0.01	0.40010
2020	231600	0.56240	0.12060	0.02550	-0.10760	0.21010	3.60700	0.02414	0.18700
2021	140900	0.75960	0.10840	0.18570	-0.08147	0.28870	0.80840	0.49890	0.49890
2022	33810	0.73900	0.05002	0.20100	-0.00816	0.80900	0.62990	0.60130	0.60130

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3.24. Performance-Matched Modified Jones Models Estimated for the Control Group

Modified Jones Model with Performance Mapping											
Year	α_0	p(α_0)	β_1	p(β_1)	β_2	p(β_2)	β_3	p(β_3)	F(Model)	p(Model)	Adjusted R ²
2019	414900	0.21120	0.07195	0.31720	-0.04725	0.38500	-0.00949	0.95270	6.21500	<0.01	0.38020
2020	206500	0.61200	0.11580	0.03590	-0.12670	0.17940	-0.16920	0.59420	2.71600	0.04840	0.16790
2021	142500	0.75900	0.10260	0.21500	-0.06375	0.43000	0.27820	0.46200	0.73630	0.57450	0.00320
2022	99770	0.29400	0.05408	0.12700	-0.01468	0.62900	1.22800	<0.01	2.68000	0.05059	0.16510

***p<0.01, **p<0.05, *p<0.1

Tables 3.23 and 3.24 present the econometric results of the Modified and Performance-Matched Modified Jones Model, which are constructed annually to determine the coefficients required when determining discretionary accruals, which are indicators of accrual-based earnings management for Turkish firms in the control group. When the econometric results of the Modified and Performance-Matched Modified Jones Model for Turkish firms in the control group presented in these tables are analysed, it is seen that the overall significance and explanatory power of the models show significant differences across years.

When the Modified Jones Model estimation results for the firms in the control group are evaluated, it is observed that the model yields statistically significant results in 2019 and 2020. In 2019, the model showed a very strong level of significance for the control group firms ($p < 0.01$) and explained 40.01% of the variance in the dependent variable (Adjusted R²). Interestingly, in the same year, the model was not significant for firms not in the control group, while the control group exhibited a more stable structure. In 2020, the model for the control group is statistically significant ($p=0.02414$). However, the explanatory power decreased to 18.70%.

In 2021 and 2022, the overall significance level of the model for the firms in the control group was calculated as ($p=0.49890$) and ($p=0.60130$), respectively, indicating that the model was not statistically significant in these years.

When the individual level effects of the coefficients in the Modified Jones Model estimates for the firms in the control group are analysed; the constant term (α_0) does not show a statistically significant effect in any year of the period analysed. The coefficient of β_1 (change in trade

receivables), one of the main variables of the model, is statistically significant only in 2020 ($p=0.02550$) and does not exhibit a statistically significant effect in other years. On the other hand, the coefficient β_2 (related to tangible fixed assets) was insignificant in all years for the firms in the control group and did not produce a significant effect. This finding is in marked contrast to the statistically significant results of the same coefficient for the non-control group firms in 2019, 2020 and 2022.

The estimation results of the Performance-Matched Modified Jones Models for the control group firms reflect the effects of adding the performance variable (β_3) to the model for the control group firms. The model is statistically significant for the control group in 2019 ($p < 0.01$), 2020 ($p=0.04840$) and 2022 ($p=0.05059$). Adjusted R^2 values were calculated as 38.02%, 16.79% and 16.51% for the control group firms in these significant years, respectively. In 2021, the model is not significant ($p(\text{Model}) = 0.57450$).

When the effects of the coefficients at the individual level are analysed in the Performance-Matched Modified Jones Models estimates for the firms in the control group, it is observed that the constant term (α_0) does not reveal a statistically significant effect in any of the years examined. The coefficient β_1 (change in trade receivables), which is one of the main variables of the model, reached statistical significance only in 2020 ($p = 0.03590$) in the control group, and did not show a significant relationship in the other years. Similarly, the coefficient β_2 (change in tangible fixed assets) remained insignificant in all years of the period under study. The coefficient β_3 (ROA), which was included in the model for performance matching purposes, was statistically significant only in 2022 ($p < 0.01$) and made a significant contribution to the explanatory power of the model for this year. This finding indicates that the performance variable has become an important factor affecting the quality of financial reporting for the firms in the control group, especially in 2022.

Table 3.25. Comparative Analysis of Financial Reporting Quality Values between the Main Sample and the Control Group

Year	Score	Country	Centre	SS	t	p
2019	FRQ1	Control	0.08766	0.08894	2.45195	0.01785
		Main Sample	0.04693	0.04468		
	FRQ2	Control	0.08802	0.08963	2.33422	0.02331
		Main Sample	0.04738	0.05424		
2020	FRQ1	Control	0.12059	0.14282	2.20701	0.03326
		Main Sample	0.06536	0.04164		
	FRQ2	Control	0.12756	0.14260	2.23814	0.03088
		Main Sample	0.07137	0.04440		
2021	FRQ1	Control	0.12523	0.12429	3.17399	<0.01
		Main Sample	0.05561	0.03994		
	FRQ2	Control	0.12155	0.12283	2.96803	<0.01
		Main Sample	0.05726	0.03906		
2022	FRQ1	Control	0.24894	0.21284	0.33041	0.74203
		Main Sample	0.23398	0.17922		
	FRQ2	Control	0.25192	0.21632	0.54631	0.58652
		Main Sample	0.22749	0.17043		
General	FRQ1	Control	0.14560	0.15994	2.70825	<0.01
		Main Sample	0.10047	0.12332		
	FRQ2	Control	0.14726	0.16119	2.80201	<0.01
		Main Sample	0.10087	0.11897		

Table 3.25 presents the comparison of the FRQ values of the main sample (sustainability reporting) and control (non-sustainability reporting) groups for the years 2019-2022.

According to the findings, there are significant differences between the financial reporting quality (FRQ1 and FRQ2) levels of the main sample and control groups over the 2019-2022 period. When the overall averages are analysed, it is seen that both FRQ1 and FRQ2 levels are statistically significantly lower in the main sample group compared to the control group (FRQ1: $t=2.70825$, $p<0.01$; FRQ2: $t=2.80201$, $p<0.01$).

This finding indicates that the reporting quality of the firms in the main sample group is stronger, as FRQ levels closer to 0 indicate higher FRQ. On an annual basis, these differences are statistically significant in 2019, 2020 and 2021; however, the difference between the groups lost its significance in 2022.

In recent years, especially with the impact of crisis periods, stakeholder pressure on disclosure of both financial and non-financial information has increased. In this context, not only the existence but also the content, scope and reliability of sustainability disclosures have become a factor that may affect the overall reporting quality of firms. Although there are theoretical expectations in the literature regarding the impact of ESG disclosures on financial reporting, empirical findings differ on how this relationship works.

Accordingly, the findings of the study are discussed under the following four headings, in light of theoretical expectations and in comparison with prior studies.

- i. Discussing the relationship between sustainability reporting disclosures and financial reporting quality within the context of sample,
- ii. Comparison of financial reporting quality by country over the years,
- iii. Breaks created by the pandemic period and change over the years,
- iv. Comparison of main sample and control groups in terms of financial reporting quality,

i. The Relationship Between Sustainability Reporting Disclosures and Financial Reporting Quality Within the Context of Sample

The results of the analysis for the Turkish sample show that most of the control variables affecting FRQ yield results consistent with theoretical expectations, whereas sustainability scores remain largely insignificant. The low overall significance level in some years at the model level is associated with inconsistencies in firms' periodic reporting behaviour (Kothari, Leone & Wasley, 2005). The findings obtained at the coefficient level reveal that especially firm performance and financial structure variables make significant contributions to the model. First, ROA (return on assets) has a negative and significant coefficient in both models, indicating that more profitable firms use fewer discretionary accruals and exhibit higher reporting quality. This finding is consistent with the literature suggesting that profitable firms avoid manipulative accounting practices as they rely less on external resources and attach more

importance to reputation (Dechow et al., 1995; Chung, Firth & Kim, 2005). The fact that this effect is more pronounced in the performance-matched model points to the importance of controlling for firm performance.

However, the positive relationship between firm size and FRQ contradicts the general expectations in the literature that "larger firms report more transparently" (Bushman et al., 2004). In Türkiye, this suggests that larger firms have more room for earnings management due to their more complex organizational structures and greater accounting discretion (Kim, Liu & Rhee, 2003; Ahmed & Duellman, 2011). Moreover, large firms with high market pressures are more likely to manage financial results to meet expectations of stable performance (Watts & Zimmerman, 1986).

The fact that the financial leverage variable has a significant and negative coefficient, especially in the FRQ2 model, suggests that firms with high debt levels tend to have higher quality financial reporting. This finding is consistent with the findings that the disciplinary effect of debt covenants leads firms to more transparent reporting behaviour (Sengupta, 1998).

The audit tenure variable is significant only in the performance-matched model and exhibits a positive relationship. This supports the theoretical framework that long-term audit relationships may weaken auditor independence and negatively affect FRQ (Johnson et al., 2002). Moreover, Özger and Tuğay (2020) also emphasize that long audit periods may negatively affect audit quality in BIST firms.

The findings regarding sustainability scores are generally insignificant; variables such as ESG overall score, social score and environmental score do not have a statistically significant effect on FRQ. This result can be explained by the fact that sustainability reporting has not yet become mandatory in Türkiye before 2022 and the maturity of implementation is low. There are also findings in the literature that the relationship between ESG performance and FRQ varies contextually (Mio, Fasan & Farneti, 2020).

However, the fact that the management score variable has positive and significant coefficients suggests that firms with higher governance scores use more discretionary accruals. Contrary to expectations, this finding suggests that management scores do not adequately reflect actual

practices in firms or that ESG scores are based on formal assessments (Hummel & Schlick, 2016). This is supported by studies suggesting that the link between ESG scores and internal transparency and accounting quality may be weak, especially in developing countries (Garcia et al., 2017).

The duality variable is not statistically significant in both models. This result indicates that the fact that the CEO is also the Chairman of the Board of Directors (CEO duality) does not have a significant impact on FRQ. This finding suggests that CEO duality is not a critical factor for FRQ in Turkish governance structures. This suggests that the country's regulatory framework, internal audit systems and stakeholder pressures may act as a constraint on the potential negative effects of CEO duality. Moreover, this result is in line with the mixed findings in the literature on CEO duality, supporting that governance effects may vary by institutional context (Davis, Schoorman & Donaldson, 1997; Brickley, Coles & Jarrell, 1997).

Finally, the emission score variable exhibits a weakly significant and negative relationship in only one model (FRQ1), supporting the hypothesis that firms with strong environmental performance have higher quality financial reporting (Clarkson et al., 2008). However, the fact that other environmental variables and emission trading status are not significant indicates that this effect has not yet reached a systematic level in Türkiye.

The findings of the analysis for the German sample provide strong insights that both support and question the theoretical framework on the determinants of FRQ. Although both models (FRQ1 and FRQ2) show generally significant results over the period analysed, the significance level and explanatory power weakened in 2021. This suggests that firm behaviour is more complex and sensitive to exogenous factors due to the more institutionalized and regulation-sensitive financial structure in Germany (Leuz, Nanda & Wysocki, 2003). The decline in 2021 suggests that temporary uncertainties in firms' operational structures, along with the ongoing effects of the pandemic, may have weakened the power of the model in explaining accrual behaviour.

As a matter of fact, during this period in Germany, various sector-specific financial support policies were implemented, especially the "Bridging Aid IV" program for fixed costs, and special incentives were provided to areas such as aviation, events, culture and transportation.

These different public interventions may have had heterogeneous effects on firms' financial reporting behaviour. Therefore, it would be appropriate to evaluate the findings for 2021 in the context of economic fluctuations caused by pandemic conditions.

The fact that the ROA variable is statistically significant and has a negative coefficient in both models (FRQ1, FRQ2) indicates that profitable German firms exhibit higher FRQ and that these firms resort less to manipulative accounting practices. In line with the Turkish sample, this finding supports studies such as Dechow et al. (1995) and Jaggi & Lee (2002), which show that firms with stronger financial performance tend to increase their transparency levels.

The fact that control variables such as firm size, financial leverage and audit tenure and duality are not statistically significant suggests that audit regimes and corporate control mechanisms in Germany provide effective oversight regardless of firm size. The fact that especially large firms do not create any advantage or disadvantage in reporting quality may be the result of a strong legal framework and audit culture (Bushman et al., 2004). Similar to the findings for Turkish firms, the findings for the duality variable indicate that the CEO also being the Chairman of the Board of Directors has no significant effect on FRQ. However, the presence of negative coefficients implies that CEO duality potentially tends to improve FRQ. This can be explained by the fact that the dual board structure (Vorstand and Aufsichtsrat) and the strong stakeholder-based approach of the German corporate governance system compensate for the potential negative effects of CEO duality.

The findings on the governance score create an interesting theoretical tension. Contrary to expectations, this score reduces rather than enhances financial reporting quality, i.e., firms with higher governance scores use more discretionary accruals (FRQ1: $\beta = 0.00161$, $p < 0.01$; FRQ2: $\beta = 0.00172$, $p = 0.00207$). This contradictory finding suggests that the corporate governance criteria used in ESG scoring may not reflect actual governance practices in Germany (Christensen, Hail & Leuz, 2021). In contrast, the negative and significant sign of the management score variable suggests that micro components of governance are more reliable indicators of reporting quality and, consistent with theoretical expectations, German firms with higher management scores exhibit higher quality financial reporting. This finding suggests that the quality of governance has a positive impact on FRQ in German firms.

The findings for the social score variable are also highly significant in this framework. Although it has a negative coefficient in both models, it did not reach significance level (FRQ1: $\beta = -0.00029$, $p = 0.38350$; FRQ2: $\beta = -0.00021$, $p = 0.54191$). However, in the correlation analysis, weak but significant negative relationships were found between SRI variables and social score. This suggests that although social responsibility practices have potentially positive implications for firms in Germany, they have not yet become a direct determinant of reporting quality. On the other hand, it implies that there is room for improvement in this area and that corporate social investments may lead to more significant effects on financial transparency over time (Ioannou & Serafeim, 2012; Dhaliwal et al., 2011).

The significant and negative relationship with the CSR strategy score (FRQ2: $\beta = -0.00040$, $p = 0.08409$) suggests that firms with a strategic integration of social responsibility policies tend to have higher quality financial reporting. This negative relationship suggests that German firms with a strong CSR strategy tend to exhibit higher quality financial reporting. This finding supports the positive relationship between corporate social responsibility and overall corporate governance quality.

The emissions trading status variable is negative and statistically significant (FRQ2: $\beta = -0.00660$, $p = 0.05482$), suggesting that environmental regulatory pressure in Germany drives firms towards higher reporting quality. This finding supports that firms subject to environmental regulations exhibit greater transparency, as emphasized in studies such as Clarkson et al. (2008) and Matsumura et al. (2014). In contrast to this finding, the Emission Score variable has negative coefficients in both models but is not statistically significant (ECR1: $\beta = -0.00005$, $p = 0.72451$; ECR2: $\beta = -0.00004$, $p = 0.77115$). This result does not support the theoretical expectation that firms with better emission performance exhibit higher FRQ. However, in the context of the European Union, especially in countries with strong environmental regulations such as Germany, firms' emission reduction strategies are expected to be in line with the principles of transparency and accountability (Laine, 2009; Ioannou & Serafeim, 2015).

In conclusion, the findings for the German sample suggest that the impact of sustainability components on FRQ is not only related to the level but also to structural attributes. While micro-level governance indicators and strategic social responsibility practices are more influential on

reporting quality, overall ESG scores or scale-based assessments offer limited explanatory power. This suggests that the impact of sustainability factors on reporting behaviours is shaped more by behavioural and governance architecture and that each component should be evaluated in its own context.

ii. Comparison of Financial Reporting Quality by Country over the Years

The financial reporting quality (FRQ1 and FRQ2) scores for the Türkiye and Germany samples reveal the differences in financial transparency and earnings management practices at the country level. Since a value of the FRQ closer to 0 implies higher FRQ (Dechow, Sloan & Sweeney, 1995), the results of the analysis indicate an overall higher reporting quality in the German sample. In particular, in 2020-2022, German firms have statistically significantly lower FRQ values than Turkish firms ($p < 0.01$). This reflects the impact of strong institutional structures, strict auditing mechanisms and the level of investor protection in Germany (Leuz, Nanda & Wysocki, 2003; Bushman et al., 2004).

Data for 2022 reveal this divergence most clearly: FRQ1 is measured as 0.23398 in Türkiye but only 0.03909 in Germany. Similarly, FRQ2 was 0.22749 in Türkiye and 0.03914 in Germany. This dramatic difference suggests that earnings management has become more prevalent in the post-pandemic period in Türkiye, possibly because financial uncertainties have led companies to aggressive reporting behaviour (Healy & Wahlen, 1999; Cohen & Zarowin, 2010). It is frequently emphasized in the literature that managers' tendency to manage earnings increases during crisis periods, especially in emerging economies (Graham, Harvey & Rajgopal, 2005).

On the other hand, no significant difference was observed between the two countries in 2019 (FRQ1: $p = 0.53100$; FRQ2: $p = 0.34500$). This result may be due to the fact that the baseline year took place under relatively stable macroeconomic conditions. However, in the following years, Germany's more consistent and lower FRQ value indicates the entrenched sustainability reporting culture and high corporate reporting standards (Velte, 2022; Hummel & Schlick, 2016).

In the Turkish sample, the significant increase in the FRQ values during and after the pandemic (especially in 2022) implies an increase in earnings management practices. This finding suggests that regulatory oversight and ESG disclosures in Türkiye are still maturing in terms of

both content and reliability. Considering that the impact of ESG disclosures on financial reporting is shaped by institutional structure, market reaction and the effectiveness of audit systems, it can be concluded that these differences are based on structural foundations (Francis, LaFond, Olsson & Schipper, 2006).

iii. Breaks Created by the Pandemic Period and Changes by Years

The COVID-19 pandemic has profoundly affected not only economic activity but also firms' reporting behaviour, transparency levels, and sustainability-oriented corporate approaches. In this study, the changes in FRQ observed in both Türkiye and Germany samples in 2020, the pandemic year, reveal the differentiating effects of crisis periods on firm behaviour.

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When the findings of the main sample group of the study are analysed, we observe a significant increase in the FRQ values in 2020 (FRQ1: 0.06536; FRQ2: 0.07137). This increase indicates that firms reduce reporting quality by using more discretionary accruals. This result suggests that firms under uncertainty pressure during crisis periods tend to engage in earnings management in order to present a more favourable financial picture to investors. It is also emphasized in the literature that such behaviour is more common especially in emerging markets and that weak corporate control systems put pressure on transparency during crisis periods (Albuquerque et al. 2020; Gafni, 2024).

The pandemic period has increased investor demands on ESG disclosures, and the content and accuracy of these disclosures have become a more critical element in firm valuation. However, this increase in demand has not been adequately reflected on the disclosure quality of firms in Türkiye. Both the structural deficiencies of the voluntary disclosure process and the weakness of the audit mechanisms caused disclosures to remain formal in the Turkish sample. Therefore, the decline in quality in 2020 is not only a reflection of financial performance pressure, but also of the lack of crisis resilience in sustainability disclosures.

Within the framework of the findings of the study, we can say that the COVID-19 pandemic was a critical stress test for all samples of the study. The findings support that the way out of this crisis and testing process is shaped by the institutional capacity and governance level of countries.

iv. Comparison of the Main Sample and Control Groups in terms of Financial Reporting Quality

In the 2019-2021 period, firms that made sustainability disclosures (main sample) had statistically significantly lower FRQ values compared to firms that did not make disclosures (control group), indicating higher financial reporting quality. This result suggests that sustainability disclosures can contribute to firm transparency in the short run (Clarkson et al., 2008; Rezaee, 2016). However, by 2022, this difference has lost its statistical significance and the reporting quality levels between the two groups have converged.

This shows that sustainability disclosures have not yet become an institutionalized governance practice, especially in the Turkish context. The fact that the impact of ESG disclosures is limited to specific periods indicates that these practices are largely shaped by external pressures (e.g., legal regulations, market expectations or reputational concerns) (DiMaggio & Powell, 1983; Marquis & Toffel, 2012). In this context, when disclosures are not fully integrated into corporate strategies, over time they can become a symbolic compliance strategy and lose their impact (Michelon, Pilonato & Ricceri, 2015; Boiral, 2013).

Indeed, studies such as Hahn and Kühnen (2013) and Michelin et al. (2015) emphasize that the impact of sustainability disclosures depends not only on the presence of the disclosure, but also on the content, regularity, and overall governance structure of the firm. The equalization in 2022 suggests that the capacity of disclosures to carry information value has weakened or their credibility in the market has decreased (Cho et al. 2015; Melloni, Caglio & Perego, 2017).

Consequently, for sustainability disclosures to have a long-term and consistent impact on FRQ, they need to be contextually deep, regularly presented in line with strategic governance, and integrated into organizational structures. Otherwise, such explanations lose credibility over time and remain only a formal obligation (Gray, 2010; Herbohn, Walker & Loo, 2014).

5. CONCLUSIONS

This study empirically examines the relationship between sustainability disclosure and financial reporting quality, focusing on Türkiye and Germany. The findings reveal that country context, institutional structures and reporting habits play a decisive role in this relationship.

As a result of the panel data analyses conducted in the Türkiye sample, no statistically significant relationship was found between overall sustainability report information disclosures (ESG scores) and financial reporting quality. However, among the subcomponents, the management score is found to be positive and significant in both models, while the emission score is found to be negatively significant only in the FRQ1 model at 10% significance level ($\beta = -0.00061$, $p = 0.08387$). This finding suggests that firms with higher environmental emission performance have higher quality financial reporting. Although this relationship loses significance in the FRQ2 model ($\beta = -0.00018$, $p = 0.43819$), this result is consistent with the theoretical expectations that firms with higher environmental responsibility may have higher standards of corporate transparency and ethical reporting.

However, the positive coefficient of the management score indicates that firms with high management scores use more discretionary accruals and thus have lower financial reporting quality. This result contradicts theoretical expectations, as firms with good governance practices are expected to exhibit more transparent, reliable and ethical reporting behaviour.

The findings suggest that there may be a divergence between practice and reality in ESG assessment systems in Türkiye, especially in the governance dimension. This suggests that firms' motivations for achieving high ESG scores are focused on formal compliance rather than substantive integrity and that reporting serves the pursuit of corporate legitimacy rather than strategic transparency. In particular, the fact that environmental and social scores are generally insignificant suggests that firms are still struggling to integrate their performance in these areas into their financial reporting processes and that their reporting systems are not yet mature enough to capture this impact. This unexpected positive relationship between the governance score and financial reporting quality suggests that some firms in Türkiye are trying to impress external stakeholders through symbolic compliance strategies such as "greenwashing" and "window-dressing".

In conclusion, it is understood that sustainability reporting in Türkiye has not yet reached a level of content maturity, and that reporting formats are more about responding to external pressures than strategic clarity and accountability. In this context, in order for ESG reporting to become an effective corporate governance tool, it is important to strengthen the regulatory framework, improve assessment methodologies and develop policies that encourage internalization of reporting.

The analyses based on the German sample revealed stronger and more theoretically consistent relationships between sustainability disclosures and financial reporting quality. In particular, statistically significant negative associations were identified between financial reporting quality measured through both the Modified Jones Model (FRQ1) and the Performance-Matched Modified Jones Model (FRQ2) and the variables of management score, CSR strategy score, and participation in the emissions trading system. Conversely, governance score demonstrated a positive and statistically significant relationship with financial reporting quality across both models. These findings indicate that firms in the German context engage not only in symbolic but also in substantively meaningful ESG related practices.

According to the panel regression results, the management score has a significant and negative effect of $\beta = -0.00134$ ($p < 0.01$) in the FRQ1 model and $\beta = -0.00135$ ($p = 0.00626$) in the FRQ2 model. Similarly, the CSR strategy score is borderline significant in both models (FRQ1: $\beta = -0.00037$, $p = 0.08992$; FRQ2: $\beta = -0.00040$, $p = 0.08409$). Financial reporting quality is found to be higher for firms that participate in the emissions trading system, and this variable has a negative effect at the 10% significance level ($\beta = -0.00444$, $p = 0.09070$) in the FRQ1 model and a stronger negative effect in the FRQ2 model ($\beta = -0.00660$, $p = 0.05482$). All these findings suggest that discretionary accruals are decreasing and accounting quality is improving.

The findings of the study suggest that sustainability reporting in Germany, unlike the Turkish sample, has a higher degree of contextual consistency. In Germany, established corporate governance structures and stringent sustainability regulations at the EU level (e.g. CSRD, Taxonomy and Emissions Trading Scheme) force companies to adopt sustainability principles not only on the surface but also on a structural level. The effect of participation in emissions trading indicates that environmental responsibility is directly integrated into financial transparency, while the effect of governance and strategic sustainability scores suggests that

long-term planning and a culture of corporate accountability positively shape financial reporting processes.

In the analysis of the German sample, the governance score variable was found to be positive and statistically significant in both models (FRQ1: $\beta=0.00161$, $p<0.01$; FRQ2: $\beta=0.00172$, $p=0.00207$). Although this might initially suggest that strong governance practices are aligned with higher financial reporting quality, this finding should be interpreted differently considering the nature of the FRQ indicators used in the study where higher values represent lower reporting quality due to their accrual-based construction. Accordingly, the results imply that firms with higher governance scores may, in fact, exhibit lower financial reporting quality, which raises concerns about the substantive effectiveness of governance practices. This may suggest that, in some German firms, governance structures appear symbolically strong in ESG assessments but fail to translate effectively into robust financial reporting processes.

On the other hand, the non-significance of the social score variable in both models (FRQ1: $p = 0.38350$; FRQ2: $p = 0.54191$) suggests that the impact of social performance on financial reporting quality remains limited even in an advanced sustainability environment such as Germany. This can be explained by the measurement difficulties and subjectivity of social indicators and the lack of standardization in reporting.

In conclusion, these findings in the German sample reveal that sustainability practices are not only a response to external pressures, but also serve as an internal governance mechanism that strengthens corporate transparency, ethical accounting behaviour and auditability. Compared to Türkiye, it can be argued that firms in Germany manage sustainability and financial reporting processes in a more integrated and reliable manner thanks to more established corporate structures and effective regulations. This provides empirical evidence supporting the theoretical approaches that sustainability reporting makes a constructive contribution to financial reporting quality.

Main Sample and Control Group Results

In the 2019-2021 period, it was found that firms that report sustainability have lower FRQ values and thus exhibit higher financial reporting quality compared to firms that do not. However, in 2022, this difference lost statistical significance and the reporting quality between

the main sample and the control group became similar. This result indicates that ESG disclosures have not yet been institutionalized by firms and reporting behaviours have not been sustained consistently. Therefore, in order for the impact of sustainability disclosures on financial reporting quality to be permanent and systematic, disclosures should be made in a continuous, content-strong and auditable manner.

Pandemic Effect

When the pandemic-level results of the findings are evaluated, it is observed that especially in 2020, there is a significant increase (i.e. a decrease in the quality of financial reporting) in the FRQ values of firms in the main observation group of Türkiye due to the pandemic conditions. This reveals that firms tend to deviate from the principle of transparency in times of crisis and tend towards earnings management. On the other hand, the fact that reporting quality was maintained in the German sample even during the pandemic shows the robustness of institutional structures and the protective effect of regulatory pressures on transparency. In 2021 and 2022, a partial improvement in reporting quality was observed in Türkiye, but this recovery was not homogenously reflected across all firms. This result points to the importance of strengthening institutional capacity and the regulatory framework in order to maintain sustainable financial reporting even in times of crisis.

The pandemic period had a significant negative impact on the financial reporting quality of firms that do not report on sustainability. In the control group, a significant increase was observed in the FRQ values in 2020, indicating that the transparency level of firms weakened in the crisis environment. Although there were limited signs of recovery in the following years, quality levels did not reach pre-pandemic levels. This result reveals that firms without sustainability reporting have low reporting resilience against crisis periods.

6. RECOMMENDATIONS

In line with the findings and methodological limitations identified in the study, several recommendations are offered for both policy makers and researchers who will conduct similar studies in the future. The recommendations are structured under two sub-headings: policy and implementation recommendations and methodological recommendations for future research.

6.1. Policy and Practice Recommendations

- i. **Encouraging Quality Reporting:** In Türkiye, ESG disclosures should not only be encouraged, but also their accuracy, comparability and auditability. Increasing compliance with international standards, such as GRI and IFRS S1/S2, can prevent symbolic reporting.
- ii. **Content-Based Strengthening of Regulations:** Legal regulations on sustainability reporting should be restructured to cover not only formal reporting obligations but also content quality, and should be integrated into independent audit processes.
- iii. **Experience Sharing and Training Programs:** The findings of the research reveal that there are differences in disclosure quality and completeness among sustainability reporting companies. This situation causes ESG disclosures to remain superficial, repetitive or reduced to standardized texts. In this context, strengthening institutional capacity is a critical requirement for sustainability reporting to fulfil its true function. Relevant departments, particularly accounting and reporting units, should be provided with technical training on sustainability-based reporting, environmental data management, ESG performance measurement, climate risk reporting and European Union green accord compliance.
- iv. **Guidance Specific to Crisis Periods:** The pandemic provides an exceptional context for both ESG disclosures and financial reporting. The study has taken this impact into account, but it is important for public authorities to develop crisis-specific guidance to systematically manage similar shocks in the future. These guidelines would both ensure disclosure consistency and preserve investor confidence.
- v. **Encouraging Voluntary Reporting:** Comparisons with non-sustainability reporting firms in the control group show that reporting behaviour is directly related to financial transparency. Therefore, financial incentives such as tax advantages and

easier access to credit should be provided for companies that voluntarily report, and voluntary processes should be repositioned as a strategic tool.

- vi. **Increasing Data Dissemination and Consistency:** The limited availability of data on emission scores, emissions trading and ESG subcomponents of Turkish firms creates a serious information asymmetry not only for academic research but also for capital markets. In this context, it is necessary to increase the openness of firms regarding their reporting processes and standardize certain datasets. In addition, an ESG data infrastructure should be established to include small and medium-sized enterprises.

6.2. Suggestions for Future Studies

As of 2024, sustainability reporting has become mandatory in Türkiye for companies that meet certain scale and criteria. This development necessitates a comparative analysis of the voluntary ESG disclosure period and the post-regulation mandatory reporting period. In future research, the effects of this transition on financial reporting quality can be analysed in detail, and guiding implications for policymakers and regulators can be presented.

Moreover, the Border Carbon Regulation (CBAM) introduced by the European Union has made the accuracy and auditability of environmental information disclosures a strategic imperative, especially for export-oriented firms. In this context, the relationship between ESG disclosures and financial reporting quality of firms operating in sectors subject to CBAM should be examined and the impact of external regulatory pressure on corporate reporting behaviour should be analysed. Since CBAM requires not only emission data but also the capacity to measure, verify and report such data, it is of great importance to develop more sophisticated assessment tools for the contextual quality of disclosures.

However, ESG disclosures should be analysed not only for their existence but also for their content coherence, strategic integrity and contextual relevance. To this end, natural language processing (NLP), machine learning, artificial intelligence-assisted classification techniques and text mining approaches can be used to measure the meaning density, strategic orientation and potential greenwashing risks of disclosures.

Finally, ESG disclosures should be analysed not only in relation to reporting quality, but also their impact on cost of capital, market capitalization, credit ratings and investor interest through different econometric models. In this way, not only the level of compliance but also the capacity of sustainability reporting to create economic output will be evaluated holistically.



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CURRICULUM VITAE

Meral Karadağ was born in 1978 in Hatay, Turkey. She completed her undergraduate studies in 2001 at Adnan Menderes University, Faculty of Economics and Administrative Sciences, Department of Economics. In 2019, she earned her master's degree from Çukurova University, Institute of Social Sciences, Department of Economics. She began her doctoral studies in 2019 at Adana Alparslan Türkeş Science and Technology University, Department of Business Administration, where she is currently continuing her education.

She started her professional career in 2002 as a Certified Public Accountant (CPA) trainee. Between 2006 and 2012, she served as Accounting Manager at Kar-Man Trans International Transport Ltd. From 2012 to 2018, she worked at Çukurova Development Agency as an accountant (CPA), where she was responsible for financial affairs, procurement processes, and reporting. Since 2018, she has been working as an Investment Support Expert at İpekyolu Development Agency. In this role, she has prepared investment guides, foreign trade analyses, feasibility studies, and regional development strategies for the provinces of Adıyaman, Kilis and Gaziantep. She has also contributed to EU-funded projects such as *Revitalisation of the Tourism Sector in Adıyaman* and has actively served as a project and monitoring expert in internationally funded programs such as **ENHANCER** and **SEECO**.

She conducts studies focused on women's entrepreneurship and technology-driven development, with a particular interest in empowering women in innovative agriculture and digital entrepreneurship. She also took part in organizing the Gaziantep–Germany Business and Investment Forum, held in cooperation with the Embassy of Germany. In 2025, she appeared in the NTV documentary series *Anadoludakiler: Gaziantep*, where she represented İpekyolu Development Agency and presented the institution's regional development vision and support mechanisms to a broader audience.

She has received training in a wide range of subjects, including sustainability, corporate sustainability specialization, foreign trade analysis, social entrepreneurship, gender equality, project cycle management, IFRS, digital marketing, and feasibility analysis. She holds

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