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GRADUATE SCHOOL OF SOCIAL SCIENCES
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DOCTORAL THESIS

Doctor of Philosophy (PhD)

INVESTIGATING MATERIALITY ISSUES IN SUSTAINABILITY REPORTING : AN ASSURANCE ORIENTED APPROACH FOR CONTAINER SHIPPING INDUSTRY

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17.10.2025

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ABSTRACT

Doctoral Thesis

Doctor of Philosophy(PhD)

Investigating Materiality Issues İn Sustainability Reporting: An Assurance Oriented Approach For Container Shipping Industry

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This study aims to analyze the sustainability reports of container shipping companies within the dimensions of materiality and assurance. The dataset covers the reports of the world's ten largest firms published between 2018 and 2022.

As a result of analyzing the literature and international standards through content analysis, a scoring system was developed to indicate the material issues and assurance levels of companies, and based on these scores, reporting quality and sustainability performance were evaluated. According to this study, the ranking of the companies was compared with the rankings provided by sustainability rating agencies, and it was revealed that there were differences between them. With statistical methods, the relationships between the companies' scores and their market shares, fleet sizes, and container capacities were examined. The findings showed that during the analyzed period, the companies increasingly emphasized materiality and assurance practices, and that the topics emphasized were employment and labor management, occupational health and safety, and greenhouse gas emissions. The least emphasized are diversity and equal opportunity, local communities and public policy, and biodiversity. Furthermore, the owned container capacities of the companies whose reports had external assurance were higher.

Keywords: Sustainability, Sustainability Reporting, Materiality, Assurance , Container Shipping

ÖZET

Doktora Tezi

Sürdürülebilirlik Raporlamasında Önemlilik ile ilgili Sorunların Güvenceye Dayalı Yaklaşım Çerçevesinde Araştırılması: Konteyner Taşımacılığı Sektöründe Bir İnceleme

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Bu çalışma, deniz konteyner taşımacılığı şirketlerinin sürdürülebilirlik raporlarını önemlilik ve güvence denetimi boyutları çerçevesinde incelemeyi amaçlamaktadır. Veri seti, 2018 ve 2022 yıllarında yayımlanan dünyanın en büyük on firmasına ait raporları kapsamaktadır.

Literatür ve uluslararası standartların içerik analizi ile incelenmesi sonucunda firmaların önemli konularını ve güvence denetimi düzeylerini gösteren bir puanlama sistemi geliştirilmiş, bu puanlar üzerinden raporlama kalitesi ve sürdürülebilirlik performansları değerlendirilmiştir. Bu çalışmaya göre şirketlerin sıralaması, sürdürülebilirlik derecelendirme kuruluşlarının puanlarına göre oluşan sıralamalarla karşılaştırılmış ve aralarında farklılıklar bulunduğu ortaya konmuştur. İstatistiksel yöntemlerle şirketlerin puanları ile pazar payı, filo büyüklüğü ve konteyner kapasiteleri arasındaki ilişkiler incelenmiştir. Bulgular, incelenen dönemde şirketlerin önemlilik ve güvence denetimine giderek daha fazla önem verdiğini; öne çıkan konuların ise istihdam ve iş gücü yönetimi, iş sağlığı ve güvenliği ile sera gazı salımları olduğunu göstermektedir. En az öne çıkanlar ise çeşitlilik ve eşit fırsat, yerel topluluklar ve kamu politikası ile biyolojik çeşitliliktir. Ayrıca güvence denetimine sahip raporlara sahip şirketlerin sahip olunan konteyner kapasitelerinin daha yüksek olduğu belirlenmiştir.

Anahtar Kelimeler: Sürdürülebilirlik, Sürdürülebilirlik Raporlaması, Önemlilik, Güvence Denetimi, Konteyner Taşımacılığı

INVESTIGATING MATERIALITY ISSUES IN SUSTAINABILITY REPORTING: AN ASSURANCE ORIENTED APPROACH FOR CONTAINER SHIPPING INDUSTRY

CONTENT

THESIS APPROVAL PAGE ii
DECLARATION iii
ABSTRACT iv
ÖZET v
CONTENT vi
ABBREVIATIONS ix
LIST OF TABLES xi
LIST OF FIGURES xii

INTRODUCTION 1

CHAPTER ONE
SUSTAINABILITY AND SUSTAINABILITY REPORTING

1.1. THEORETICAL BACKGROUND 6
1.1.1. Stakeholder Theory 6
1.1.2. Shareholder Theory 11
1.1.3. Agency Theory 13
1.1.4. Political Cost Theory 17
1.1.5. Institutional Theory 19
1.2.SUSTAINABILITY 24
1.2.1. Historical Evolution Of The Sustainability And Sustainable Development 24
1.2.2. Definition Of The Sustainability 28
1.2.3. Dimension Of The Sustainability 29
1.2.3.1. Environmental (Ecological) Dimension 29
1.2.3.2. Economic Dimension 32

1.2.3.3. Social Dimension 34
1.2.4. Approaches On Sustainability 37
1.2.4.1. Triple Bottom Line 37
1.2.4.2. Weak And Strong Sustainability 38
1.2.4.3. Circular Economy 40
1.3.SUSTAINABILITY REPORTING 42
1.3.1. Evolution And Current Situation Of The Sustainability Reporting 42
1.3.2.Standards Of The Sustainability Reporting 48
1.3.2.1. Sustainability Reporting Standards İntroduced Before 2000 And During The 2000s 48
1.3.2.2. Sustainability Reporting Standards İntroduced During The 2010s 50
1.3.2.3. Sustainability Reporting Standards İntroduced After The Year 2020 51
1.3.3. Principles on the Sustainability Reporting 53
1.3.3.1. Principles Of The Global Reporting Initiative 53
1.3.3.2. Principles Of The International Financial Reporting Standards 55
1.3.3.3. Materiality Concept in Sustainability Reporting 59
1.3.3.4. Reliability Concept İn Sustainability Reporting 63
1.4.CONTAINER SHIPPING COMPANIES AND SUSTAINABILITY REPORTING 66

CHAPTER TWO
LITERATURE REVIEW ON SUSTAINABILITY REPORTING

2.1. STUDIES ON ASSURANCE DIMENSION OF SUSTAINABILITY REPORTING 69
2.2. STUDIES ON MATERIALITY DIMENSION OF SUSTAINABILITY REPORTING 74
2.3. SUSTAINABILITY STUDIES USING CONTENT ANALYSIS AS RESEARCH METHOD 79
2.4. SUMMARY OF THE LITERATURE REVIEW 83

CHAPTER THREE
ANALYSIS OF CONTAINER SHIPPING COMPANIES

3.1. RESEARCH QUESTION AND PURPOSE OF THE STUDY	150
3.2. RESEARCH SAMPLE	151
3.3. DATA OF THE RESEARCH	153
3.4. METHOD OF THE RESEARCH	166
3.5. FINDINGS OF THE RESEARCH	174
CONCLUSION	193
REFERENCES	196

ABBREVIATIONS

ACCA	Association of Chartered Certified Accountants
CDP	Carbon Disclosure Project
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
EEA	European Environment Agency
EC	European Commission
ESG	Environmental, Social and Governance
ESRS	European Sustainability Reporting Standards
EU	European Union
EY	Ernst & Young
FSB	Financial Stability Board
GRI	Global Reporting Initiative
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standards
IIRC	International Integrated Reporting Council
ISO	International Organization for Standardization
ISSB	International Sustainability Standards Board
KPMG	Klynveld Peat Marwick Goerdeler
MDGs	Millennium Development Goals
NYK	Nippon Yusen Kaisha Lines
p.	Page
pp.	Pages
PwC	PricewaterhouseCoopers
SASB	Sustainability Accounting Standards Board
SDGs	Sustainable Development Goals
TCFD	Task Force on Climate-related Financial Disclosures
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNGC	United Nations Global Compact
US	United States
WBCSD	World Business Council for Sustainable Development

LIST OF TABLES

Table 1: Agency Theory Overview p.14

Table 2: Millennium Development Goals p.26

Table 3: Sustainable Development Goals p.27

Table 4: Integration of the Triple Bottom Line (TBL) with Sustainability Dimensions p.38

Table 5: Literature Review on Sustainability Reporting p.85

Table 6: TEU Capacity and Market Share of the Top Ten Companies p.151

Table 7: Data of the Study p.154

Table 8: Mediterranean Shipping Company p.156

Table 9: Maersk p.157

Table 10: CMA CGM p.158

Table 11: Cosco Shipping Lines p.159

Table 12: Hapag Lloyd p.160

Table 13: ONE (Ocean Network Express) p.161

Table 14: Evergreen Line p.162

Table 15: HMM Co Ltd. p.163

Table 16: Yang Ming Marine Transport Corp. p.164

Table 17: ZIM Line p.165

Table 18: Final Version of the Checklist p.167

Table 19: Tests of Normality p.186

Table 20: Mann Whitney-U Test p.187

Table 21: Mean Comparison of the Owned TEU Capacity p.188

Table 22: Comparison of Companies Based on Different Sustainability Scoring Methods p.189

LIST OF FIGURES

Figure 1: Stakeholders of the Firm p.7
Figure 2: Management of the Stakeholders p.10
Figure 3: Friedman's Shareholder Theory p.12
Figure 4: Three Mechanisms of Institutional Isomorphic Change p.21
Figure 5: Three Core Pillars of Institutional Order p.21
Figure 6: Ecosystem Services p.31
Figure 7: Social Sustainability Principles p.36
Figure 8: Weak and Strong Approaches to Sustainability p.40
Figure 9: Circular Economy Model p.41
Figure 10: Sustainability Reporting Rates of the World's 250 Largest Companies by Revenue based on Fortune Rankings p.45
Figure 11: Multiple Concepts used for Sustainability Reporting p.46
Figure 12: United Nations Global Compact Themes p.49
Figure 13: GRI Reporting Principles p.54
Figure 14: IFRS Fundamental Sustainability Reporting Principles p.56
Figure 15: Factors that Enhance the Quality of Useful Sustainability-related Financial Information p.58
Figure 16: Double Materiality Principles p.61
Figure 17: Material Topic Disclosure by Materiality Concept p.63
Figure 18: Total Score by Years p.174
Figure 19: 2018 Score of the Firms p.175
Figure 20: 2019 Score of the Firms p.175
Figure 21: 2020 Score of the Firms p.176
Figure 22: 2021 Score of the Firms p.177
Figure 23: 2022 Score of the Firms p.177
Figure 24: Total Score of the Firms p.178
Figure 25: Five-Year Scoring of the Firms p.179
Figure 26: Topic-Based Scoring p.180
Figure 27: Topic-Based Fulfillment Ratio p.183

INTRODUCTION

Sustainability was defined by the United Nations Brundtland Commission in 1987 (United Nations, 2016):

> *Meeting the needs of the present without compromising the ability of future generations to meet their own needs.*

Sustainability reporting is a tool used by companies and organizations to show their commitment to sustainable development and the efforts they make towards achieving sustainability goals and sustainable finance (Dilling, 2010:19; Siew,2015:180).

Interest in sustainability is growing rapidly in the US and UK financial markets, as well as among companies and in household purchasing behaviors (Lo & Sheu, 2007:347; Ahmad et al. , 2024:2966; Nostrabadi et al., 2019:23). One of the most notable examples of the growing interest in sustainability by companies is the increase in the sustainability reporting rate among the world's 250 largest companies by revenue, based on the 2021 Fortune 500 ranking. While only 35% of these companies reported on sustainability in 1999, this ratio rose to 96% in 2022 (KPMG,2022:13). Despite this notable expansion of corporate sustainability reporting, there remain persistent concerns about the quality of the disclosed information in the sustainability reports (Michelon et al., 2015:59–60; Khan et al., 2021a).

Sustainability reports face critiques, with some researchers describing them as opportunistic "greenwashing," lacking in credibility, ignoring stakeholder perspectives, and failing to meet user expectations (Burritt & Schaltegger, 2010; Thorne et al., 2014; Leung et al., 2015; Khan et al., 2021a). Greenwashing is a phenomenon occurs when organizations highlight favorable environmental or social performance aspects while downplaying or darkening adverse outcomes as an approach strategically aimed at promoting an excessively positive image (Lyon & Maxwell, 2011: 7–8; Garst et al., 2022:66).

The reasons behind this negative perception of sustainability reporting may primarily be explained by the existence of multiple sustainability standards, the lack of a unified organization to evaluate sustainability performance, and the adoption of

different rating methods for sustainability performance evaluation (Shi & Yao, 2025:21). Because sustainability reporting was initially adopted voluntarily in many firms, companies have adopted different sustainability reporting standards according to the requirements of their sectors and stakeholders. This situation creates challenges in the evaluation and comparison of sustainability reporting and sustainability performance (Jose, 2017: 254; De Micco, 2021:431; Brusca et al., 2018:353).

Although efforts are being made to achieve alignment among leading reporting standards such as the European Sustainability Reporting Standards, the International Financial Reporting Standards, and the Global Reporting Initiative but this process will take considerable time. This, in turn, creates a number of issues (Goerzen et al.,2025:135).

One key issue is the materiality judgments as a part of sustainability performance that companies make regarding which sustainability topics are most relevant and thus require increased emphasis in these reports (Jørgensen et al., 2022:342; Beske et al., 2020:163).

Different standards involve different materiality judgments. For instance, when determining the materiality of an issue according to the Global Reporting Initiative (GRI) GRI 3 Material Topics 2021, the organization must explain how it has identified both the actual and potential positive and negative impacts of the issue on the economy, environment, people, and human rights, taking into account its specific circumstances (GRI, 2021:15-16). On the other hand, the materiality of a sustainability issue in the IFRS Sustainability Disclosure Standard is determined by how that issue poses a threat or opportunity to the company's financial situation (IFRS, 2023a:8).

The concept of materiality originated in financial reporting, where it was used to highlight financial information significant enough to influence investors' decisions. This principle is fundamental to the preparation and auditing of financial statements (Messier et al., 2005:155; Fasan and Mio, 2017:289-290; Edgley, 2014:258-259; Farooq et al., 2021:969). In recent years, the concept of materiality has gained further relevance through its application in sustainability reporting, where it remains a key factor in decision-making processes (Jones et al., 2016:224;

Calabrese et al., 2017:440). Moreover, the concept of double materiality refers that sustainability reporting should address both a company's impacts on society and the environment and the financial effects of sustainability issues on the company (GRI,2023).

Another issue is that stakeholders are also cautious about the reliability of sustainability reports (Adams & Evans, 2004:101; Farooq & De Villiers, 2017:92; Farooq et al., 2023:49). In sustainability reporting, in order to prevent doubts about information, metrics, and activities related to sustainability, it is necessary for an independent third party to externally assure them (International Auditing and Assurance Standards Board, 2021:7).

Without external assurance, sustainability reports can fall short of providing high-quality information about sustainability performance to support stakeholder decision-making, as they may be viewed with suspicion in terms of reliability (Carrington, 2019:160; Boiral et al., 2019a:705; Boiral et al., 2019b:1120). Hence, external assurance serves as a critical element to increase stakeholder confidence for sustainability disclosures (Gao et al., 2016:290; Khan et al., 2021a:339).

Where sustainability information is both material and reliable, it diminishes stakeholder skepticism and promotes the external image of firms (Cormier et al., 2005:9; Michelon et al., 2015:73; Ashrafi et al., 2020:1028). For sustainability reports to be perceived as useful and reliable by stakeholders, companies must consider the significance of the assurance and materiality (Simnett et al., 2009: 965; Manetti& Becatti, 2009: 290-291; Hummel& Schlick, 2016:473).

As companies are now responsible for their sustainability performance and stakeholders have expectations in this regard, materiality and assurance have become essential parts of sustainability reporting. (Perego & Kolk, 2012:184 ; KPMG, 2020:23; Adams et al., 2021:6-7).

Since sustainability issues differ across industries, material topics change across industries (Eccles et al., 2012:71). Therefore, there is a clear need for sector-level research on the materiality and assurance in the sustainability reports (Fasan & Mio, 2017:288; Roca & Searcy, 2012:103; Padilla-Garrido et al., 2024:5391). In sectors with high environmental impact, such as container shipping, there is a strong

demand for more comprehensive and sector-specific research on companies' sustainability reports (Karagiannis et al., 2022: 13;Jørgensen et al., 2022: 342–344).

The maritime industry has been subject to extensive sustainability regulations since the establishment of the International Maritime Organization (IMO) in 1959, focused primarily on preventing and controlling environmental pollution from maritime activities (IMO, 2019). A key example is the International Convention for the Prevention of Pollution from Ships (MARPOL) of 1973, one of the earliest holistic anti-pollution conventions.

However, there are various factors that make container shipping particularly important for sustainability. For example, About 80% of global merchandise is transported by sea, and two-thirds of this maritime transport is carried out by container ships. The increase in container ship capacity from about 11 million metric tons in 1980 to nearly 293 million metric tons in 2022 demonstrates the significance of container shipping for global trade (World Trade Organization, 2021; Zhang et al., 2020; Placek, 2023).

Moreover, as climate change extends the navigable periods of Arctic shipping routes, these routes are emerging as new alternatives for container vessels (Poo et al., 2024:219). The expansion of Arctic shipping will place container shipping companies in a central position by increasing their sustainability responsibilities, as their activities directly affect Arctic water bodies, air emissions, and wildlife. If container shipping companies fail to consider sustainability in their operations, serious consequences such as ocean acidification, reduced snow and ice albedo, and threats to animal survival may occur (Qi et al., 2024:9).

The significance of container shipping in terms of sustainability is expected to increase in the future. Therefore, this makes container shipping companies more crucial for sustainability research (Nusa & Kodak, 2022; Fan et al., 2025:174-175).

Moreover, as Arctic routes open up new alternatives for maritime container transport, the container shipping industry is likely to assume a far more prominent role in sustainability.

This study aims to analyze material issues and assurance levels in the sustainability reports of container shipping companies. A scoring system was developed through content analysis based on the literature and international

standards to indicate material issues and assurance levels of the companies, and the reporting quality and sustainability performance are analyzed through these scores.

The scoring method developed by Perego & Kolk (2012) was expanded and revised with indicators derived from IFRS and GRI standards. In this way, the scoring method was customized specifically to container shipping companies. According to this scoring method, 34 reports published between 2018 and 2022 were analyzed. The scores obtained by the companies between 2018 and 2022 were aggregated and their rankings were made. The same companies were also ranked according to the scores they received in 2024 from the sustainability rating agencies Sustainalytics and S&P Global. These three different rankings created in the study were compared with each other, and the sustainability performances of the companies were evaluated. However, it was observed that there were differences between these rankings. The findings also show that the average scores of the reports followed a continuous upward trend between 2018 and 2022. It was observed that companies whose sustainability reports were externally assured had greater owned TEU capacity. The increase in externally assured sustainability reports between 2018 and 2022 demonstrates that sustainability reporting in the container shipping sector is evolving toward a more assurance-based system.

Chapter one presents information on sustainability, sustainability reporting. container shipping. In chapter two, previous studies are analyzed and summarized. In chapter three, method, data, and results of this study are explained. The conclusion was written according to the results of this study.

CHAPTER ONE
SUSTAINABILITY AND SUSTAINABILITY REPORTING

1.1. THEORETICAL BACKGROUND

Agency theory, shareholder theory, stakeholder theory, political cost theory, and institutional theory are considered to have contributed to the emergence and development of sustainability reporting.

1.1.1. Stakeholder Theory

Stakeholder theory was first introduced by Edward Freeman in his book *Strategic Management: A Stakeholder Approach*. The theory was later further developed by various academics and researchers (Freeman, 1984:24). Stakeholder theory (ST) is a theory of business ethics and organizational management (Laplume et al., 2008:1153) .

According to this theory, the success of businesses should not be evaluated solely based on shareholder satisfaction but also on stakeholder satisfaction. The stakeholders of a company consist of individuals, groups, or legal entities in the external environment who are directly or indirectly affected by the company's decisions. Customers, employees, suppliers, society, and government can be cited as examples of a company's stakeholders (Freeman, 1984:25).

Stakeholder theory does not force the firm to choose between its stakeholders and shareholders. Rather, it calls for a choice regarding whether the business will be managed from a narrow perspective or a holistic one. This distinction is similar to the difference between a value chain and a value network. While a value chain focuses solely on financial value, a value network emphasizes shared purpose and values (Freeman et al.,2020: 217).

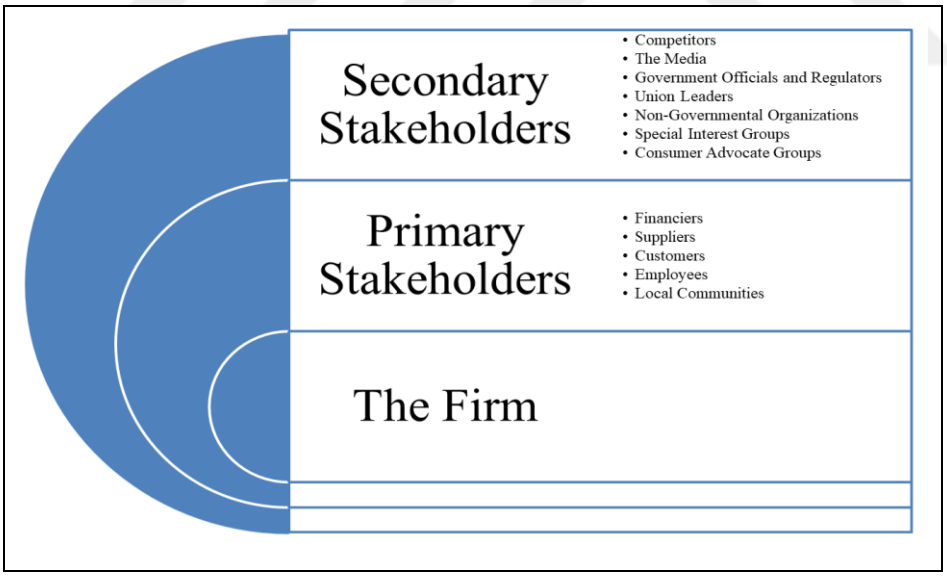
In a value chain, goals are set exclusively for shareholders, and all other actors are viewed merely as means to that end. However, in a system built on interconnection and interdependence, each stakeholder has to be regarded both as a means and an end (Freeman et al.,2020: 217).Therefore, stakeholder theory has emerged as the most prominent theoretical framework in sustainability management

and corporate social responsibility research. It plays a vital role in explaining why companies engage in corporate responsibility and sustainability activities (Schaltegger et al., 2019:193).

Stakeholder Theory in that sense could be defined as a conceptual framework that (Mahajan et al.,2023:2):

- encourages firms to actively engage with both internal and external stakeholders;
- promotes a deeper understanding of stakeholder expectations, requirements, and concerns;
- expands the scope of decision-making beyond a shareholder-centric view by promoting accountability and inclusivity, and;
- supports strategic alignment, enhances value creation, and contributes to the long-term resilience and sustainability of organizations.

Figure 1: Stakeholders of the Firm



Source: Adapted From Freeman et al., 2018: 192

Figure 1 illustrates the stakeholders of the company at different levels. The figure places the firm at the center, surrounded by its primary and secondary stakeholders. The primary stakeholders of the firm consist of financiers, suppliers, customers, employees, and local communities In addition, the firm's secondary

stakeholders include competitors, the media, government officials and regulators, union leaders, non-governmental organizations, special interest groups, and consumer advocate groups.

The stakeholders located in the outer section of the semicircle are classified as secondary stakeholders. The defining characteristic of secondary stakeholders is that they are influenced by the current and potential future impacts of the firm. However, they do not have a direct transactional influence on the company itself (Freeman et al., 2007: 8). Secondary stakeholder group does not have a direct transactional or commercial relationship with the firm, yet affects or is affected by its activities. They are therefore not considered essential for the firm's continued survival (Clarkson, 1995:107).

Primary stakeholders, by contrast, are situated in the inner section of the semicircle. They are influenced by the current and potential future impacts of the firm. The continuous participation of primary stakeholder groups is essential for the firm to sustain its operations. There exists a strong level of interdependence between the company and its primary stakeholders (Clarkson, 1995:106). Unlike secondary stakeholders, primary stakeholders exert a direct effect on the company's decisions, activities, and performance. The financial resources required by the firm are provided by financiers through various financing instruments. In return, financiers have an interest in obtaining financial returns from the firm (Freeman et al., 2010: 24).

Employees are a group of stakeholders who provide labor to the firm in return for wages. They possess the expertise, skills, and experience required by the firm. In exchange, they expect to receive salaries, job security, and additional benefits (Freeman et al., 2010: 25).

The products and services sold by the firm are purchased by customers, who in return make payments for the goods and services they receive. Customers expect to derive benefits from the products and services they purchase. Suppliers, on the other hand, deliver raw materials and semi-finished goods that are essential for the firm's production activities, and in return, they anticipate receiving payment (Freeman et al., 2010: 25).

Through the establishment of facilities and the conduct of their operations, companies create economic and social impacts on the local communities in which

they operate. Consequently, these communities anticipate deriving benefits from the economic contributions, social initiatives, and tax revenues generated by corporate activities (Freeman et al., 2010: 25).

In this context, governments and official institutions establish laws and regulations to protect the public interest. Through these legal frameworks, they aim to ensure order and promote compliance in both markets and the broader society (Freeman, 1984: 13).

Consumer advocate groups may affect companies in the consumer goods sector by advocating to protect customer rights and interests (Freeman, 1984: 18).

Companies have relationships with special interest groups and individuals focused on issues such as individual arms control or gender equality, aiming to strengthen their reputation by responding to their concerns (Freeman, 1984: 21).

Donaldson & Preston (1995) p.70 later developed stakeholder theory by emphasizing that companies carry responsibilities to take into account the concerns of all stakeholder groups. In addition, they proposed three different approaches, thereby systematizing stakeholder theory and strengthening its legitimacy as a theoretical framework.

The descriptive approach explains the organization's relationships with various stakeholder groups in the external environment who hold diverse interests. The instrumental approach focuses on identifying which specific tools or strategies lead to particular outcomes. The normative approach acknowledges that all managers and representatives of the organization are responsible for equally safeguarding the interests of all stakeholders (Donaldson & Preston,1995:70).

Mitchell et al. (1997) developed a stakeholder prioritization model built upon three dimensions: power, legitimacy, and urgency. Power refers to the extent of a stakeholder's influence over organizational outcomes. Legitimacy refers to the perceived validity and appropriateness of a stakeholder's claims. Urgency reflects the degree to which stakeholder demands are time-sensitive and require immediate managerial response (Mitchell et al., 1997:879-880).

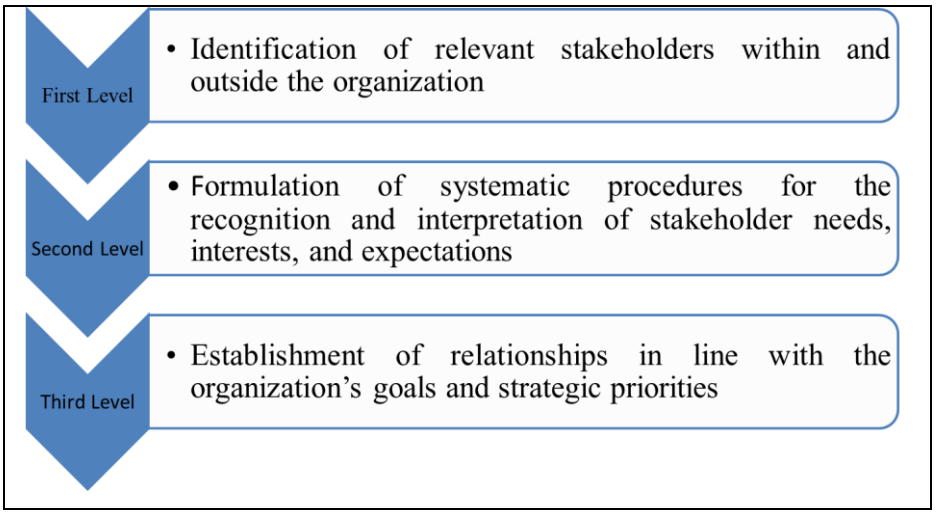
As stakeholder theory has continued to develop, it has allowed researchers to analyze companies in more detail and from an ethical perspective, rather than looking at business issues one by one or only as a whole (Freeman,1994: 409).

Firms that develop mutually trust-based relationships with their stakeholders are generally more successful in creating value, adapting to environmental changes, and fostering innovation (Harrison et al., 2010:58) However, ethical ambivalence may arise for firms. Behaviors, attitudes, and norms that align with ethical values may conflict with those shaped by the organizational reward system, leading to a state of sociological inconsistency. While ethical principles require that all information about the firm be reported honestly and transparently, the concealment or destruction of negative information may, in some cases, be rewarded (Jansen & Glinow, 1985: 814).

Stakeholder theory is explored across four main academic domains: sociology, politics, economics, and ethics. It aims to explain the nature of the relationship between the firm and its stakeholders within the external environmen (Mainardes et al., 2011: 229).

Within the scope of stakeholder management, firms are required to identify and manage the groups that influence and are influenced by their organizational behavior. In this regard, stakeholder relationships are organized through the three levels illustrated in Figure 2.

Figure 2: Management of the Stakeholders



Source: Mainardes et al., 2011: 230

As illustrated in Figure 2, the first stage consists of the identification of the firm's stakeholders; the second stage involves the formulation of structured

mechanisms aimed at interpreting and addressing stakeholder needs and expectations; and the third stage concerns the establishment of stakeholder relationships aligned with the strategic objectives of the firm.

There is a broad consensus among management scholars that stakeholder theory and stakeholder collaborations offer substantial contributions to the advancement of sustainability initiatives and management practices (Wang et al., 2023; Freudenreich et al., 2020; Schaltegger et al., 2019; Valentinov et al., 2019; Hörisch et al., 2014; Garvare & Johansson, 2010; Valentinov, 2023:61).

1.1.2. Shareholder Theory

Milton Friedman introduced the shareholder theory. According to him, in a capitalist society, any idea or innovation can be brought to life through shareholder wealth, which is considered the central priority (Friedman, 1962: 17).According to this theory, a company's sole social obligation is to maximize its profits. Social responsibility is seen as relevant to individuals rather than to corporations. In such firms, employees are hired by business owners under the conditions of a free market economy (Friedman, 2007: 173). Within this framework, the duty of corporations is to enhance shareholder wealth, provided they do not engage in unlawful or unethical conduct. Shareholder theory is based on the assumption that pursuing non-profit objectives by corporations would be incompatible with the principles of a free market system (Friedman, 2007: 177).

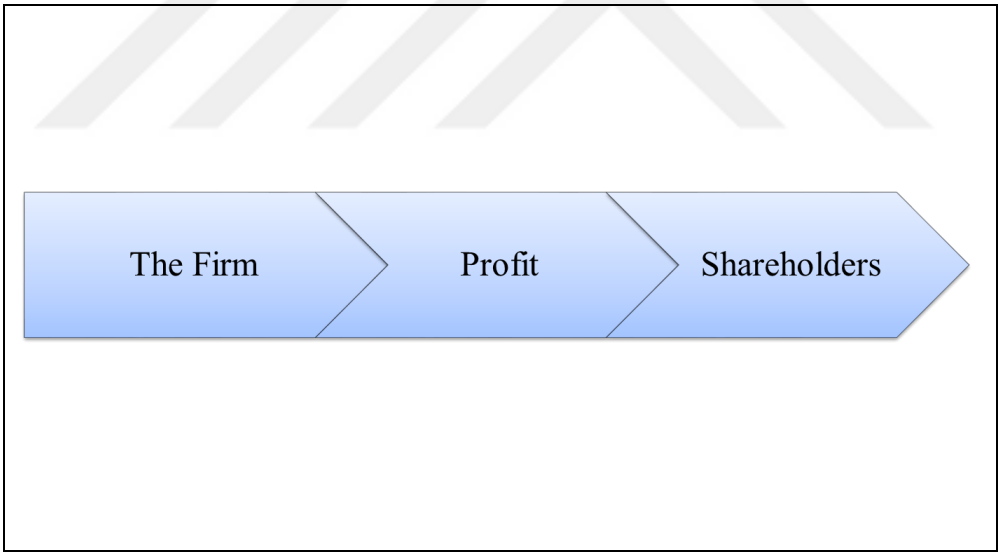
There are four main arguments that support the idea that shareholders should be given priority over other stakeholders: agency, control, residual claims, and congruence with social wealth (O' Connel & Ward, 2020:2920).

Agency perspective proposes that there is a contractual or representative relationship between a corporation's employees and managers and its owners, the shareholders. This framework places managers under a fiduciary duty to act in alignment with shareholder interests. This duty derives from the principle that shareholders, as the legal owners of the company, assume the financial and operational risks of corporate activities and are therefore considered the primary beneficiaries of corporate value creation (Boatright, 1994:393). The connection

between a firm's shareholders and its managers can be described as a classic agency relationship. To avoid problems that may result from the separation of ownership and control, corporate managers must carefully safeguard the interests of shareholders (Jensen & Meckling, 1976:309).

The control perspective argues that shareholders are the most important stakeholders due to their decisive influence over the corporation. The residual claims view holds that shareholders constitute the primary stakeholder group, as the company's assets are financed by them and they bear significantly greater risks compared to other stakeholders. The congruence with social wealth perspective suggests that when corporate governance focuses on maximizing shareholder value, it leads to greater value creation for the company, which in turn benefits other stakeholders as well (O' Connel & Ward, 2020:2921).

Figure 3: Friedman's Shareholder Theory



Source: Adapted from Narbel&Muff,2017:1360

Figure 3 illustrates a conceptual model based on Friedman's approach. In this model, profit maximization is presented as the firm's exclusive objective, with shareholders identified as the sole group to whom the company owes social responsibility (Narbel&Muff, 2017:1360).

The shareholder-oriented model of corporate governance gained broad acceptance by the end of the 20th century. This model places pressure on corporate managers to focus on maximizing shareholder value. It is widely believed that doing so strengthens a company's competitiveness and improves its long-term performance (Hansmann&Kraakmar,2001: 468).

However, there is often a misconception concerning the maximization of shareholder value, as noted by Sundaram & Inkpen (2004). Efforts to maximize shareholder value represent a long-term objective. Enhancing shareholder wealth does not equate to exploiting suppliers, other stakeholders, or society at large (Sundaram&Inkpen, 2004:371).

Corporate managers may act in ways that protect and promote the interests of non-shareholding stakeholders without contradicting the core principles of shareholder theory. Nevertheless, the theory lacks a clear framework for guiding managerial conduct when it comes to balancing the diverse interests of multiple shareholders while avoiding ethical tensions with other stakeholder groups (Mansell, 2013:597).

1.1.3. Agency Theory

Berle and Means (1932) are widely acknowledged as key contributors to the emergence of agency theory, primarily through their influential book *The Modern Corporation and Private Property*. In this work, they explored topics such as economic power, ownership, managerial control, the modern corporate structure, and shareholders. They emphasized the potential risk that, in large corporations with dispersed ownership, managers might prioritize their own interests rather than those of the shareholders. This perspective played a foundational role in shaping the subsequent development of agency theory (Bendickson et al.,2016:176).

During the 1960s and early 1970s, scholars such as Arrow (1971) and Wilson (1968) expanded the understanding of risk-sharing dynamics among individuals and groups. Agency theory broadened the scope of risk-sharing studies by addressing the potential conflicts that may emerge among cooperating agents with differing objectives.These challenges came to be known as agency problems (Ross,1973:134).

An agency relationship arises when one or more individuals, known as principals, enter into a contractual agreement that authorizes another party, referred to as an agent, to carry out a service on their behalf, including the authority to make decisions in their name (Jensen & Meckling, 1976:308).

Although the agency relationship between a company's shareholders, who act as principals, and its managers, who serve as agents, is widely acknowledged, there are two additional forms of agency within the corporate structure. The first exists between minority shareholders, as principals, and controlling shareholders, as agents. The second arises when the company functions as an agent in its contractual dealings with third parties, particularly creditors, who are considered the principals in such cases (Sepe,2010: 124).

Table 1: Agency Theory Overview

Key idea	Principal-agent relationships should reflect efficient organization of information and risk-bearing costs
Unit of analysis	Contract between principal and agent
Human assumptions	Self-interest, bounded rationality,risk aversion
Organizational assumptions	Partial goal conflict among participants Efficiency as the effectiveness criterion Information asymmetry between principal and agent
Information assumption	Information as a purchasable commodity
Contracting problems	Agency (moral hazard and adverse selection) Risk sharing
Problem domain	Relationships in which the principal and agent have partly differing goals and risk preferences

Source: Adapted from Eisenhardt, 1989: 58

As presented in Table 1, the central idea is that agency relationships are expected to ensure the effective organization of information flows and the distribution of risk-bearing costs. In this context, the unit of analysis is the contract between principal and agent. Human assumptions take into account individuals' self-interest, limited rationality and risk aversion. In terms of organizational assumptions,

there is partial goal conflict between the participants, with efficiency as the success criterion. The information asymmetry between principal and agent is also emphasized. In this regard, information is treated as a purchasable commodity. Contractual issues include classic agency problems, such as moral hazard and adverse selection, as well as matters of risk sharing. Finally, within the problem domain, the principal-agent relationship is defined by divergent objectives and risk preferences.

The primary aim of agency theory is to address two fundamental problems that may arise within agency relationships. The first involves conflicts that occur when the goals and preferences of the principal and the agent are misaligned, making it difficult for the principal to monitor whether the agent is acting in line with those objectives. The central issue here is the principal's inability to guarantee that the agent is performing appropriately (Eisenhardt, 1989: 58).

The second issue concerns risk sharing between principal and agent. This problem emerges when the two parties hold different risk attitudes, which may result in distinct preferences for action due to varying levels of risk tolerance (Eisenhardt, 1989: 58).

Studies centered on agency theory have developed along two main lines: the positive theory of agency and the principal-agent approach. Scholars of principal-agent approach have typically examined three key factors that influence the modeling of agent-principal contracts: the preferences of the parties involved, the uncertainty inherent in the environment, and the informational structure of that environment. This line of research generally focuses on the structure of the optimal contract between the principal and the agent, the distribution of risk between them, and the cost differences among alternative solutions to agency problems (Jensen,1983:334).

Positive agency researchers typically focus on the additional characteristics of the environment in which contracts are established, as well as on how principals oversee and control the behavior of agents. These features affect not only the forms of agency contracts but also the continuity and survival of organizations. Environmental factors such as the degree of asset specificity, capital intensity, information costs, capital markets, and internal and external labor markets are examples of factors form contract structures. Furthermore, the costs associated with

various monitoring and bonding activities interact with these environmental factors to influence the formation of agency agreements (Jensen,1983:335).

Principals are expected to undertake two essential responsibilities: managing the organization and assuming its risks. In the corporate context, competition with other firms functions as the main source of discipline. As a result, monitoring the performance of both teams and individual members within the firm becomes critical to its survival. Managers, in particular, must deal with a range of risks and opportunities that originate both internally within the company and externally in the business environment (Fama, 1980: 288).

In the context of agency relationships, agency costs are typically categorized under three headings: monitoring costs, bonding costs, and residual loss. Monitoring costs refer to the costs incurred by the principal to supervise and control the agent's actions efficiency (Jensen& Meckling,1976:308). Bonding costs represent the costs borne by the agent to provide assurance and demonstrate commitment to the principal's interests. Residual loss refers to the decline in overall welfare resulting from unresolved conflicts between the principal and the agent, which cannot be fully eliminated through monitoring or bonding efforts. These cost elements are regarded as core components of agency costs and are widely seen as major barriers to achieving organizational efficiency (Jensen& Meckling,1976:309).

From an institutional perspective, agency theory holds a prominent position within the management literature and significantly influences the design of governance structures within organizations. It provides a theoretical basis for key aspects such as the structure and independence of boards of directors, the role of executive compensation mechanisms, and the implementation of performance-based reward systems (Fama&Jensen, 1983:321). For example, in large corporations, granting company shares to top executives and implementing performance-based reward systems have become widespread practices. The essential aim of these mechanisms is to align the personal interests of agents with those of shareholders, thereby reducing potential conflicts of interest (Jensen&Murphy,1990:226).

Legal regulations that promote corporate governance, clarify managerial responsibilities, and enhance financial transparency are essential for effectively protecting investors against agency problems. Well-established corporate governance

systems, such as those in the United States, Germany, and Japan, provide significant legal safeguards for certain categories of investors (Shleifer&Vishny,1997:773-774).

Sustainability is increasingly examined within the framework of agency theory. In firms with high sustainability performance, executive compensation incentives are tied to sustainability metrics. Moreover, such firms tend to engage more actively with stakeholders and adopt a long-term perspective in their decision-making processes (Eccles et al.,2014:2835). Monitoring mechanisms such as external assurance and the provision of long-term compensation incentives for executives contribute to enhancing a company's sustainability performance (Berrone& Gomez-Mejia,2009:120). Agency theory also provides an important framework for understanding both corporate structures that emphasize sustainability performance and the external assurance of sustainability-related information (Hahn & Kühnen,2013:15-16).

Although agency has traditionally been regarded as a foundational conceptual framework, in both business practice and academic research, over time it has faced various criticisms, which have led to the development of alternative approaches such as stewardship theory (Donaldson&Davis,1991:61).

1.1.4. Political Cost Theory

Political cost theory was first articulated by Watts & Zimmerman (1978), in the late 1970s within the framework of positive accounting theory (Watts &Zimmerman, 1978: 112; Watts&Zimmerman, 1986: 287). The central aim of Positive Accounting Theory is to explain and predict the selection of financial accounting methods. Although its contribution to accounting thought is significant, there is a need for further development through the use of empirical techniques (Demski,1988:623).

Positive accounting theory proposes three primary hypotheses: the bonus plan hypothesis, the debt-equity hypothesis, and the political cost hypothesis (Watts & Zimmerman, 1990: 138–139). The bonus plan hypothesis states that managers in firms with bonus-based compensation schemes are more likely to choose accounting methods that increase reported income in the current period. The debt-equity

hypothesis posits that the higher a firm's debt-to-equity ratio, the greater the likelihood that managers will adopt income-enhancing accounting choices. By contrast, the political cost hypothesis suggests that larger firms, compared to smaller ones, are more prone to select accounting practices aimed at reducing reported profits (Watts & Zimmerman, 1990: 138–139).

Policymakers have the power to redistribute corporate wealth across different societal groups. In this context, companies may face risks such as nationalization, expropriation, break-up, or increased regulation of their industry or operations. To prevent the likelihood of such government interventions, firms often incur certain costs. These costs were caused by the activities such as engaging in corporate social responsibility projects, lobbying efforts, and adopting accounting standards that minimize reported earnings. These expenditures are collectively referred to as political costs (Watts and Zimmerman, 1978: 112).

Although the influence of corporate social responsibility (CSR) campaigns on political costs is not entirely conclusive, they may function as effective tools for diverting the attention of the public and policymakers away from companies and their profitability. CSR initiatives, together with accounting strategies that lower reported earnings, are frequently employed to shift the attention of governments, labor unions, and the wider public away from corporations (Milne,2002:374).

The political cost hypothesis suggests that managers who face the risk of government-imposed wealth transfers are likely to choose accounting strategies that help reduce that risk. In this regard, Cahan's study shows that companies undergoing antitrust investigations due to monopolistic behavior tend to use accounting methods that lower reported earnings, especially when political pressures increase (Cahan,1992:93).

For example, in the oil industry, the high visibility of companies and their potential to cause environmental harm often leads to stricter government scrutiny. As a result, firms in this sector may intentionally adopt accounting practices that reduce reported earnings in order to mitigate political costs and regulatory risks (Ness& Mirza,1991:215).

Political cost theory has been used for voluntary disclosure of non-financial information extending beyond the choice of accounting method. Belkaoui & Karpik

(1988) there is a positive link between social performance and the extent of non-financial disclosure. Moreover, greater firm visibility is positively associated with the level of such disclosure. Conversely, there is a significant negative association between the disclosure of non-financial information and financial leverage (Belkaoui & Karpik,1988:46-47).

The relationship between a company's profitability and its voluntary disclosure of non-financial information has also been widely studied in academic research. Evidence indicates that firms with higher profitability are more likely to engage in corporate social responsibility initiatives, often as a means of avoiding criticism associated with excessive profits (Gamerschlag et al.,2011:233).

It is well known that politically visible companies with high profitability tend to allocate more resources to sustainability and integrated reporting practices in order to strengthen public awareness of their operations. Furthermore, as firm size increases, the amount of sustainability-related information disclosed also tends to rise (Frias-Aceituno et al.,2014:66-68). In parallel, firms engaged in earnings management are also more likely to issue higher-quality sustainability reports (Ningshih et al.,2023:137).

Some scholars contend that the social and environmental performance disclosed through sustainability reporting does not primarily aim to prevent potential political intervention. Instead, they argue that the underlying objective of such reporting is to legitimise specific aspects of an organisation's activities that could be perceived as controversial or in need of justification (Deegan,2002:302; Patten,1992:475).

1.1.5. Institutional Theory

Institutional theory is an organizational framework that suggests organizations adopt similar structures and practices as a result of pressures from their institutional environment. It posits that organizational behavior is shaped not only by economic considerations as well as the pursuit of legitimacy, cultural norms, and societal expectations. According to this theory, organizations that incorporate institutionalized rational elements into their formal structures are more likely to to

achieve legitimacy and improve their prospects for survival (Meyer& Rowan,1977:352).

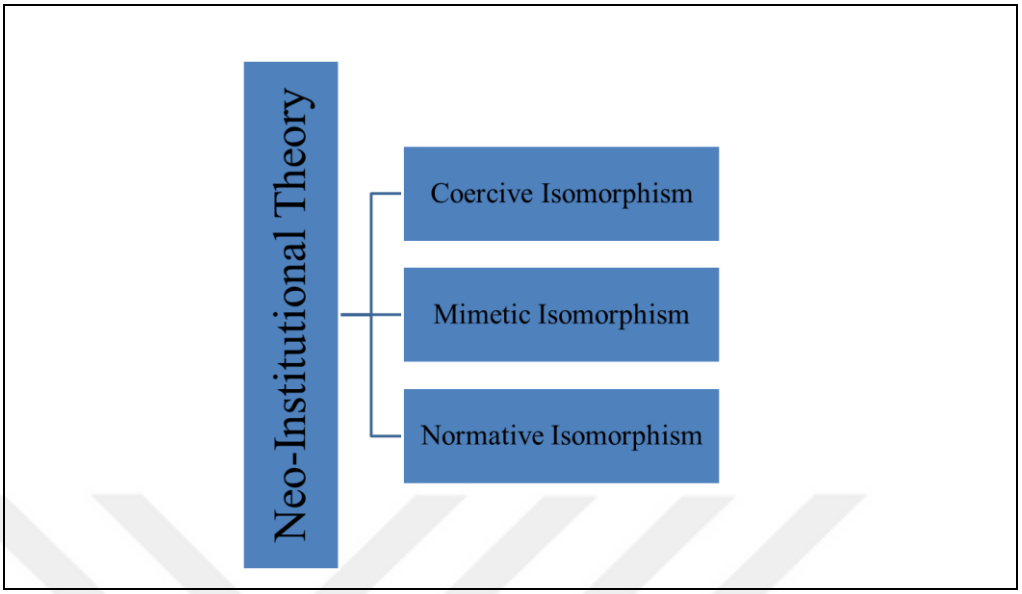
Rationalized formal structures arise in two main contexts. First, the demands and expectations of local relational networks promote the establishment organizational structures that coordinate and regulate organizational activities. Second, the interconnectedness of social relations, the collective structuring of society, and the influence of organizational elites foster the development of a deeply institutionalized environment (Meyer& Rowan,1977:353).

Over time, institutional theory evolved into a more refined approach known as new institutionalism. The new institutionalism approach aims to explain why organizations become more alike over time. DiMaggio and Powell describe the forces that drive this similarity as rational actors and group them under the concept of institutional isomorphism. These processes are divided into three types: coercive, mimetic, and normative (Di Maggio & Powell,1983:147).

As shown in Figure 4, institutional isomorphism is driven by three mechanisms. The first, coercive isomorphism, stems from political pressure and concerns about legitimacy. The second, mimetic isomorphism, occurs as a response to uncertainty. The third, normative isomorphism, is associated with professionalization processes and the role of professional standards (Di Maggio & Powell,1983:150).

Coercive isomorphism reflects both formal and informal pressures imposed on organizations by the institutions they rely on, together with societal expectations. Mimetic isomorphism, by contrast, does not arise from coercive authority; rather, it is reinforced by uncertainty, which drives imitation among organizations. Normative isomorphism develops through processes of professionalization (Di Maggio & Powell,1983:151-152).

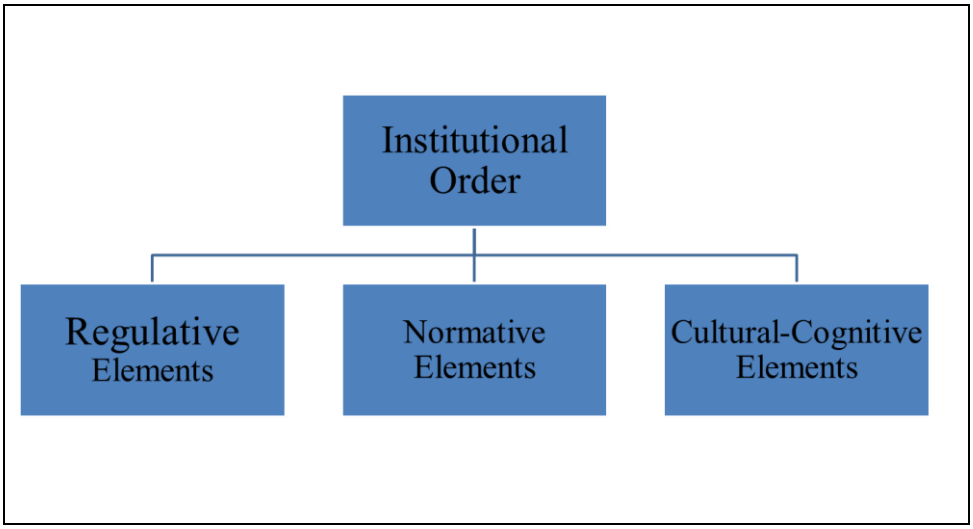
Figure 4: Three Mechanisms of Institutional Isomorphic Change



Source: Di Maggio & Powell,1983:150

Scott later defined the three fundamental components underlying institutional order as the regulative, normative, and cultural-cognitive elements (Scott, 1995; 2005; 2008a).

Figure 5: Three Core Pillars of Institutional Order



Source: Adapted from Scott, 2008a:54-57.

As indicated in Figure 5, regulative elements highlight rule-setting, monitoring, and enforcement processes imposed on organizations. Normative elements introduce a prescriptive, evaluative, and obligatory dimension to social life, while cultural-cognitive elements emphasize the concepts that construct social reality and provide the frameworks through which meaning is generated (Scott, 2008a: 54-57).

Each of these three elements supports a distinct form of institutional order and differs significantly in terms of order, motives for compliance, action logics, mechanisms, and indicators employed. Each element provides a different basis for institutional legitimacy: legal approval, moral justification, or cultural acceptance (Scott 2008a: 51).

Each institution consists of different combinations of these specified elements, and the emphasis placed on each element may vary. While some institutional elements are shaped through interaction with rules, norms, or beliefs, others are formed under the influence of environmental factors. Although institutional elements are symbolic in nature, they are effective to the extent that they constrain social behavior, provide cognitive schemas, and offer normative guidance (Scott 2008b: 429).

Institutional logic refers to a historically constructed system of material practices, underlying assumptions, values, beliefs, and rules. It is socially created to allow individuals to satisfy material needs, organize activities across time and space, and assign meaning to their social reality (Jackall 1988:112; Friedland & Alford, 1991:243; Thornton & Ocasio, 1999:804)

Institutional theory studies that focus on norms, accepted assumptions, cognitive limitations, and coordination constraints, along with the use of passive structural models, have gradually shifted their focus toward issues concerning interests and the role of actors (Di Maggio,1988: 10).

Institutional theory has become a widely used framework for understanding the increasing adoption of sustainability reporting and sustainability-related practices across companies.

Institutional theory has become a commonly applied framework for understanding the growing prevalence of sustainability reporting and sustainability

practices among companies. Institutional theory emphasizes that coercive, mimetic, and normative pressures, as identified by DiMaggio and Powell (1983), play a central role in explaining the widespread adoption of sustainability reporting.

Initially introduced as a voluntary practice, sustainability reporting has gradually become an institutional norm in many sectors and countries. It has developed into a requirement associated with professionalization and is now commonly expected from companies, much like financial reporting, serving as a source of normative pressure (de Villiers & Alexander, 2014:208).Through normative pressures, having a transparent sustainability report has come to be seen in the business world as an ethical and professional requirement for being regarded as a good company (Suchman, 1995:579–581).

Laws and regulations that make sustainability reporting mandatory create coercive pressure on companies. For instance, publicly listed firms are required to disclose more detailed information regarding their sustainability activities, as they are subject to stricter reporting standards (Hahn & Kühnen, 2013:12). There are concerns that potential threats to a firm's legitimacy may reduce its chances of long-term survival. In this context, organizations often develop their sustainability policies with the aim of complying with both national and international regulations(Bansal&Roth,2000:727).

The first companies to publish sustainability reports globally were industry leaders with strong global recognition. The positive reactions these companies received from society and stakeholders for their sustainability activities led other firms to start sustainability reporting through benchmarking, as a result of mimetic pressure (Kolk, 2004: 58). In the field of environmental sustainability, the practices implemented by leading firms often serve as reference models for others. The increasing adoption of sustainability reporting and related practices among organizations can be attributed to a process of observational learning and imitation, reflecting the dynamics of mimetic isomorphism within institutional environments (Jennings & Zandbergen, 1995:1034). In line with the theoretical frameworks examined in this study, it is concluded that the adoption of stakeholder theory provides a more comprehensive and appropriate basis for the analysis conducted in this thesis.

1.2.SUSTAINABILITY

Within the scope of sustainability, the historical evolution of sustainability and sustainable development, the definition of the sustainability concept, and the sub-dimensions of the sustainability are going to be examined. The concepts of sustainability and sustainable development are often used interchangeably.

1.2.1. Historical Evolution Of The Sustainability And Sustainable Development

The potential impact of humanity on environmental and natural resources was questioned more than two centuries ago, in 1798, by Thomas Robert Malthus (1766–1834). According to him, the human population would either perish from famine or be forced to live at a subsistence level. Because food production would not be able to keep pace with population growth. (Paul, 2008:576). Due to technological advancements, production today has grown at a faster pace than the population (Baumol, 2007:17). Nevertheless, the possible outcomes of the depletion of non-renewable resources were demonstrated through computer simulations in the book "The Limits to Growth"(Meadows et al., 1972). With the model they adopted, they predicted the collapse of humanity with the depletion of non-renewable resources.

The 1972 Conference on the Human Environment in Stockholm, Sweden, is considered to be the first international conference to focus on environmental issues. During the conference, experts investigated the link between environment and development, highlighting the conflicts between environmental and economic priorities (Vogler, 2007:432).Another result of this conference, the United Nations Environment Program was established. The mission of this program is to provide leadership and increase partnership to improve the quality of life of nations and people without threatening their future (United Nations Environment Programme, 2022).

In 1983, the UN General Assembly established the World Commission on Environment and Development, later known as the Brundtland Commission. In 1987, this commission published the Brundtland Report whose name is "Our Common

Future".The report not only defined the concept of sustainability but also proposed a sustainable development framework that equally prioritizes environmental, social, and economic dimensions (United Nations, 1987). The explanation regarding sustainable development and needs in this report is outlined below (United Nations, 1987, p. 24):

> *Humanity has the ability to make development sustainable to ensure that it meets the needs of the presentwithout compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth. The Commission believes that widespread poverty is no longer inevitable. Poverty is not only an evil in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes*.

This definition encompasses two key concepts. The first is "needs," emphasizing the priority of meeting the essential needs of the world's poor. The second concerns the limitations imposed by technology and social conditions, highlighting the necessity of addressing present and future needs within these constraints (Paul, 2008:577).

A major development for the concept of sustainability occurred twenty years after the 1972 Stockholm Conference. Between June 3 and 14, 1992, the United Nations Conference on Environment and Development (UNCED), also known as the "Earth Summit," was held in Rio de Janeiro, Brazil. With participation from 179 countries, the summit focused on the impact of human socio-economic activities on the environment. The Rio de Janeiro Conference emphasized how different social, economic, and environmental factors are interconnected and evolve together. Furthermore, it stressed the necessity for various sectors to work collaboratively in order to achieve sustainable success. It was concluded that sustainable development should be considered a goal for all humanity, regardless of whether it is pursued at the local, national, regional, or international level (United Nations, 1992).

Following the establishment of sustainable development as a universal goal for humanity, a series of initiatives were launched to address this objective. The Millennium Summit, held in New York in 2000, provided the United Nations with an

opportunity to propose a new development strategy aimed at meeting the specific needs of the twenty-first century and adapting to change.Organized at the United Nations Headquarters in New York between September 6 and 8, 2000, the Millennium Summit resulted in the adoption of the Millennium Declaration by 189 countries. This declaration outlined eight Millennium Development Goals (MDGs) (United Nations, 2000). The Millennium Development Goals are shown in Table 2.

Table 2: Millennium Development Goals

Millennium Development Goals	
MDG 1	Eradicate extreme poverty and hunger
MDG 2	Achieve universal primary education
MDG 3	Promote gender equality and empower women
MDG 4	Reduce child mortality
MDG 5	Improve maternal health
MDG 6	Combat HIV/AIDS, malaria and other diseases
MDG 7	Ensure environmental sustainability
MDG 8	Develop a global partnership for development

Source: Adapted from United Nations, 2000

In 2002, the World Summit on Sustainable Development was held in Johannesburg. This summit led to significant progress in advancing sustainable development.Unlike previous conferences, it concluded with the adoption of a political declaration and an implementation plan that outlined a series of activities and necessary measures. Environmental issues were examined under subtopics such as water, energy, health, and agriculture. The conference also resulted in more tangible outcomes through multi-stakeholder implementation plans and the commitments made during the summit (United Nations, 2002).

Millennium Development Goals would later evolve into the 2030 Sustainable Development Goals (SDGs), which were adopted by all United Nations Member States in 2015. The 17 Sustainable Development Goals represent an urgent call to action for all countries, both developed and developing, to work together through a global partnership (United Nations, 2015).

Sustainable development goals are shown in Table 3. The aim of these goals is to invite all segments of society to take responsibility in order to promote a fairer and healthier life for everyone. They continue to serve as the most comprehensive roadmap for humanity's common future, addressing a wide range of areas from eradicating hunger to advancing education, achieving gender equality, and tackling various environmental and social challenge (International Organization for Standardization, 2016).

Table 3: Sustainable Development Goals

Sustainable Development Goals	
SDG 1	No Poverty
SDG 2	Zero Hunger
SDG 3	Good Health and Well-being
SDG 4	Quality Education
SDG 5	Clean Water and Sanitation
SDG 6	Decent Work and Economic Growth
SDG 7	Affordable and Clean Energy
SDG 8	Decent Work Economic Growth
SDG 9	Industry, Innovation and Infrastructure
SDG 10	Reduced Inequalities
SDG 11	Sustainable Cities and Communities
SDG 12	Responsible Consumption and Production
SDG 13	Climate Action
SDG 14	Life Below Water
SDG 15	Life on Land
SDG 16	Peace, Justice and Strong Institutions
SDG 17	Partnership for the Goals

Source: Adapted from United Nations, 2015

Sustainable development goals are planned to be realized by 2030. In this way, the historical evolution of sustainable development and sustainability concept are shown above.

1.2.2. Definition Of The Sustainability

Sustainability is a way of thinking that aims to improve quality of life by addressing environmental, social, and economic issues related to the future (Jeronen,2024:1).There are different definitions of the concept of sustainability. These definitions have been made by different institutions to meet different expectations. As given in the introduction. Sustainability was defined by the United Nations Brundtland Commission in 1987 (United Nations, 2016):

> " Meeting the needs of the present without compromising the ability of future generations to meet their own needs."

The United States Environmental Protection Agency (EPA) has provided the following explanation regarding the meaning of sustainability (U.S. EPA, 2020):

> *Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations.*

The European Environment Agency defines the sustainability as follow (EEA, 2025):

> "Sustainability is about meeting the world's needs of today and tomorrow by creating systems that allow us to live well and within the limits of our planet."

In addition to this definition of sustainability, the European Commission has made the following statements about sustainable development (EC,2022):

> *Sustainable development means meeting the needs of the present whilst ensuring future generations can meet their own needs.It has three pillars: economic, environmental and social. To achieve sustainable development, policies in these three areas have to work together and support each other.*

This definition also provides an understanding about the dimensions of the sustainability concept.

A similar dimensions regarding the concept of sustainability has also been made by United Nations Educational, Scientific and Cultural Organization. UNESCO highlights that sustainability encompasses environmental (ecological), social, and economic dimensions (UNESCO,2005: 13). Definitions of sustainability

may vary depending on who defines it. Individuals, institutions, and organizations differ based on the environmental, social, and economic conditions in which they operate. This variation allows for a degree of flexibility in the meaning attributed to the concept of sustainability (Jeronen, 2013: 2376).

1.2.3. Dimension Of The Sustainability

As previously stated, the dimensions of sustainability are defined as environmental (ecological), social, and economic (Jeronen, 2024; EC, 2022; Harris et al., 2001). These dimensions will be examined under the corresponding categories of environmental, social, and economic sustainability**.**

1.2.3.1. Environmental (Ecological) Dimension

Environmental sustainability has emerged as one of the most pressing challenges of our time. As a result, it has gained a prominent place both in daily life and on the agendas of policymakers. Today, the issue of environmental sustainability is increasingly attracting the attention of a growing number of consumers.Various approaches are being implemented to promote or enforce environmental sustainability, including legal regulations, policy instruments, public awareness campaigns and educational programs aimed at influencing household behavior, as well as financial incentives (Homar&Cvelbar, 2021:2). As a result, policymakers have begun to increase their use of non-traditional policy instruments within the scope of environmental policies, drawing on research in the field of behavioral economics to promote greater interest in environmental sustainability (Thaler and Sunstein, 2009). In the context of environmental policy, the primary aim of such interventions is to either enhance individual well-being or reduce external dependencies and negative externalities (Carlsson et al., 2019).

The term environmental sustainability is generally understood as the conservation of “natural capital” and is directly linked to economic and social sustainability in an environmental context. It is also closely linked to ecological and agricultural sustainability(Khan et al. 2021b: 590). The concept of ecological

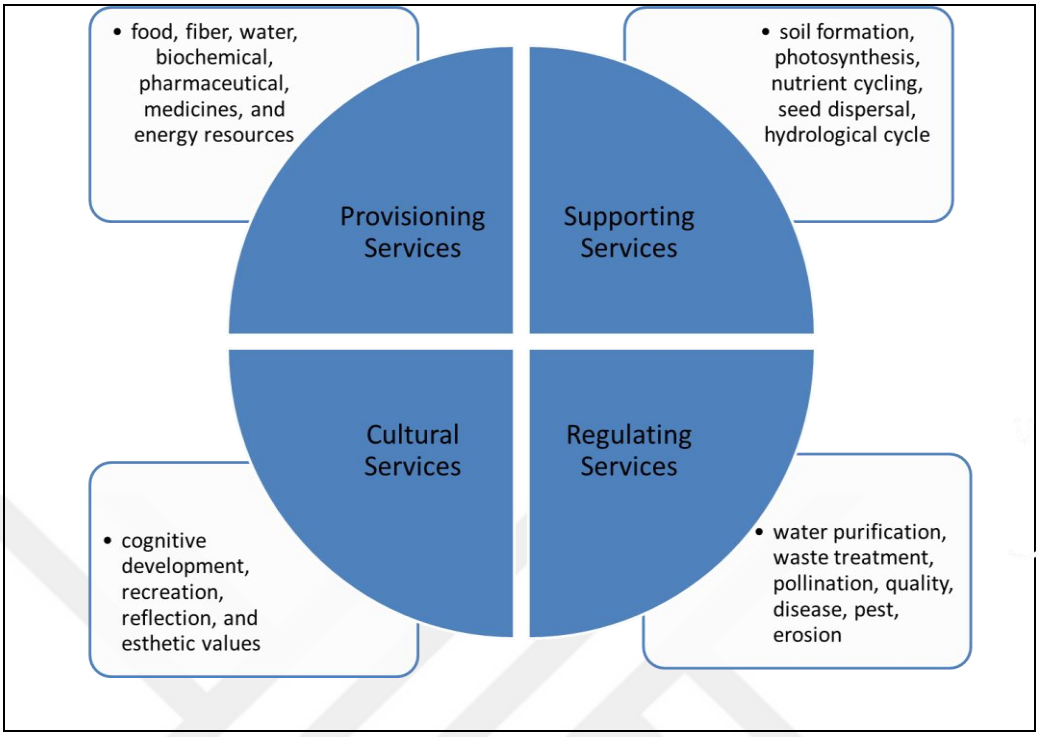
sustainability provides a valuable framework for conservation of ecosystem services against extreme human usage. Human activities have significantly transformed ecosystems through the expansion of agricultural lands and urban development. The sustainability balances these human needs with the capacity of ecosystems to provide essential services, despite the pressures caused by these activities (Callicott &Mumford, 1997).

While this explanation may suggest that ecology and environmental sustainability are separate concepts, *ecological* and *environmental sustainability* are often used interchangeably. This is because environmental sustainability is a broad concept that enables society to meet its needs without exceeding the capacity of supporting ecosystems to regenerate essential services, while also preserving biodiversity. It encompasses the conditions of resilience, balance, and interconnection (Vos, 2007:335-336).

Environmental sustainability aims to ensure the indefinite continuation of the planet's life support systems, especially those that sustain human life. The world's ecosystems offer two basic capacities: resource capacity, providing essential inputs such as food, water, air and energy; and sink capacity, assimilating and processing outputs and wastes generated by human activities. These ecological capacities are vast but ultimately limited. Sustainability therefore requires that these functions are preserved over time without depletion (Goodland, 1995:6).

A sustainable environment can function as an independent system and does not rely on social or economic structures. In contrast, humans are entirely dependent on the continuous flow of ecosystem services shown in Figure 6.

Figure 6: Ecosystem Services



Source: Adapted from Khan et al., 2021b: 609

Ecosystem services encompass all the benefits that nature provides to humans, ranging from vital resources such as clean air and water to essential processes like pollination and erosion control (Khan et al., 2021b:609). Figure 6 presents the types of these ecosystem services along with illustrative examples.

In light of the information presented above, the concept of environmental sustainability is defined as the preservation of the services and resources provided by ecosystems for future generations.Accordingly, the key principles of an environmental sustainability strategy are outlined below (Morelli, 2011:5-6):

- Biodiversity Conservation: Refers to the preservation of biodiversity and the responsible use of energy resources.
- Social Needs: Ensures the availability of essential goods, services, and basic needs for both present and future generations.
- Regenerative Capacity: Focuses on preventing the depletion of natural resources and maintaining the harvest rate of renewable resources within their natural regeneration capacity.

- Reuse and Recycling: Encourages practices that promote reuse and recycling in order to minimize waste, reduce emissions and costs, and enhance overall product efficiency.
- Limits of Non-Renewable Resources and Waste Generation: Highlights the need for economic systems to operate within the Earth's carrying capacity.

1.2.3.2. Economic Dimension

Economic sustainability refers to the management of natural resources that supply essential physical inputs to production. These resources include both renewable types, such as forests, and non-renewable ones, such as minerals (Goodland, 1995:2). Economic sustainability is one of the integral component of the sustainability. It seeks to enhance the economic well-being of stakeholders while also ensuring the protection of the environment (Azlan et al.,2024: 10). The economic dimension of sustainability primarily focuses on enhancing cooperation among supply chain members and addressing key challenges that hinder the successful implementation of sustainability practices (Kamble et al., 2020: 180).

The main objectives of studies on economic sustainability are to reduce overall supply chain costs and to provide solutions for minimizing supply chain design expenses (Musavi & Bozorgi-Amiri, 2017:766–767). In most of these studies, social and environmental impacts are addressed as secondary objectives. These include the reduction of total carbon emissions, the minimization of water footprint, and the creation of employment opportunities (Allaoui et al., 2017:382; Accorsi et al., 2016:159).

The key characteristics of an economically sustainable system include the uninterrupted production of goods and services, the maintenance of debt levels at a manageable scale, and the ability to avoid sectoral imbalances that may harm various forms of industrial output (Harris et al.,2001). One of the core requirements of economic sustainability is the preservation or enhancement of the different types of capital necessary for economic activity. These types of capital include physical (manufactured) capital, natural capital, human capital, and social capital. Although partial substitutability among these forms of capital may be possible, they are

generally considered complementary. Therefore, ensuring the long-term sustainability of the economic system requires the continued preservation of all four types (Harris, 2003:2).

Atkinson et al. (2007). p.49 define economic sustainability as the ability to transfer an equivalent amount of current capital to future generations. This dimension of sustainability is also referred to as the “profit” aspect. From a business perspective, the economic dimension of sustainability involves efforts to increase the value created and delivered by the organization, while also aiming to reduce the costs arising from supply chain activities (Closs et al., 2011:107). When social and economic factors are taken into account, the economic dimension of sustainability is further defined as a business's ability to continue its operations over time. The principles of economic sustainability are directly linked to concepts such as competitiveness, innovation, manufacturing efficiency, lean systems, and profitability, which are essential for businesses to maintain their existence in both the short and long term (Omolosso et al., 2021: 4).

To achieve sustainability from an economic perspective, businesses must make efforts to utilize all available resources and raw materials as efficiently as possible, with the goal of maximizing profit (Singh & Gupta, 2013: 38). It can be argued that social and environmental sustainability practices contribute to the economic sustainability of a sector or supply chain. Conversely, economic sustainability also supports the implementation of social and environmental sustainability practices. A financially stable and profitable organization is more likely to invest in sustainability initiatives related to social and environmental dimensions (Singh & Gupta, 2013: 42). Based on this, it can be stated that the economic dimension of sustainability is associated with themes such as competitiveness, customer perception and sustainable behavior, innovation aimed at increasing efficiency, and supply chain transparency (Omolosso et al., 2021: 9).

In the context of measuring sustainability from an economic perspective, profitability is one of the most widely used and well-known indicators for evaluating both individual businesses and supply chains. Competitiveness is regarded as a key factor in enhancing economic sustainability. It often serves as a driving force behind initiatives such as corporate social responsibility projects aimed at improving

customer perception, innovation-oriented efforts, and activities focused on increasing sustainability and efficiency (Balaman,2019: 80).

Economic sustainability is closely related to environmental and social sustainability. However, the need to ensure that environmental and social sustainability practices do not negatively impact the economy can sometimes lead to conflicts. When products or services become excessively expensive, this may hinder progress toward achieving broader sustainability goals. Elements such as long-term planning, cost savings, productivity, living standards, development, and smart growth are also considered integral components of the economic dimension of sustainability.

Even though many agree that economic activities negatively affect the environment, ensuring the long-term survival of humanity requires a shift towards sustainable development (Lubacha,2023: 33). The primary question is how producers, consumers, and governments can reduce the negative impact of economic activities on sustainability. There is no single answer to this question. Humanity needs a comprehensive transformation of the economic model that incorporates diverse approaches such as the sharing economy, the collaborative economy, the circular economy, and the bioeconomy (Lubacha,2023: 38).

1.2.3.3. Social Dimension

Social sustainability is considered as the process of identifying and managing the positive or negative impacts of various systems, processes, institutions and activities on individuals and social life. This concept encompasses a wide range of topics such as access to health services, social equity, human and labor rights, fair working conditions, social justice and responsibility, community well-being and development, sensitivity to cultural diversity, product safety and the resilience capacity of communities (Balaman,2019: 86).

It has become clear that the concept of sustainability does not consist solely of environmental concerns, but also includes economic and social dimensions. However, although the existence of a social dimension within sustainability is widely accepted, there is no consensus on what it precisely means or what it encompasses.

Similar to the concept of sustainability itself, the social dimension is not absolute and is subject to change. It is a dynamic concept whose meaning and scope may vary depending on time and place (Carley & Kirk, 1998: 4). The social dimension of sustainability has often remained under-theorised or has been addressed in an overly simplified manner.There is no consensus in the literature regarding the definition of social sustainability.Scholars and policymakers tend to develop discipline-specific approaches, which makes it difficult to establish a broadly accepted or commonly agreed-upon definition (Colontanio et al.,2009:16).

It has been observed that sustainability has evolved over time beyond ecological and environmental issues to include social and economic dimensions. This evolution has led to the emergence of the social dimension as a central theme in sustainability studies (Turkington and Sangster, 2006: 184).To ensure that social sustainability is not achieved at the expense of economic or environmental sustainability, it may be necessary to maintain a balance among the different dimensions of sustainability (Dempsey et al.,2011: 289).

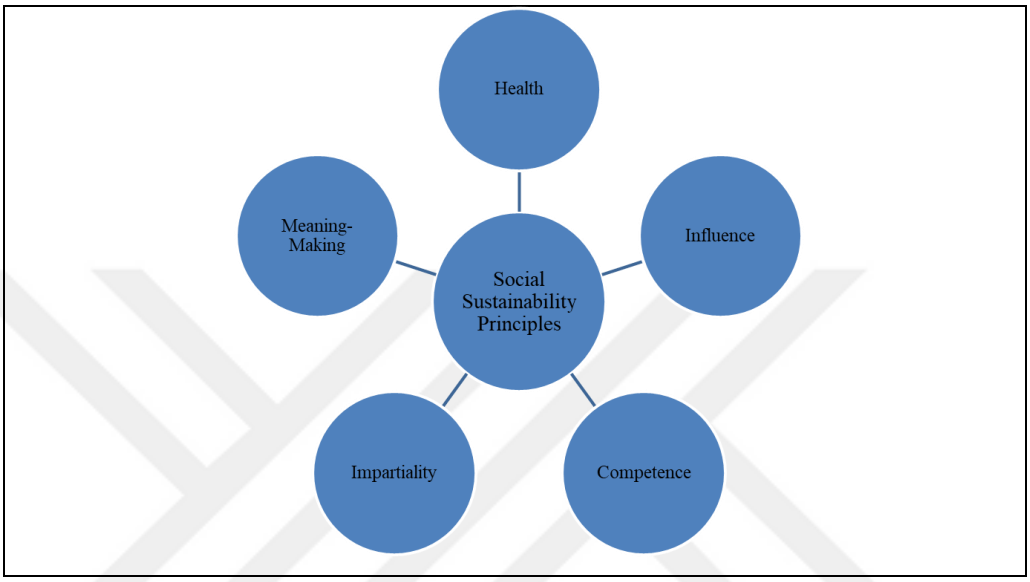
In terms of its core objectives, social sustainability aims to ensure that individuals' socio-cultural and spiritual needs are met in a fair and balanced manner within society.Each individual has different needs, and these needs are shaped by the specific social context in which the person lives (Assefa & Frostell, 2007: 65). Since the ultimate goal of sustainable development is to improve human life in both social and environmental dimensions, social sustainability stands out as one of the most critical components of the broader sustainability concept (Popovic et al., 2013: 933).

Although various conceptual models have been developed in the field of social sustainability, these impacts are difficult to measure and analyze due to the dynamic, cultural and psychological nature of social dimension.The lack of well-developed measurement tools is one of the main reasons why social sustainability issues are less attractive for researchers and decision makers compared to environmental and economic dimensions (Balaman,2019: 88-89).

The literature on social sustainability also highlights the need for further theoretical development and conceptual clarification of the social dimension of sustainability (Missimer, 2013). It is also noted that social sustainability is considered the least developed dimension of sustainability in various studies (Littig

& Griessler, 2005; Cuthill, 2010; Dempsey et al., 2011). Although there is no consensus on the definition or conceptual scope of social sustainability, the proposed principles of social sustainability are presented in Figure 7.

Figure 7: Social Sustainability Principles



Source:Adapted from Missimer et al., 2017:47

The five core principles of social sustainability were defined by (Missimer et al., 2017:47) as follows:

- Health principle refers thatpeople should not be exposed to social conditions that systematically undermine their ability to maintain physical, mental, or emotional well-being;
- Influence principle refers that individuals should not be systematically prevented from participating in the shaping of the social systems they are part of. Suppression of free speech or the disregard of opinions are examples of such constraints;
- Competence principle refers that everyone should have the equal opportunity to learn and develop skills, both individually and collectively. Barriers to education or the lack of personal development opportunities violate this principle;

- Impartiality principle refers thatpeople should not be subjected to biased or unequal treatment. Discrimination or unfair hiring practices are common violations of this principle;
- Meaning-making principle refers that that individuals must be free to create personal meaning and participate in the co-creation of shared purpose.

At this point, in order to promote social sustainability as a core dimension of sustainability and to increase attention to this issue, several actions can be taken. These actions include (Mohamed & Paleologos, 2021:32):

- Encouraging active participation within communities,
- Conducting comprehensive product cost assessments that take into account social costs throughout the entire life cycle, from raw material extraction to final disposal,
- Prioritizing community well-being and social organization over short-term economic gains,
- Using natural and recyclable materials in ways that promote fairness and impartiality while reducing social disruption,
- Facilitating the transfer of resources, knowledge, and technology to communities in need.

1.2.4. Approaches On Sustainability

The historical transformation, development, definition, and dimensions of the concept of sustainability have been outlined. Under this heading, various approaches to the implementation of sustainability in business practices will be examined.

1.2.4.1. Triple Bottom Line

The concept of sustainability and sustainable development was first defined in the 1987 Brundtland Report. According to this definition (UN,1987) sustainability refers to meeting present needs without compromising the ability of future generations to meet their own. In addition, the report identifies three main dimensions of sustainability as economic, environmental, and social.

The Triple Bottom Line approach was introduced by Elkington (1998) in his book Cannibals with Forks: The Triple Bottom Line of 21st Century Business.

the Triple Bottom Line (3BL) approach emphasizes that a company's success should not be measured solely by its financial performance, but also by its social and environmental impacts. It emphasizes that businesses have responsibilities toward their stakeholders, both within and beyond the corporate environment, and that they are expected to act in a socially and ethically responsible manner (Norman & MacDonald,2004: 243).

Table 4: Integration of the Triple Bottom Line (TBL) with Sustainability Dimensions

Dimension of Sustainability	TBL Equivalent	Explanation
Economic sustainability	Profit	the economic profitability of companies
Social sustainability	People	the social consequences of companies' actions
Environmental sustainability	Planet	the ecological consequences of companies' actions

Source: Adapted from Elkington, 1998:16; United Nations, 1998

3Ps of the Triple Bottom Line and match with the sustainability dimensions was shown in the Table 4. In this context, the "Profit" refers to evaluating a company's long-term financial success, its efficiency in resource use, and its ability to create value. "People" focuses on the company's social contribution and its overall impact on communities and society. Lastly, "Planet" concerns the preservation of natural resources and efforts to reduce environmental harm, such as lowering carbon emissions (Elkington,1994: 99; Elkington,1998: 16).

1.2.4.2. Weak And Strong Sustainability

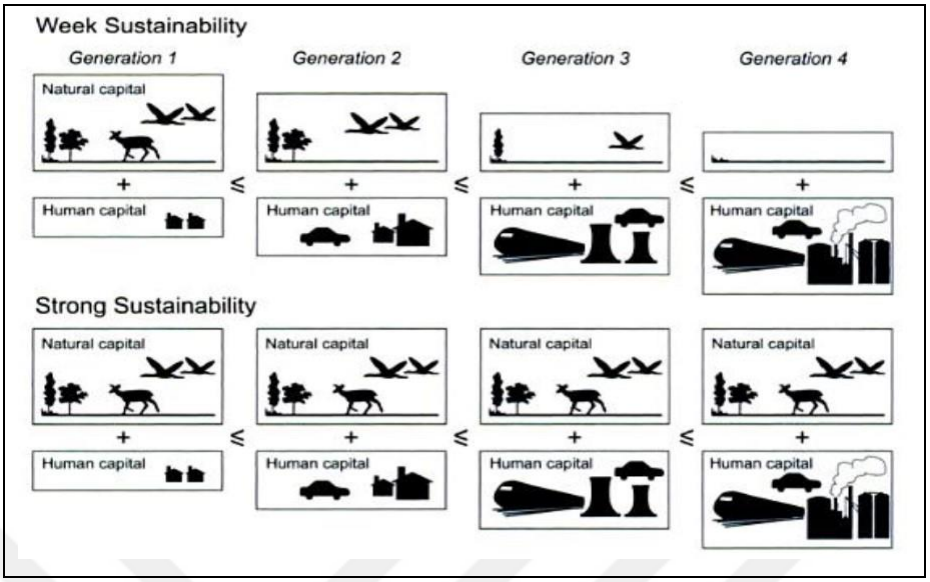
Weak and strong sustainability approach was introduced by Neumayer in his 1999 book "Weak versus Strong Sustainability Exploring the Limits of Two Opposing Paradigms".Weak sustainability is based on the assumption that natural

capital can be substituted with human-made capital. It assumes that savings are invested in physical or human capital, and that these forms of capital can fully replace natural resources. From this perspective, the depletion of natural resources is not considered a major problem, as the continued production of physical or financial assets is prioritized (Neumayer,2003). In weak sustainability, environmental degradation is assumed to be compensable through economic instruments. This approach places greater importance on economic growth than on environmental sustainability. Natural resources are reduced to their market value and treated merely as economic assets. As a result, even countries that have depleted their natural capital and caused severe damage to ecosystems may still be viewed as sustainable under this paradigmn (Ayres et al.,2008:158).

Strong sustainability argues that certain types of natural capital cannot be substituted and must therefore be preserved absolutely.Different forms of capital should be managed independently, each within its own physical and biological reality (Davies,2013: 115-116). In this view, the services provided by ecosystems, biodiversity, and the natural environment cannot be measured solely in economic terms.The absence or loss of these elements can lead to irreversible environmental and social damage.Natural resources are indispensable for human well-being and cannot be replaced by physical or human capital. Furthermore, strong sustainability calls for respect for the integrity of nature and the recognition of the environment's intrinsic rights (Ayres et al.,2008:169).

Figure 8 presents the paradigm of weak and strong sustainability through the intergenerational capital transfer. This process aims to ensure that the total amount of capital transmitted to future generations remains stable or increases over time.In both approaches, capital, whether in the form of natural or human resources, is transferred across generations (Barr, 2008:44).

Figure 8: Weak and Strong Approaches to Sustainability



Source: Barr, 2008: 44

The main difference between weak and strong sustainability lies in the type of capital being preserved. Strong sustainability requires the maintenance of the same level of natural capital for future generations, based on the assumption that human capital will grow over time.Weak sustainability, on the other hand, proposes that a reduction in natural capital may be acceptable as long as it is compensated by a corresponding increase in human capital (Dasgupta, 2007:9–10).

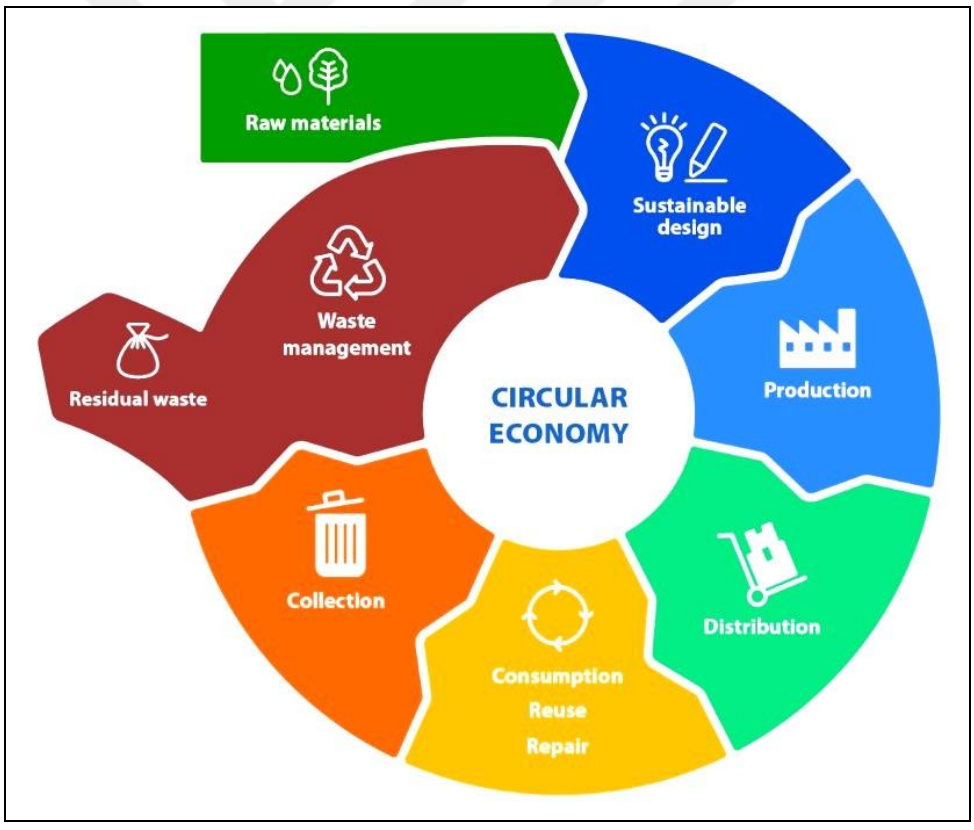
1.2.4.3. Circular Economy

The Circular Economy is an economic model grounded in sustainability that seeks to use resources efficiently and minimize waste by closing material cycles. This system focuses on reducing resource input, waste, emissions, and energy loss by slowing down, closing, and narrowing material and energy flows. Key practices within this model include designing for durability, conducting regular maintenance, performing repairs, encouraging reuse, enabling remanufacturing, supporting refurbishment, and promoting recycling. (Geissdoerfer et al.,2017: 759). Instead of the traditional linear economy model based on the sequence of take, make, consume, and dispose, the circular model emphasizes extending product lifecycles and

promotes practices such as reuse, repair, recycling, and remanufacturing (Yuan & Moriguichi,2006: 6).

The Circular Economy is directly related to the environmental, economic, and social dimensions of sustainability. By replacing the traditional "take–make–waste" approach with practices such as reduction, reuse, recycling, and recovery in production, distribution, and consumption processes, it helps slow down the depletion of natural resources and reduces pressure on ecosystems.The Circular Economy operates at different levels, including the micro level (products, companies, consumers), the meso level (eco-industrial parks), and the macro level (cities, regions, countries, and beyond) (Kirchherr et al., 2017: 229–230).

Figure 9: Circular Economy Model



Source:European Parliment, 2023

As illustrated in Figure 9, in order to minimize waste, the materials contained in a product at the end of its life cycle are reintegrated into the usage loop through recycling and sustainable design practices (European Parliment, 2023).

However, a complete transformation of the economy from a linear to a circular model requires the development of more refined and comprehensive business models and design strategies.Facilitating this transition calls for a diverse set of business models, strategic approaches, and practical tools that are specifically tailored to support the circular economy (Bocken et al.,2016: 317).

For a sustainable future, humanity needs to develop a systems-based way of thinking that gives equal importance to society, the environment, and the economy. In this economic model, planning, resource use, supply chains, production, and reprocessing activities must be managed in ways that maximize both ecosystem functionality and human well-being, in terms of both process and outcome. Society, the individuals who form it, their actions, and their environment are all part of the same cycle. In a circular economy, ethical and environmental responsibility is distributed across both producers and consumers. Nobody could remain ethically neutral (Murray et al.,2017: 377).

1.3.SUSTAINABILITY REPORTING

Under the heading of sustainability reporting, the historical development and definition of sustainability reporting will be discussed, along with an overview of existing reporting standards and an explanation of the key dimensions of sustainability reporting.

1.3.1. Evolution And Current Situation Of The Sustainability Reporting

A sustainability report is a document published by companies to disclose the environmental, social, and governance (ESG) impacts of their activities.It explains to readers how a company affects the environment and society, going beyond financial performance to include environmental and social outcomes as well.Such reports also

serve as a communication tool to help reassure stakeholders who may have doubts about the company's actions and commitments (Pricewaters Coopers,2023).

The origins of sustainability reporting can be traced to the 1987 Brundtland Report, titled "Our Common Future," prepared by the World Commission on Environment and Development (WCED). The report not only defined the concept of sustainability but also proposed a sustainable development framework that equally prioritizes environmental, social, and economic dimensions (United Nations, 1987).

General-purpose financial reports are designed to inform investors about a company's financial condition.They include quantitative and financial data and provide insights into how suitable the company is for investment from a financial standpoint.On the other hand, sustainability reports are often prepared voluntarily. Rather than addressing only financial investors, they are directed toward a broader stakeholder group and present information on the economic, social, and environmental impacts of the company's operations, as well as its efforts toward achieving sustainable development. (Beske et al.,2020:162-163)

The primary purpose of sustainability reporting is to provide information on an organization's most significant impacts on the economy, the environment, and people, including its effects on human rights.The information provided through sustainability reports enables users to accurately assess the organization's contribution to sustainable development (GRI, 2021:13).

Sustainability reporting was initially perceived as a form of social accounting. It involved the preparation and publication of reports concerning a company's interactions and activities with society, the environment, employees, communities, customers, and other stakeholders, as well as the outcomes of these activities. Although these reports sometimes included financial data, they mostly consisted of descriptive and non-quantitative information. During this period, companies prepared such reports voluntarily, with the aim of demonstrating accountability to their stakeholders (Gray, 2000: 250).

With the establishment of the Global Reporting Initiative in 1997, sustainability reporting began to take on a more conceptual structure. This marked the beginning of a search for standardization in sustainability reporting.Multi-stakeholder processes, which allowed stakeholders to express their concerns

regarding sustainability performance, contributed to the preparation of reports in a more systematic and organized manner (Brown et al., 2009:573). In the following years, various regulatory initiatives were introduced concerning sustainability reporting. Especially within the European Union, there has been a shift from voluntary disclosure toward making sustainability reporting a legal obligation (KPMG,2015:5).

There is a growing demand for businesses to contribute to sustainable development. Innovative and sustainable business models adopted by companies offer several advantages, including long-term planning, customer loyalty, and cost savings (Ahmad et al. , 2024:2967). For businesses to succeed while contributing to sustainable development, they must understand and manage their positive and negative impacts in a manner that is transparent, reliable, and objective.This is precisely where sustainability reporting plays a vital role. To fulfill this vital role, sustainability reports must possess the following essential characteristics (GRI,2020:1):

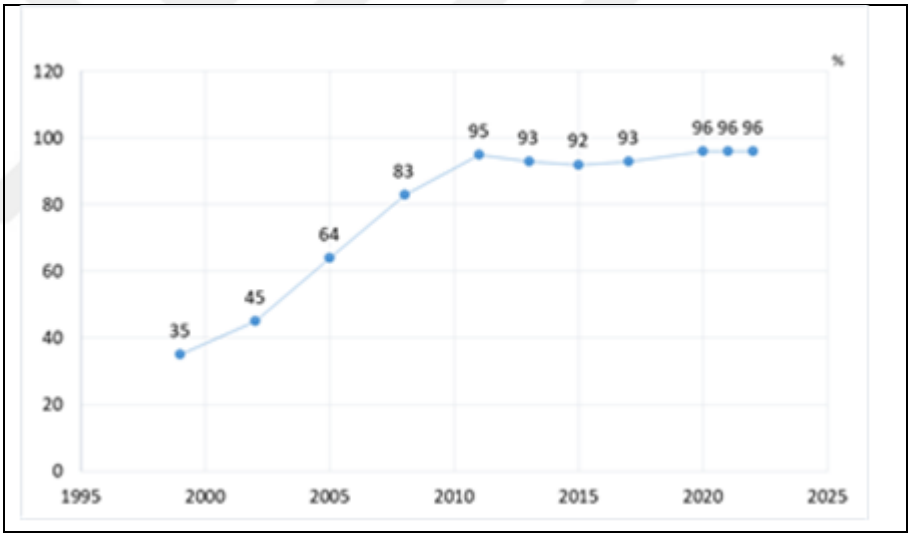
- Helps make complex and abstract topics easier to understand
- Guides companies in developing strategies and actions related to sustainability;
- Assists in setting goals, tracking progress, and managing change more effectively;
- Encourages responsibility, helps identify risks, and creates space for new opportunities;
- Improves how companies are governed, strengthens stakeholder relationships, and builds trust;
- Supports better conversations and decision-making among customers, employees, investors, local communities, suppliers, and others;
- Makes it easier to compare sustainability data between different organizations;

Sustainability reporting is used as a corporate communication tool by companies and other organizations to demonstrate their commitment and contribution to the principles of sustainable development, to disclose the environmental and social impacts of their activities, and to show that sustainability

elements are increasingly integrated into their strategic planning (Dilling, 2010:19; Siew,2015:180).

Sustainability reporting continues as a dynamic and evolving process. It is increasingly observed that businesses are integrating financial and non-financial information more closely. At the global level, the rate of sustainability reporting among companies is rising, and it is becoming a regular practice to publish such reports annually. Within these reports, climate change and climate-related issues are considered among the most important components of sustainability reporting (Ngu & Amran, 2018:1).

Figure 10: Sustainability Reporting Rates of the World's 250 Largest Companies by Revenue based on Fortune Rankings

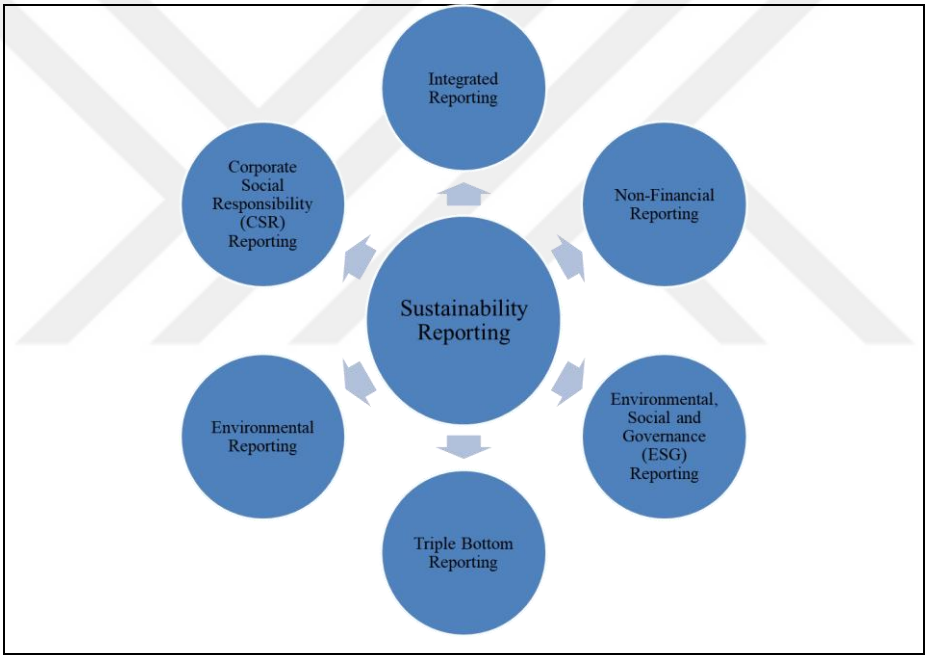


Source: Adapted from KPMG, 2022:13

One of the clearest indicators of the growing interest in sustainability among companies is illustrated in Figure 10. This figure presents the sustainability reporting rates of the world's 250 largest companies by revenue, based on the 2021 Fortune 500 ranking. The proportion of companies publishing sustainability reports grew substantially over time, climbing from 35% in 1999 to 96% in 2022 (KPMG, 2022: 13).

The increase in the number of companies publishing sustainability reports has given rise to a range of emerging challenges. Among these, a key difficulty lies in determining which sustainability issues carry greater or lesser significance across different industries, as well as ensuring the reliability and credibility of the information disclosed in such reports (Eccles et al., 2012; Beske et al., 2020: 163; Jørgensen et al., 2022: 342). This challenge is equally applicable to container shipping companies operating within the maritime sector (European Commission, 2019). This issues are going to be analyzed in the following chapters in detail.

Figure 11: Multiple Concepts used for Sustainability Reporting



Source: Adapted from Paridhi & Arora,2023: 376

Moreover, the lack of a common understanding, problems related to measuring sustainability, and country-level differences are key issues that make it difficult for all companies and organizations to adopt and apply sustainability reporting effectively and uniformly (Paridhi&Arora,20230: 373). Figure 11 shows the different concepts used in sustainability reporting. Sustainability reporting refers to the disclosure of non-financial information by an organization to external parties, either voluntarily or as a mandatory requirement (Erkens et al., 2015:17-18).

Environmental, social, and governance (ESG) reporting refers to the disclosure of environmental, social, and corporate governance data in order to enhance a company's transparency and accountability toward society and investors (Tocchini&Cafagna,2022).

In general terms, corporate social responsibility (CSR) refers to a company's ethical behavior not only toward its shareholders but also toward society as a whole. CSR is regarded as a commitment made by businesses to all their stakeholders to act ethically, contribute to the economy, and continuously work to improve the overall quality of life within society (World Business Council on Sustainable Development, 2000: 3).

Environmental reporting is a key communication tool through which businesses share the extent of their environmental sensitivity and responsibilities with the public and their stakeholders.These reports are typically presented either as standalone documents or as part of annual reports.They include information on various environmental issues such as the use or degradation of natural resources, initiatives for ecosystem restoration, and data on emissions related to air, water, or soil pollution (Selven et al., 2022:138; Paridi&Arora,2023:376).

Integrated reporting refers to an approach that reflects an organization's activities within a commercial, social, and environmental context, while also presenting its strategy, governance, performance, and future outlook. Through this type of report, users gain insight into the organization's responsibilities, its value creation process, and how that value is sustained over time (International Integrated Reporting Council, 2011: 2; IIRC,2013: 7).

Non-financial reporting serves two main institutional objectives: enhancing the comparability of disclosed information and strengthening corporate accountability.This approach is widely recognized as desirable, appropriate, and legitimate in the eyes of society (La Torre,2018: 598).

Triple Bottom Line Reporting emphasizes the environmental and social impacts of companies beyond the pursuit of profit. Within this approach, reports are typically structured around three dimensions: planet, people, and profit (Miller,2020).

1.3.2.Standards Of The Sustainability Reporting

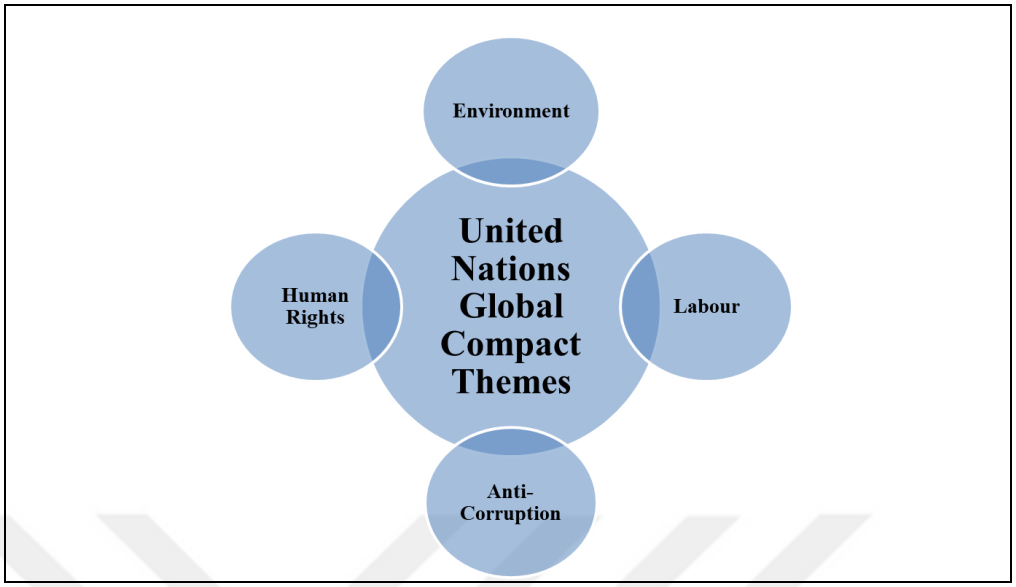
There are numerous sustainability reporting standards, published at different times, that outline how sustainability reporting should be conducted.These standards will be discussed by classifying them into three periods: those introduced before and around the year 2000, those published in the 2010s, and those released in the 2020s.

1.3.2.1. Sustainability Reporting Standards İntroduced Before 2000 And During The 2000s

Established in 1997, the Global Reporting Initiative (GRI) was created to support companies and other organizations in reporting their economic, environmental, and social sustainability performance (GRI, 2024a). GRI published its first reporting standards in 2000 and has since developed both general and sector-specific standards. The most recent version of the GRI Standards was released in 2021, and it is now widely recognized as a global framework for sustainability reporting (GRI, 2024b).

The AA1000 Accountability Standards, published in 1999, aim not only to measure and report corporate sustainability performance but also to ensure that organizations uphold their responsibilities to stakeholders and maintain effective accountability. By providing a systematic framework, these standards emphasize transparency and credibility (AccountAbility, 2024).

Figure 12: United Nations Global Compact Themes



Source: Adapted from United Nations Global Compact,2024

The United Nations Global Compact was launched in 2000 by the United Nations with the aim of promoting corporate sustainability (UNGC,2024). Figure 12 illustrates the core themes on which the principles are based. Ten principles of the UNGC are as follows (UNGC,2024):

> *Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and*
> *Principle 2: make sure that they are not complicit in human rights abuses*
> *Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;*
> *Principle 4: the elimination of all forms of forced and compulsory labour;*
> *Principle 5: the effective abolition of child labour; and*
> *Principle 6: the elimination of discrimination in respect of employment and occupation.*
> *Principle 7: Businesses should support a precautionary approach to environmental challenges;*
> *Principle 8: undertake initiatives to promote greater environmental responsibility; and*
> *Principle 9: encourage the development and diffusion of environmentally friendly technologies.*
> *Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.*

In light of the information presented above, the period leading up to the 2000s is regarded as the phase during which the first standardization efforts in sustainability

reporting emerged, accompanied by the rise of global initiatives aimed at promoting such reporting practices.

1.3.2.2. Sustainability Reporting Standards İntroduced During The 2010s

The International Integrated Reporting Council (IIRC) was established in 2011 and, in 2013, published the International Integrated Reporting Framework, which aims to combine sustainability and financial information into a single report (International Financial Reporting Standards, 2024). International Integrated Reporting Framework's primary goal is to provide more efficient and higher-quality information to those who supply financial capital to the company. This reporting framework seeks to enhance corporate accountability across a broad range of capital types, including financial, manufactured, intellectual, human, social and relationship, and natural capital (International Financial Reporting Standards, 2024).

The Sustainability Accounting Standards Board (SASB) was established in 2011 and began publishing sustainability reporting standards in 2013. It developed industry-specific standards covering 77 different sectors, emphasizing that sustainability priorities may vary depending on the specific context of each industry. As of August 2022, the responsibility for the SASB Standards was transferred to the International Sustainability Standards Board (ISSB) under the IFRS Foundation (Sustainability Accounting Standards Board, 2024).

In 2015, the United Nations published the Sustainable Development Goals (SDGs), which were adopted by all member states. With 17 main goals and 169 targets to be achieved by 2030, the SDGs have become a significant reference point for sustainable development and performance measurement. Organizations now indicate in their sustainability reports which of their activities align with specific SDGs (United Nations, 2015).

The Task Force on Climate-related Financial Disclosures (TCFD), established by the Financial Stability Board (FSB) in 2015, published its recommendations in 2017, primarily focusing on climate-related and broader sustainability issues.These recommendations have had a significant impact on

organizations and companies.They are structured around four core pillars: governance, strategy, risk management, and metrics and targets (TCFD, 2018).

In 2015, the Paris Climate Agreement was adopted during the United Nations Climate Change Conference, marking a turning point in global efforts to combat climate change by aiming to limit the increase in global average temperatures to well below 2°C above pre-industrial levels (United Nations Climate Change, 2020). The purpose of this agreement is to periodically assess the progress made by organizations toward achieving their long-term climate goals, to evaluate their performance in reducing climate-related risks and negative impacts, and to provide financial support to developing countries in order to enhance their capacity to adapt to climate impacts (United Nations, 2022).

The European Green Deal, announced by the European Commission in 2019, aims to make Europe carbon-neutral by 2050. As part of this strategic plan, the European Union has set key objectives such as reducing greenhouse gas emissions, supporting sustainable agricultural and industrial policies, and promoting initiatives like the circular economy. To reduce at least 55% of net greenhouse gas emissions compared to 1990 levels, the EU has introduced a series of measures for climate, energy, transport, and taxation policies. These developments have also imposed additional obligations on both local and international companies regarding their sustainability performance and the reporting of such activities (European Commission, 2021).

An analysis of the standards introduced during the 2010s reveals an increasing emphasis on defining reporting requirements based on sector-specific needs, integrating financial and sustainability-related information, and incorporating standards for disclosing climate-related financial risks into the broader sustainability reporting framework.

1.3.2.3. Sustainability Reporting Standards İntroduced After The Year 2020

The Corporate Sustainability Reporting Directive (CSRD), published by the European Union in 2021 and entering into force on January 5, 2023, extends the

sustainability reporting obligation to a broader range of companies. The primary aims of the directive are to enhance the transparency and auditability of sustainability performance and to promote greater alignment with international sustainability standards (European Commission, 2023a).

Although the CSRD expands the scope of reporting obligations, the framework and requirements it establishes remain relatively broad. To address this, the European Commission adopted and published the European Sustainability Reporting Standards (ESRS) in 2023. These standards offer more detailed guidance on key environmental, social, and governance (ESG) topics, including climate change, biodiversity, and human rights (European Commission, 2023b).

The International Sustainability Standards Board (ISSB) was officially established on November 3, 2021, by the Trustees of the IFRS Foundation, consolidating the efforts of the IIRC, SASB, and TCFD.In 2023, the ISSB released two foundational standards: IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures (IFRS, 2022). These standards are designed to provide users of general-purpose financial reports with clear and decision-useful information, particularly regarding sustainability and climate-related risks and opportunities, thereby supporting more informed resource allocation decisions (IFRS, 2023a: 6; IFRS, 2023b: 5).

The most recent sustainability reporting standards published by the Global Reporting Initiative (GRI) were released in 2021. These standards provide a comprehensive framework covering the structure of the report, general disclosures, and guidance on how to assess the materiality of sustainability topics. In addition, GRI has developed sector-specific standards and topic-specific disclosures that define reporting requirements based on different industries and sustainability-related issues (GRI,2024b).

The sustainability standards introduced after 2020 are intended to guide companies in achieving international alignment, ensuring transparency in the disclosure of sustainability performance and related information, and addressing the

potential risks and opportunities that climate change may pose to their financial position.

1.3.3. Principles on the Sustainability Reporting

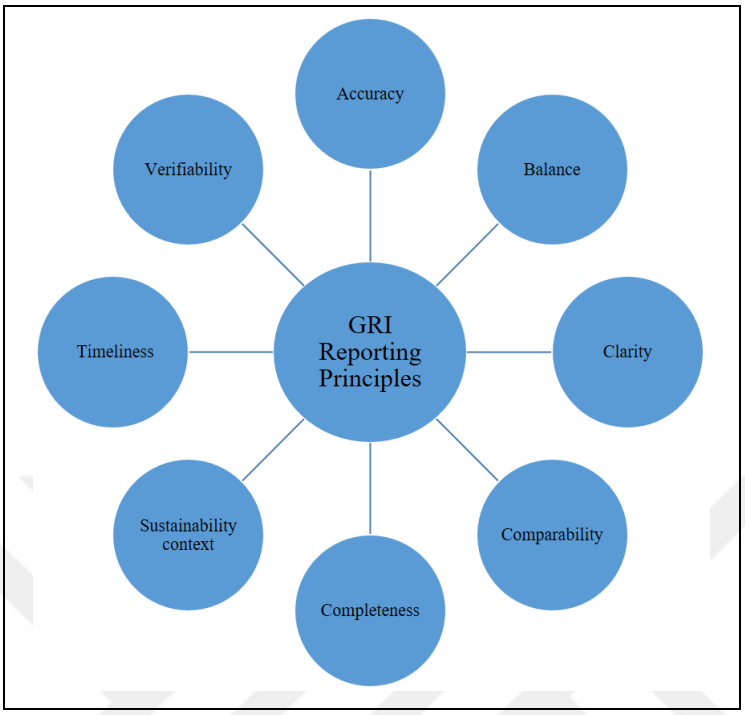
There are several key principles that must be taken into account when preparing sustainability reports. Among the most widely used and comprehensive frameworks for sustainability reporting are the standards developed by the Global Reporting Initiative (GRI) and the International Financial Reporting Standards (IFRS) Foundation (Rezaee & Tuo, 2019: 764; Bircan & Özcan, 2023: 25–26). The principles of sustainability reporting will be examined based on these standards.

1.3.3.1. Principles Of The Global Reporting Initiative

Some key principles must be met to ensure the production of a high-quality sustainability report. In order for an organization to claim that its report has been prepared in accordance with the GRI Standards, it must adhere to specific reporting principles. GRI reporting principles were presented in Figure 13. (GRI,2021:22).

Accuracy principle requires the organization to provide information that is correct and sufficiently detailed to enable an assessment of its impacts.The definition of accuracy depends on whether the information is qualitative or quantitative (GRI, 2021: 22). In the case of quantitative data, accuracy is influenced by the methods used to collect and analyze the data. For qualitative information, the level of detail and consistency with available evidence are key factors. To apply this principle effectively, the organization has to support qualitative statements with credible evidence, clearly indicate which data has been measured, explain how calculations were carried out, and explicitly disclose any margins of error and assumptions involved (GRI, 2021:22).

Figure 13: GRI Reporting Principles



Source: Adapted From GRI, 2021:22

Balance principle requires the organization to report information in an impartial manner, covering both positive and negative impacts.Accordingly, the organization should ensure transparency in all disclosures, make a clear distinction between actual events and organization's interpretation, avoid omitting information about negative impacts, and not exaggerate positive outcomes (GRI,2021:23).

According to the clarity principle, the organization has to present its information in a manner that is accessible and easy to understand for all users. To implement this principle effectively, the organization should consider the language, technological, and physical ability needs of report users. Additionally, the information provided should be clear and easy to understand; the content of the report should be concise yet sufficiently detailed, and supported with graphics and tables to enhance comprehension (GRI,2021:23).

According to the comparability principle, organizations are expected to select, compile, and report information related to both current and past periods in a consistent manner. If there are any changes from previous reports, such differences

and their justifications should be clearly explained, and updated data should be provided whenever possible. Moreover, organizations have to ensure consistency in the methods used for data measurement and impact assessment (GRI,2021:23).

In line with the completeness principle, organizations shall present a sufficient information about their activities during the reporting period. This includes not only short-term impacts but also those with potentially long-term, lasting consequences. To enable an accurate assessment of the organization's impact, no relevant information should be omitted from the report (GRI, 2021:24).

According to the sustainability context principle, the organization should report its impacts within the broader framework of sustainable development. In line with this principle, the organization is expected to explain how it contributes to sustainable development (GRI, 2021:25).

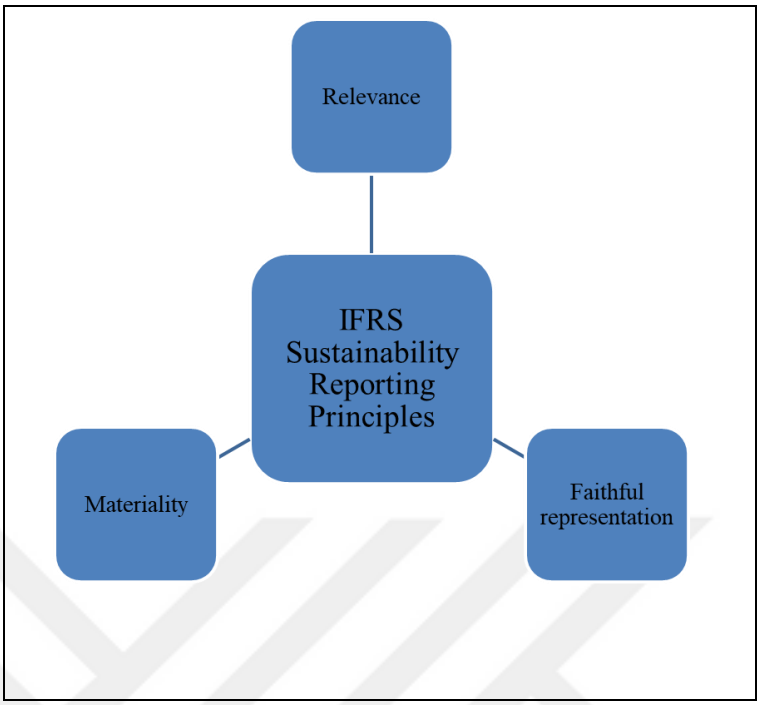
Within the scope of the timeliness principle, organizations shall disclose to information at regular intervals and in a timeframe that supports users in their decision-making processes. In accordance with this principle, organizations should ensure that high-quality information is provided consistently and that the time period covered by the reported data is clearly stated (GRI, 2021:25).

Under the verifiability principle, organizations are shall conduct their reporting processes in a transparent and traceable manner to allow for the verification of the reported information. In applying this principle, organizations should establish internal control mechanisms, develop information systems that can be examined as part of an independent assurance process, clearly identify the original sources of reported data, and document the decision-making processes behind their sustainability reporting (GRI, 2021:25).

1.3.3.2. Principles Of The International Financial Reporting Standards

For sustainability-related financial information to be useful, it has to be both relevant to the subject matter and accurately reflect what it is intended to represent. The information presented in this report reflects the fundamental qualitative characteristics of sustainability-related financial information(IFRS,2023a:7).

Figure 14: IFRS Fundamental Sustainability Reporting Principles



Source:Adapted from IFRS, 2023a:7

In this way, as presented in Figure 14. relevance, faithful presentation and materiality are regarded as fundamental principles of the IFRS sustainability standards. Comparability, verifiability, timeliness and understandability are regarded also are among the factors that increase the quality of sustainability reporting.According to the IFRS, the information has to be comparable, verifiable, timely, and understandable to ensure the usefulness of sustainability-related financial disclosures. These are considered the enhancing qualitative characteristics of sustainability-related financial information (IFRS,2023a:7).

The relevance implies that sustainability-related financial information has the potential to influence the decisions of primary users. According to this concept, if the information is used for future-oriented assessments, it has predictive value; if it is used to evaluate past performance, it has confirmatory value (IFRS, 2023a:7). For example, data on greenhouse gas emissions from previous years may be used to forecast future emissions. Conversely, the entity's current emissions performance can be compared with historical emissions to assess consistency or progress. In this

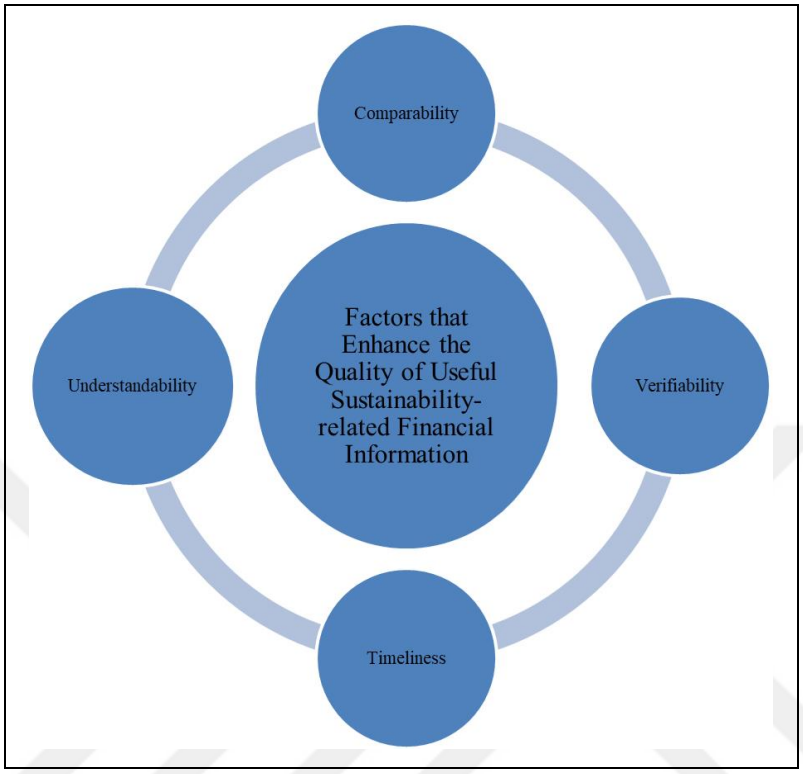
example, the same information holds both predictive and confirmatory value within the scope of relevance (IFRS,2023a:40).

According to the principle of materiality, an entity is expected to disclose significant information regarding sustainability-related risks and opportunities that could reasonably be expected to influence its future prospects. Information is considered material if its omission or misstatement could affect the decisions made by users of financial reports.In this context, materiality is an entity-specific concept that should be assessed in relation to the organization's own circumstances.The determination of materiality depends on both the nature of the issue and its potential impact (IFRS,2023a:40).

According to the faithful representation, all sustainability-related financial information disclosed by an entity has to be complete, neutral, and accurate.All sustainability-related risks and opportunities should be presented to users of the reports without distortion or bias.When providing information about future targets, the entity must also disclose the factors that could potentially hinder the achievement of these targets (IFRS,2023a:39). In line with the requirements of neutrality and prudence, risks and opportunities must be presented without exaggeration or understatement. The information disclosed in the report should be clearly articulated, any forecasts should be explicitly identified, and the underlying data should be sufficient in terms of quality and quantity (IFRS,2023a:40).

When making choices between alternatives, users of general purpose financial reports assess the similarities and differences among the available information. Comparability enables the evaluation of multiple items and enhances the usefulness of information when it can be compared either across previous reporting periods or with other entities operating in similar industries. Consistency supports comparability but represents a distinct concept (IFRS,2023a:40). Consistency refers to the application of the same methods across reporting periods and among different entities.Comparability is not uniformity. For information to be comparable, Like things shall look alike and different things shall look different. Artificially making dissimilar items appear alike, or similar items appear different, does not improve comparability (IFRS,2023a:41).

Figure 15: Factors that Enhance the Quality of Useful Sustainability-related Financial Information



Source: Adapted from IFRS, 2023a:40

As presented in Figure 15. There are factors which enhance the quality of the useful sustainability-related financial information. These are Comparability, verifiability, timeliness and understandability.

The verifiability factor ensures that users can trust the information as being complete, unbiased, and accurate.Verifiable information is characterized by the ability of knowledgeable and independent auditors to reach a general consensus that the information provides a true and fair representation of the actual circumstances. To enhance the verifiability of information, it is necessary to enable comparisons with other data, clearly disclose the inputs and methodologies used, and present information that has been approved by governance bodies. Sustainability-related financial information should also be supported by disclosures such as strategies, plans, and risk assessments to strengthen its reliability (IFRS,2023a: 41).

Timeliness refers to decision makers having access to information when they need it. Information often loses its value as it ages, but some information may remain relevant to users long after the reporting period (IFRS,2023a: 41).

The concept of understandability requires that sustainability-related financial information be presented as clearly and concisely as possible. The information should be structured to avoid generic, non-entity-specific statements and unnecessary duplication of the information (IFRS,2023a: 41) .Information that has changed during the reporting period should be distinguished from information that has remained constant. Risks and opportunities should be explained in a clear manner, and no material information should be omitted for the sake of simplification. Moreover, the information should form a coherent whole, enabling users to enabling users to establish links between sustainability-related risks and opportunities and the financial statements (IFRS,2023a: 42).

1.3.3.3. Materiality Concept in Sustainability Reporting

The concept of materiality initially emerged in financial reporting, developed to identify and highlight information significant enough to influence investors' economic decisions. It serves as a filter for determining which information needs to be disclosed, aiming to ensure that financial information remains both relevant and reliable (Edgley, 2014:258-259; Farooq et al., 2021:969). Over time, the principle of materiality has become a fundamental element not only in the presentation of information but also in the preparation of financial statements and in independent audit processes (Messier et al., 2005:155; Fasan &Mio, 2017:289-290).

In recent years, the concept of materiality has expanded beyond financial reporting and has found wide application in the field of sustainability reporting (Calabrese et al., 2015:440). This principle, used to identify which environmental, social, and governance (ESG) disclosures are truly critical for information users, has not only maintained its position as a key factor in decision-making processes but has also begun to play a central role in enhancing corporate transparency and accountability (Jones et al., 2016:224).

Today, with the growing emphasis on the measurement and reporting of sustainability performance, the concept of materiality is recognized as one of the most critical features. In order for report users to transparently understand the impacts of environmental, social, and governance (ESG) activities, it is essential to identify which sustainability issues are considered more significant (Jørgensen et al., 2022:341). According to the principle of materiality, companies are expected to define, prioritize, and provide greater disclosure on matters they deem material. However, a key challenge surrounding materiality is the existence of multiple parallel standards being applied in practice (Jørgensen et al., 2022:342).

There are various standards developed for sustainability reporting, and these standards offer different approaches for companies to determine the materiality of the topics they should include in their reports. Accordingly, there are practical differences in how the significance of sustainability issues is assessed. For instance, according to the GRI 3: Material Topics 2021 standard published by the Global Reporting Initiative (GRI, 2021: 107):

> *The organization shall describe the process it has followed to determine its material topics, including: how it has identified actual and potential, negative and positive impacts on theeconomy, environment, and people, including impacts on their human rights,across its activities and business relationships and how it has prioritized the impacts for reporting based on their significance. The organization shall specify the stakeholders and experts whose views have informed the process of determining its material topics*.

As explained above, under the GRI Standards, the assessment of materiality is based on considering both actual and potential positive and negative impacts on the economy, the environment, people, and human rights.

On the other hand, the materiality of a sustainability issue in the IFRS Sustainability Disclosure Standard is determined (IFRS,2023a:8):

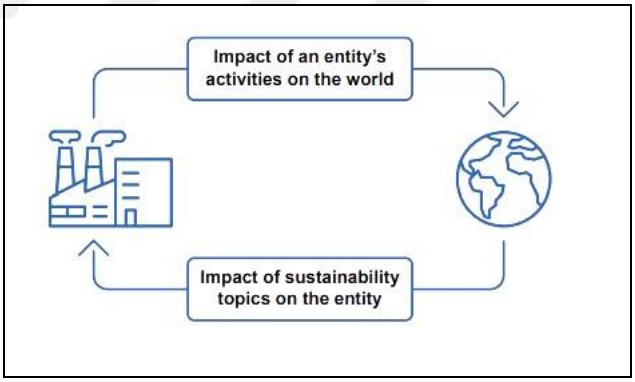
> *An entity shall disclose material information about the sustainability-related risks and opportunities that could reasonably be expected to affect the entity's prospects.In the context of sustainability-related financial disclosures, information is material if omitting, misstating or obscuring that information could reasonably be expected to influence decisions that primary users of general purpose financial reports make on the basis of those reports, which include financial statements and sustainability-related financial disclosures and which provide information about a specific reporting entity.*

In line with IFRS Accounting Standards, information is considered material if its omission, misstatement, or obscuration could reasonably be expected to influence

the decisions made by users of general-purpose financial reports.Within this framework, the materiality of an event or matter is assessed based on its potential impact on the entity's financial position, performance, or cash flows. Specifically, a sustainability-related risk or opportunity is deemed material if it is expected to affect the company's current or future financial position (Sekiguchi, 2024).

Articles 19a (1) and 29a(1) of Directive 2013/34/EU stipulate that companies must report both on their activities and on their impact in areas such as environmental protection, social and employee matters, human rights, and anti-corruption and bribery (European Union, 2013). This approach, which requires companies to disclose effects on both people and the environment, as well as sustainability-related financial disclosures that is known as the "double materiality" principle. Owing to frequent misunderstandings about this principle, it is crucial for companies to evaluate and disclose issues deemed material from both standpoints (European Union, 2022; GRI, 2023)

Figure 16: Double Materiality Principles



Source: GRI, 2023: 1

As presented in Figure 16. According to the concept of double materiality, companies are required to consider two distinct perspectives in their reporting practices. They have to disclose how their activities impact society and the environment, as well as how these impacts contribute to sustainable development. In addition, sustainability reporting must address the financial implications of sustainability issues through appropriate financial disclosures (GRI, 2023).

Material sustainability information, as described by (Adams et al.,2020:9; Jørgensen et al.,2022:344), refers to any information that has the potential to influence the assessments made by:

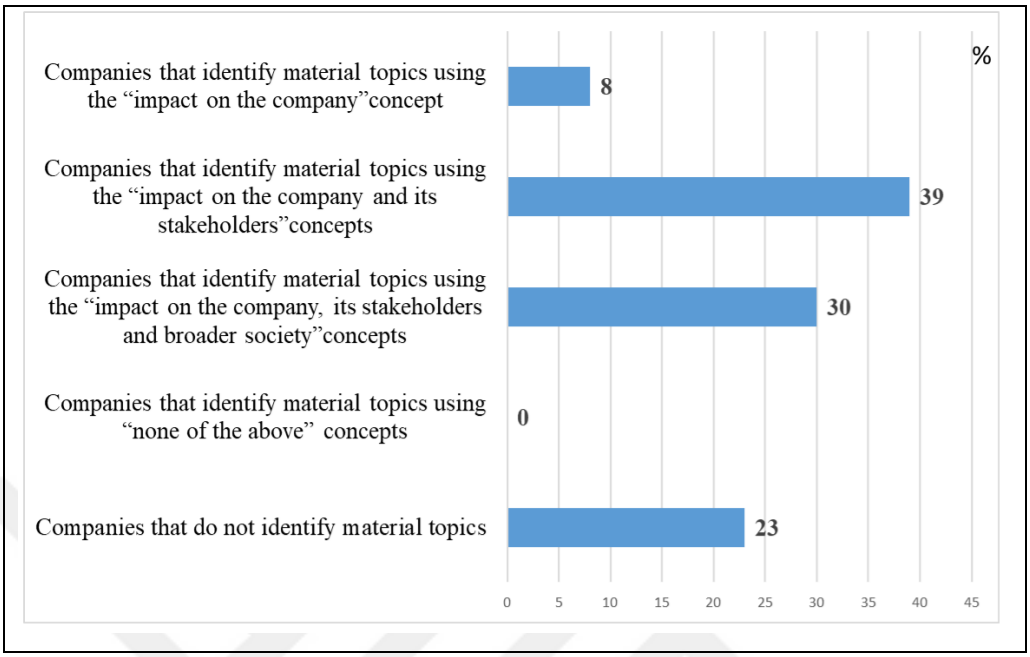
- Stakeholders regarding the organization's contributions, both positive and negative, to the global progress of achieving the Sustainable Development Goals (SDGs).
- Financing providers regarding the organization's capacity to generate lasting value for both the organization itself and society.

This definition highlights the significance of sustainability information from both financial and socio-environmental perspectives. In this context, the materiality concept requires that all matters reasonably likely to influence investors' decision-making processes be disclosed. Business leaders have increasingly recognized the critical role of materiality in determining which issues should be incorporated into sustainability reports and in ensuring that these reports remain clear and concise. It is important to note that, under the materiality principle, not all issues are considered significant (Ngu & Amran, 2018: 2). The identification of material information presents a considerably greater challenge in the context of non-financial reporting compared to financial reporting (Mio et al., 2020:308). This challenge can largely be explained by the unique characteristics specific to each company, the sectoral differences in social and environmental impacts, and the absence of a complete consensus on materiality matters.

The Global Reporting Initiative determines the materiality of a sustainability issue based on its impact on stakeholders. In contrast, the International Sustainability Standard Board determines the materiality of a sustainability issue by assessing its impact on the entity itself (Çıkıkcı et al., 2023:50).

In financial reporting, managerial discretion is constrained by mandatory reporting standards and materiality thresholds determined independently by auditors. However, in the case of non-financial reporting, materiality assessments are carried out by the company itself without standardized methodologies, highlighting a difference in the approach to determining materiality (Eccles& Krzus,2014:119).

Figure 17: Material Topic Disclosure by Materiality Concept



Source: Adapted from KPMG,2022:32

Figure 17 illustrates how the world's 250 largest companies by revenue, as identified by Fortune magazine in 2021, determine the materiality of sustainability issues. According to the findings, 8% of the companies assess the materiality of sustainability topics solely based on their impact on the company itself. 39% evaluate materiality based on the impact on both the company and its stakeholders, while 30% consider the impact on the company, its stakeholders, and the broader society. Apart from these approaches, no alternative methods for determining materiality have been identified. Lastly, 23% of the companies do not conduct any materiality assessment for sustainability topics. Based on Figure 17, it is evident that companies adopt different approaches in determining the significance of sustainability issues.

1.3.3.4. Reliability Concept İn Sustainability Reporting

In sustainability reporting, reliability refers to the assurance that the information presented is accurate and unbiased. Acting upon sustainability information that has not been properly assured carries significant risks (Junior et al., 2014:361). At this point, stakeholders continue to express concerns regarding the

reliability of the information presented in sustainability reports. Many of these activities are perceived as examples of greenwashing (Adams & Evans, 2004:101; Farooq & De Villiers, 2017:92; Farooq et al., 2023:49).

Due to the existence of multiple sustainability reporting standards, international consistency in practice has not yet been achieved. This situation can lead companies to engage in greenwashing, a tendency to highlight positive aspects of their environmental or social performance while concealing negative impacts. The primary objective of greenwashing is to present an excessively favorable image of the company to the public(Lyon & Maxwell,2011:7-8; Garst vd., 2022:66).

Reliability of the sustainability disclosure is secured only by the external assurance. Purpose of the external assurance is to increase realibility through independent assurors verify accuracy of sustainability information (Simnett et al., 2009:965; Manetti & Toccafondi, 2012:363).

In the context of sustainability reporting, the process of verfiying information, metrics, and activities related to environmental, social, and governance issues is known as an assurance engagement. In this process, an independent third party seeks to obtain sufficient and appropriate evidence to enhance the confidence of intended users regarding the subject matter (International Auditing and Assurance Standards Board, 2021:7). Effectiveness of the assurance depends on how assurance process was carried out to examine reliability of the disclosed information (O'Dwyer, 2011:1230; O'Dwyer et al., 2011:31).

The assurance of information included in sustainability reports is conducted to strengthen stakeholders' trust in the reliability of the information disclosed by organizations. At this stage, the information must be relevant to sustainability topics, maintain its validity, and be reliable in order to be properly assured. Following this process, the information asymmetry between organizations and stakeholders is minimized, and uncertainties are reduced (Dhaliwal et al.,2012:752; Casey and Grenier, 2015:122-123; Cuadrado-Ballesteros et al., 2017:1154-1155; Gillet-Monjarret, 2018:589-590; Ruiz-Barbadillo & Martínez-Ferrero,2022: 460).

The quality of assurance engagements on sustainability reports depends on key criteria aimed at enhancing the comparability of sustainability disclosures as outlined in the assurance statement, the reliability of the information provided, and

the social responsibility owed to stakeholders. At present, there is no international regulation that defines quality requirements for the assurance of sustainability reports (Ruiz-Barbadillo & Martínez-Ferrero,2022: 461).

Assuring the reliability of information presented in sustainability reports is an extremely complex process. Successfully completing this process requires assurance providers to possess diverse professional competencies and areas of expertise (Canning et al., 2019:6–7). Variations in the practice of sustainability reporting further complicate the assurance process. Sustainability reports encompass a wide range of topics, including social processes, human rights, anti-corruption practices, environmental issues, biodiversity impacts, ethical conduct, and greenhouse gas emissions. Assurance practitioners should have a thorough understanding of these subjects in order to effectively perform their engagements (Cohen & Simnett, 2014:70–71).

Additionally, the voluntary and unregulated nature of sustainability reports implies the absence of universally accepted reporting criteria. Each company determines the information it discloses based on its distinct sustainability policy, practices, and performance. Companies possess significant flexibility in selecting the methods, models, and valuation techniques for processing sustainability information (Park & Brorson, 2005). Consequently, the sustainability information framework adopted by firms varies, necessitating assurance providers to have adequate knowledge of the subject matter for effective assurance, highlighting the importance of company-specific insight. Efficient and high-quality assurance engagements demand profound, extensive knowledge about each individual company (Ruiz-Barbadillo & Martínez-Ferrero, 2022: 465).

It can be stated that sustainability reporting has reached a certain level of maturity. It has become a widespread practice globally, and an increasing number of regulations are being introduced on various issues (KPMG, 2020: 13). However, doubts persist regarding the reliability of the information disclosed in sustainability reports. These doubts largely stem from stakeholders' concerns about the reliability of the information provided (KPMG, 2022: 23).

The assurance of non-financial sustainability information is a relatively new process compared to the assurance of financial information. However, this process

has experienced rapid evolution and adaptation. It has created a need for studies aimed at understanding the dynamics of assurance for non-financial information (Farooq et al., 2023:29).

Sustainability assurance has become an increasingly prominent topic, with a growing number of studies being conducted in recent years. Nevertheless, research across different sectors remains limited, highlighting the need for further investigation into sustainability assurance practices (Hazaea et al., 2022:4859). Additionally, there is a need for sector-specific studies to identify which sustainability issues are considered material and the assurance status of within different industries (Eccles et al., 2012:71).

1.4.CONTAINER SHIPPING COMPANIES AND SUSTAINABILITY REPORTING

The maritime industry has long been conducted by comprehensive sustainability regulations, beginning with the establishment of the International Maritime Organization (IMO) in 1959, which primarily aimed to prevent and control environmental pollution arising from maritime activities (IMO, 2019). One of the earliest and most comprehensive examples of these efforts is the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL), recognized as one of the first holistic frameworks for preventing marine pollution. Also, starting from January 1, 2020, the International Maritime Organization (IMO) imposed new restrictions on the sulfur content of fuels used on ships, representing a major step toward cleaner air, better protection of human health, and greater environmental preservation (IMO,2020).

International trade contributes to approximately 20–30% of global CO_2 emissions when assessed from a carbon emissions standpoint (World Trade Organization, 2021; Peters et al., 2011; Meng et al., 2018; Zhang et al., 2020).

More than 90% of international trade by volume is carried by sea, making maritime transport a fundamental component of the global supply chain. In this regard, it can be stated that maritime shipping serves as a critical driver of globalization (Zhou & Yuen, 2024).

From 1980 to 2022, the carrying capacity of maritime container shipping increased from approximately 11 million tons to 293 million tons (Placek, 2023). Although maritime transport has historically been regarded as the most environmentally friendly mode of transportation, its contribution to greenhouse gas emissions and the release of hazardous pollutants cannot be overlooked.

The growing impact of these emissions on human health is also becoming an increasing source of concern (Nusa & Kodak, 2022). Therefore, assessing the sustainability performance of maritime companies and their related reporting is of critical importance for ensuring their long-term success and competitive advantage (Fan et al.,2025:174-175).

The maritime sector has emerged as a leading force in the global sustainability transition, with the container shipping industry playing a vital role in facilitating the transport of semi-finished and finished goods essential to daily life (Zhou et al.,2022). Accordingly, the container shipping industry is required to provide a precise and correct disclosure of its sustainability performance (Zhou et al.,2021: 465).

Maritime container shipping companies have two main options for disclosing their sustainability information. The first is the publication of sustainability reports on their official websites. The second is the dissemination of sustainability-related activities and performance through social media platforms. These approaches enable stakeholders to access information regarding the companies' sustainability efforts (Zhou et al.,2022).

Container shipping is primarily a business to business market and key element of the international trade (Lee and Song, 2017:442; Ng, 2015:79; Zhou et al.,2021:465). Container shipping firms are expected to shift their focus towards a broader range of stakeholders. Rather than concentrating on short-term economic returns to satisfy shareholders, they should work towards achieving long-term sustainability goals that address the expectations of stakeholders, including customers, suppliers, employees, regulatory authorities, shareholders, and the wider society (Yang, 2018: 246).

Considering the significance of maritime in global trade and sustainability. Moreover, as Arctic routes open up new alternatives for maritime container transport,

the container shipping industry is likely to assume a far more prominent role in sustainability (Statista,2023). This research focuses on examining the material topics and assurance levels presented in the sustainability reports of container shipping firms. By conducting a content analysis grounded in academic literature and global reporting standards, a comprehensive scoring framework was created to capture these dimensions. Using the resulting scores, the study evaluates both the overall quality of sustainability reporting and the companies' performance in sustainability practices.

Accordingly, the research question can be formulated as follows: What material sustainability issues are prioritized in the sustainability reports of container shipping companies, to what extent is the reported material information independently assured, and how does this reflect the quality of the sustainability reports on the basis of materiality and assurance?

CHAPTER TWO
LITERATURE REVIEW ON SUSTAINABILITY REPORTING

2.1. STUDIES ON ASSURANCE DIMENSION OF SUSTAINABILITY REPORTING

In the the Web of Science, Scopus, and Google Scholar databases concepts of 'Sustainability Reporting', 'Materiality', 'Assurance', and 'Container Shipping' and 'Content Analysis in Sustainability Report' were individually and collectively researched. The literature review included academic studies indexed in the Social Science Citation Index. According to the search results, it was determined that, as far as detected, no publications have been made on the topics of assurance in sustainability reports within the container shipping industry. The reviews covered explanations under the headings of research questions, data, method, main findings, and finally, future directions.

The assurance of sustainability or other non-financial information is intended to strengthen stakeholders' trust in the disclosures made by companies. This is accomplished by verifying that the information provided is relevant, complete, accurate, and reliable. As a result, it helps reduce uncertainty and closes the information gap among firms and their stakeholders (Dhaliwal et al., 2012: 752; Casey and Grenier, 2015: 122–123; Cuadrado-Ballesteros et al., 2017: 1154–1155; Gillet-Monjarret, 2018: 589–590; Ruiz-Barbadillo & Martínez-Ferrero, 2022: 460).

Quality of sustainability assurance is formed by the fundamental elements presented within the assurance statement. These elements improve the consistency, reliability, and responsiveness to stakeholders in sustainability reporting. However, despite its growing relevance, sustainability reporting assurance continues to be largely unregulated, without universally accepted standards for quality (Ruiz-Barbadillo & Martínez-Ferrero, 2022: 461).

Ensuring reliability of the sustainability information requires a highly intricate process, and those offering assurance should have distinct abilities and knowledge (Canning et al., 2019:6-7).The complexity of assurance process arises from the diverse nature of sustainability reporting. Sustainability information covers a broad range of topics covering areas like social dynamics, human rights protection,

anti-corruption efforts, environmental challenges, biodiversity influence, ethical standards, and the impact of greenhouse gases. Assurance providers need to grasp and navigate this varied landscape (Cohen &Simnet, 2014:70-71).

There are studies that investigate the underlying purposes for assuring sustainability information. Simnett et al. (2009) examined sustainability reports of 2,113 firms from 31 countries covering the period between 2002 and 2004. Their findings indicate that the external review of sustainability reports is primarily undertaken to enhance corporate reputation and increase the reliability of the disclosed information. However, whether the external assurance is provided by a member of the auditing profession does not create a significant difference in the perceived reliability of the reports (Simnett et al., 2009: 937). In line with this, Cuadrado-Ballesteros et al. (2017). emphasize the importance of external assurance in lowering information asymmetry, noting that reports provided with a higher level of external assurance are considered more valuable from the perspective of investors (Cuadrado-Ballesteros et al., 2017: 1144). Assurance may also be used for a different purpose. For example, Herda et al. (2014) show that in countries where investor protection is perceived as weak, corporate managers are subject to greater external pressure to obtain assurance. In contrast, in environments where investor protection is strong, this pressure tends to decrease (Herda et al., 2014: 209).

There are also studies that analyze the quality regarding assurance practices and the scope of sustainability reports. Several studies in the literature have investigated the quality of sustainability assurance. Zaman et al. (2021), examining companies in Australia and New Zealand, report that the involvement of independent audit entities improves assurance quality. They also observe that firms frequently prefer to engage their financial auditors for assurance related to sustainability matters (Zaman et al., 2021: 2887).

Boiral et al. (2020a), through their examination of 337 sustainability reports from the mining and energy industries, present a critical perspective by arguing that many assurance statements fail to provide high-quality assurance, as they lack materiality, substance, and credibility. The authors suggest that, in many cases, the assurance process functions more as a symbolic exercise rather than delivering substantive verification (Boiral et al., 2020a: 1).

Donkor et al. (2021) explore the effect of assurance on the quality of sustainability reporting. Their findings reveal a significant link between assurance practices and sustainability disclosures, suggesting that assurance enhances the credibility of sustainability reports (Donkor et al., 2021: 475).

Farooq et al. (2023). reviewed previous studies on the factors that determine the quality of sustainability information assurance. Based on this review, the assurance of sustainability reports is categorized into five essential elements: a tripartite framework, subject relevance, an appropriate criterion, adequate supporting evidence, and a documented assurance statement (Farooq et al., 2023: 1).

At this point, Rezaee et al. (2023) examined the quality of sustainability reports and assurance within the context of the Sustainable Development Goals (SDGs). Their findings suggest that firms with a stronger commitment to the SDGs are more successful in both publishing sustainability reports and assuring the information disclosed within them (Rezaee et al., 2023: 989).

Several studies examine the selection of assurance providers for sustainability information, focusing on who is chosen or who ought to be chosen to carry out the assurance process.

Research by Martínez-Ferrero and García-Sánchez (2017) identifies a clear positive association between the quality of sustainability assurance and the choice of assurance providers from the auditing profession. They further emphasize that the independence of the board of directors and the level of the sustainability committee's involvement strengthen the effectiveness of the assurance process (Martínez-Ferrero & García-Sánchez, 2017: 665–666).

In a subsequent study, Martínez-Ferrero et al. (2018) found that the quality of sustainability assurance is higher when the assurance is conducted by professional auditors with relevant expertise, compared to individuals without such specialization. The study also highlights that stronger assurance quality tends to coincide with greater practitioner experience in assurance work, especially where there is a long-term relationship between the assurer and the client (Martínez-Ferrero et al., 2018: 1181).

Simnett (2012) also explored the application of the ISAE 3000 framework in sustainability assurance influences the assurance process. The findings indicate that

distinctions such as reasonable and limited assurance create ambiguity about both the procedures to be followed during the assurance process and how the assurer should be selected (Simnett, 2012: 89).

In relation to this topic, Farooq and De Villiers (2019). state that assurors with an accounting background tend to prefer the ISAE 3000 standard, while non-accounting assurors tend to adopt alternative assurance frameworks such as the AA1000 Assurance Standard (AA1000AS). They argue that this preference directly affects the methodological choices and the audit depth when comparing accounting-based assurance providers (ASAPs) with non-accounting sustainability assurance providers (NASAPs) (Farooq & De Villiers, 2019: 307).

Channuntapipat et al. (2019) find that assurance providers have varying perceptions regarding the implementation of sustainability assurance. These variations among providers significantly influence the way the assurance process is carried out (Channuntapipat et al., 2019: 556).

Several studies in the domain of sustainability assurance highlight participatory approaches and the importance of stakeholder involvement in the assurance process. At this point, Manetti and Toccafondi (2012) explored whether stakeholder engagement is integrated into the assurance activities of sustainability reporting. Although there has been some progress toward including stakeholders, the study finds that stakeholder participation is generally overlooked, with most assurance statements being addressed primarily to management and the board of directors (Manetti & Toccafondi, 2012: 374).

Bepari and Mollik (2016) examined the extent to which assurance statements demonstrate organizational transparency and accountability to stakeholders. Their findings emphasize that these reports are usually directed toward management and boards of directors, while stakeholders are largely excluded from the assurance process (Bepari & Mollik, 2016: 655).

Significant cross-national variations can be identified how sustainability assurance is practiced internationally. For example, Jones et al. (2016) report that all property companies in Europe either publish sustainability reports or disclose information related to their sustainability activities. Additionally, the study finds that half of these companies have their sustainability reports independently assured by

external parties and consider this assurance to be a fundamental part of the overall sustainability reporting framework (Jones et al., 2016: 165).

Peters and Romi (2015), in their study, highlight companies with weak environmental performance are less inclined to seek assurance for their sustainability disclosures. They also emphasize that large U.S. corporations have progressively moved away from assurance practices over time (Peters & Romi, 2015: 163).

Branco et al. (2014) conducted a study on the sustainability assurance practices of Portuguese firms between 2008 and 2011. The results indicate a declining trend in both sustainability reporting and related assurance throughout this period. Furthermore, the study highlights that factors such as company size, leverage, profitability, stock market status, and industry sector are significant determinants shaping sustainability assurance adoption (Branco et al., 2014: 237).

Gomes et al. (2015) aimed to examine the impact of the economic crisis negatively influenced sustainability reporting practices; however, this effect did not translate into a notable decrease in the assurance quality of the reports themselves (Gomes et al., 2015: 281).

Moreover, certain studies focus on the classification of sustainability assurance practices. The literature on sustainability assurance can be classified into three main areas of research. The first focuses on assessing assurance statements by comparing them with recognized standards to evaluate their quality. The second explores determinants that shape the demand for sustainability assurance and the contextual variables affecting its effectiveness.. The third concentrates on stakeholder perceptions and expectations, offering insights into how various actors understand and interpret the role and significance of sustainability assurance within organizational and societal frameworks (Zaman et al., 2021: 2888).

Voluntary and non-standardized sustainability assurance practices implies the absence of universally accepted reporting criteria. Each company determines the information it discloses based on its own sustainability strategies, procedures, and performance outcomes. Firms are granted wide discretion in determining the approaches, methodologies, and scope of assurance engagements (Park & Brorson, 2005). Consequently, the frameworks for sustainability information adopted by firms varies, necessitating assurance providers to have adequate expertise regarding the

subject matter for effective assurance, highlighting the importance firm-specific knowledge. Robust and well-structured assurance processes require in-depth and comprehensive understanding of each organization (Ruiz-Barbadillo & Martínez-Ferrero, 2022: 465).

Sustainability reporting has reached a certain level of maturity. It is now widely practiced across the globe and is increasingly governed by regulations in many countries. However, the assurance of disclosures related to non-financial information remains underdeveloped in comparison to sustainability reporting progress, raising questions about how far reporting entities are committed to delivering credible, accurate, and balanced information to their stakeholders (KPMG, 2020: 13; KPMG, 2022: 23).

Compared to the reporting itself, the assurance of non-financial data is a relatively new phenomenon. Nonetheless, it is rapidly evolving, and this trend has led to increasing academic interest in the auditing practices related to non-financial data (Farooq et al., 2023: 29).Despite growing scholarly attention, some markets remain under-researched. This highlights the necessity for additional studies to explore regional and sectoral differences in sustainability assurance literature (Hazaea et al., 2022: 4859).

2.2. STUDIES ON MATERIALITY DIMENSION OF SUSTAINABILITY REPORTING

In the Web of Science, Scopus, and Google Scholar databases, the concepts of 'Materiality', 'Container Shipping' and 'Materiality in Sustainability Report' were individually and collectively researched. ,According to the search results, it was determined that, as far as detected, no publications have been made on the materiality in sustainability reports within the container shipping industry. The reviews covered explanations under the headings of research questions, data, method, main findings, and finally, future directions.

In the context of materiality, there are studies that examine which indicators are selected for sustainability performance and how these choices vary across companies and content of the material issues.

Roca & Searcy (2012), through their review of 94 Canadian companies' sustainability reports, find significant variation in sustainability performance indicator selection. They attribute these differences to factors such as the industry in which the company operates, corporate strategies, and variations in value prioritization. The study further notes that this diversity complicates standardization and makes meaningful comparison across companies nearly impossible (Roca & Searcy, 2012: 115–116).

In the study conducted by Boiral & Henri (2017), it is explained that firms' sustainability performances cannot be compared because companies tend to place greater emphasis on indicators that predominantly produce positive outcomes, and this selective disclosure also influences materiality processes (Boiral & Henri, 2017: 307). Khan et al. (2016), in their study, found that companies showing strong results on sustainability matters that are perceived as material by investors are more likely to achieve higher market value. In contrast, issues considered immaterial were shown to have little to no impact in capital markets (Khan et al., 2016: 1717).

Beske et al. (2020) argue that companies recognize their stakeholders and sustainability-related indicators, yet they rarely clarify the methodologies employed in making these selections. Based on this observation, serves more as a symbolic tool for legitimacy than as a genuine mechanism for accountability (Beske et al., 2020: 174). Torelli et al. (2020). state that the evaluation of materiality in sustainability reporting is shaped by multiple factors, including industry sector, the extent to which Global Reporting Initiative (GRI) standards are applied, and the degree of stakeholder engagement (Torelli et al., 2020: 480).

Mezzanotte (2024) states that there are legal uncertainties surrounding the determination and selection of indicators within the context of materiality. These uncertainties are particularly related to determining the relevant impact of sustainability issues and the extent to which stakeholder input should be considered in the materiality assessment process (Mezzanotte, 2024: 633).

How stakeholders are the determination of sustainability materiality, and to what degree, is a critical issue. Studies in this field primarily investigate the extent of stakeholder engagement in deciding which sustainability topics should be considered material.

For example, the study by Manetti & Toccafondi (2014). analyzes stakeholder participation in the materiality processes of sustainability reports published by non-governmental organizations (NGOs). The findings indicate that stakeholder involvement in these processes is often symbolic and limited, serving more as a tool for gaining legitimacy than reflecting meaningful engagement (Manetti &Toccafondi, 2014: 35). This implies a potential risk that the materiality process may be interpreted and employed as a means of enhancing organizational image.

Fasan & Mio (2017). also focus on stakeholder participation in materiality processes. Their study indicates that companies participating in the IIRC Pilot Program tend to have stronger relationships with civil society and place importance on involving multiple stakeholders in materiality judgements, thereby making the analysis more inclusive (Fasan & Mio, 2016: 302). Abhayawansa (2022). argues that the materiality approach adopted in sustainability reporting should not be limited to specific stakeholders. A materiality perspective that incorporates the interests of all stakeholder groups is considered more conducive to fostering sustainable development (Abhayawansa, 2022: 1379).

Padilla-Garrido et al. (2024) developed the Materiality Disclosure Assessment (MDA) index to assess the quality of disclosures produced by Spanish firms.. According to this index, on average, just over 50% of the materiality disclosure criteria are met. Additionally, the study finds that around 20% of the material topics identified by these companies have no direct connection to the GRI standards (Padilla-Garrido et al., 2024:91). Additionally, the researchers have suggested enhancing materiality models by incorporating broader stakeholder involvement and emphasized the need for empirically testing these improved frameworks (Padilla-Garrido et al., 2024:92).

Huq &Mohammadrezaei (2025) state that while existing ex ante measures of materiality are more sophisticated, they often lack proper validation. In contrast, ex post approaches tend to oversimplify the concept of materiality and frequently disregard stakeholder involvement and the inputs they provide in the materiality process (Huq & Mohammadrezaei, 2025: 92).

When examining the materiality studies under this theme, takeholder participation in the materiality process remains limited and is frequently described as symbolic. From this perspective, effective and meaningful involvement of stakeholders in materiality determinations is essential to ensure the transparency of sustainability disclosures.

The materiality process is influenced not only by the expectations of external stakeholders but also by a company's internal governance structure, strategic decisions, and organizational culture. In this context, existing studies focus on how organizational configurations and companies' strategic decision-making processes influence materiality.

Thijssens et al. (2016) explain that companies' internal audit systems, governance structures, and their level of access to organizational resources directly influence how they conduct materiality assessments. They note that while some firms integrate sustainability into almost every aspect of their business, others treat it as something separate from their core operations. According to the authors, this variation largely arises from how each company internally understands and positions sustainability and materiality of the sustainability issues within its overall strategy (Thijssens et al., 2016: 99).

In their study, Khan, Serafeim, and Yoon (2016) observe that companies performing strongly on material sustainability topics are also more likely to exhibit sound financial outcomes. (Khan et al., 2016: 1717). This indicates that decisions related to materiality are often closely aligned with a company's strategic financial direction.

Grewal et al. (2021) examined whether companies' adoption of SASB-identified material sustainability disclosures influences their stock prices. The findings indicate that firms making materiality decisions in accordance with SASB standards experience an increase in firm-level information, which is then reflected in their stock prices. These results confirm that the standards companies adopt for materiality assessments can also have an effect (Grewal et al., 2021: 524).

Based on the empirical findings of their study, Ruiz-Lozano et al. (2022) report that firms that obtain external assurance, as well as larger organizations, are more inclined to disclose sustainability information at a more comprehensive level.

Additionally, they observe that although state-owned enterprises disclose material issues, they rarely include the materiality assessment process (Ruiz-Lozano et al., 2022: 400). These findings reveal the connection between organizational structure, company size, and assurance decisions, and how these factors relate to sustainability and materiality decisions.

Although the materiality processes in sustainability reports are often presented as a positive development in terms of corporate transparency, accountability, and stakeholder communication, some academic studies offer critical evaluations of these practices. For example, Flower's (2015) study shows that sustainability reporting often focuses on material issues based on investor priorities, instead of giving attention to social and environmental matters that support corporate sustainability principles. From this perspective, the study criticizes materiality processes for favoring corporate interests over accountability (Flower, 2015: 3–4).

Cho et al. (2015) examined the progression of sustainability reporting practices over time to explore whether legitimacy theory still explains sustainability disclosures. Their findings suggest that legitimacy theory remains relevant in interpreting such disclosures, and that firm size and industry continue to have a substantial impact on materiality decisions and sustainability reporting choices (Cho et al., 2015: 29). Consistent with this, Maroun's (2017) study highlights that companies follow different approaches in the assurance of sustainability reporting. It is also noted that firms are reluctant to disclose material issues that conflict with their strategic orientation, as well as to provide assurance for such information (Maroun, 2017: 335).

Clark (2021) examined how definitions of materiality by international standard-setters influence ethical responsibility and managerial disclosure practices. The study's findings reveal that ethical issues arise when materiality judgments result in actions such as selective disclosure, under-reporting, or avoidance of unfavorable information (Clark, 2021: 379). The critical perspectives provided by the above studies suggest that materiality and the materiality assessment of sustainability issues are often used for purposes other than their ideal objectives.

Jørgensen et al. (2022) examined the problems arising from the varied definitions of materiality by international standards. Their findings indicate that the

concept of materiality is often applied selectively to serve companies' own purposes rather than being approached holistically. Additionally, professionals face difficulties in distinguishing between financial and stakeholder-driven materiality, which frequently results in the misinterpretation of sustainability data (Jørgensen et al., 2022: 343–344, 349).

The literature makes clear the growing need for sector-specific research on materiality within sustainability reports (Boiral & Henri, 2017: 283; Fasan & Mio, 2017: 288; Roca & Searcy, 2012: 103; Padilla-Garrido et al., 2024: 5391). Moreover, there is a noticeable research gap concerning materiality issues in sustainability reporting within the maritime industry, highlighting the necessity of targeted studies in this field (Karagiannis et al., 2022: 13).

2.3. SUSTAINABILITY STUDIES USING CONTENT ANALYSIS AS RESEARCH METHOD

Comprehensive searches were conducted in the same academic databases using the keywords 'Content Analysis,' 'Content Analysis in Sustainability Reporting,' and 'Content Analysis in Sustainability Assurance Studies,' both collectively and individually.

According to the search results, it was determined that, as far as detected, no prior publications have specifically addressed materiality and assurance topics in sustainability reporting within the container shipping industry. A total of fourty-four studies were found out which employ content analysis materiality dimensions and/or assurance practices in sustainability reporting.The literature reviews covered explanations under the headings of research questions, data, method, main findings, and finally, future directions.

According to the research, the initial study on the topic was conducted by Gill et al. (2008). The purpose of this study was to identify the sustainability initiatives of companies through the utilization of triple bottom line reporting on the global network referred to as the World Wide Web (Gill et al.,2008:243). To determine and differentiate the reporting of economic, social, and environmental aspects among 39 companies and agencies located across Europe, North America, and Asia, an

automated analysis of web content was employed. These firms were evaluated using keywords derived from the Global Reporting Initiative (GRI) (Gill et al.,2008:246). Website content of the firms was used as data (Gill et al.,2008:247). Among the regions studied, North American firms were found to disclose the largest quantity of triple bottom line information for both environmental and economic indicators. European firms emerged as the most frequent reporters of social indicators. On the other hand, Asian firms exhibited the most favorable inclination towards their sustainability reporting. (Gill et al.,2008:249-250). Future research should explore the connection between firms' triple bottom line reporting and their performance, while also encompassing a broader range of countries and industries for the purpose of comparison (Gill et al.,2008:257).

As a result of the literature review, three studies were identified whose methodologies were deemed most appropriate for the doctoral research. These are Gürtürk & Hahn, (2016).; Amini et al., (2018). and finally Jayarathna et al., (2022).

Gürtürk & Hahn (2016) specified the purpose of their study was to analyze the significance and informational role of assurance statements through the perspective of neo-institutional theory. Deductive content analysis was employed as the method of the study (Gürtürk & Hahn,2016:33). The study applied the coding framework developed by Perego and Kolk (2012) for evaluating assurance statements. These rules are derived from standards established by AccountAbility, the Federation of European Accountants, and the GRI. The research also included supplementary criteria concerning recommendations, reporting progress, reservations, and reflection on the examined work, resulting in a comprehensive set of 23 criteria(Gürtürk & Hahn,2016:31).

The data comprised the assurance statements found within the sustainability reports that were issued by the UK FTSE 100 companies, as well as the German DAX and MDAX companies, for the year 2013. The UK FTSE 100 index is a compilation of 100 companies that possess the the largest market capitalization on the London Stock Exchange. In contrast, the German DAX and MDAX indices consist of a list of 80 prominent German companies that are listed on the Frankfurt Stock Exchange (Gürtürk & Hahn,2016:33).

Findings of the study showed that a differentiation was observed between individuals with a background in accounting and those without in relation to their abilities. While most individuals without a background in accounting explicitly described or at the very least referred to their skills, individuals with a background in accounting seemed to feel less obliged to articulate their proficiency in the statements of assurance. Furthermore, disparities were apparent in the extent of the statements of assurance, with individuals without a background in accounting generally producing lengthier reports, on average (Gürtürk & Hahn,2016:37).This paper examined de-institutionalization and assurance standards. For further studies are needed to confirm the potential existence of such de-institutionalization (Gürtürk & Hahn,2016:31).

Amini et al., (2018) prepared two research questions for the study. First, which of the given themes in the study characterize Corporate Sustainability reports? Second, do the themes and concepts in corporate sustainability reports remain consistent or do they vary based on the particular industry? (Amini et al.,2018:1452). Content analysis of the reports were adapted as research method and made by using Leximancer software program(Amini et al.,2018:1453).

Dataset comprised thirty-nine company reports from the 2013 Fortune 500 list. Twenty of these corporate sustainability reports followed GRI standards, while nineteen did not (Amini et al.,2018:1454). According to the content analysis of the 2013 Fortune 500 companies' sustainability reports, three recurring themes were observed across eight of the nine industries analyzed: business, employees, and energy/environment.Business is also most significant theme in every analyzed industry (Amini et al.,2018:1459).

Sample size could be specified as the limitation of the study. This constraints validty of the research's conclusions. Future studies that explore other distinguishing factors, such as the type of markets catered to, the characteristics of customers, and the priority placed on sustainability by stakeholders are beneficial for theoretical and practical aspects (Amini et al.,2018:1460).

Jayarathna et al., (2022). sought to identify sector-specific sustainability indicators within the logistics industry and prioritize them according to material issues. Qualitative content analysis was conducted using Leximancer software to

extract central themes and material concepts from these reports (Jayarathna et al.,2022:325).

Data of the study consisted of fourty-one GRI standard reports and twenty-three G4 reports (Jayarathna et al.,2022:327). The results highlighted that while the logistics sector places importance on economic performance and energy efficiency, sustainability reports often emphasize social sustainability information. Among the various sustainability dimensions, environmental and social aspects were most prominent in the reporting (Jayarathna et al.,2022:321). For future research , advancing sector-specific sustainability indicators to achieve consistent reporting and policy development was recommended. Despite the voluntary nature of sustainability reporting ogistics companies were found not to fully align with the GRI framework, underlining the need for tailored sustainability metrics (Jayarathna et al.,2022:334).

Regarding the coding rules they used, Gürtürk & Hahn's (2016) study was deemed more appropriate for the doctoral thesis topic. Gürtürk & Hahn (2016) extended the coding principles originally developed by Perego and Kolk (2012). Therefore, based on the coding rules outlined by Perego and Kolk (2012), a checklist was revised to align them with international sustainability reporting frameworks and container shipping.

According to their coding rules, the ratings derived from the examination of content can span from zero to 27, where zero signifies the minimum, and 27 denotes the highest standard. The evaluation criteria for most of the 19 elements included in the coding procedure primarily concern the existence or non-existence of references within the sustainability assurance statement (Perego and Kolk,2012:178).

One notable observation in the existing literature is the absence of content analysis studies directly focusing on materiality and assurance in the container shipping sector. Defining sustainability indicators specific to this industry, assessing priorities through a comprehensive sectoral approach, and improving reporting practices accordingly remain important challenges. High-quality academic research in this area is expected to contribute meaningfully to theoretical discussions while also offering valuable insights for practical applications within the sector.

2.4. SUMMARY OF THE LITERATURE REVIEW

Sustainability reporting research predominantly concentrates on the concepts of assurance and materiality. Assurance mechanisms are designed to validate the credibility and accuracy of sustainability information, aiming to bridge the information gap between firms and their stakeholders while fostering greater transparency. However, the largely voluntary nature of these processes, the variation in quality standards, and inconsistent application remain significant challenges in the field.

The materiality dimension deals with identifying which sustainability topics companies deem worthy of reporting, the decision-making processes behind these selections, and the stakeholders involved. Existing literature suggests that these decisions are mainly driven by internal strategic priorities, with stakeholder engagement often remaining superficial. This raises concerns that sustainability reports risk being used more as tools for securing corporate legitimacy rather than genuine instruments of accountability.

While the number of content analysis studies in sustainability reporting has grown, most focus on broad sectors, and research considering sector-specific contexts remains limited.

In particular, industries with significant environmental impact, such as container shipping, lack systematic content analyses that address both assurance and materiality. This gap points to the need for defining sustainability indicators tailored to specific sectors and improving reporting standards accordingly.

In summary, although the sustainability reporting literature has advanced considerably, it still requires deeper attention to contextual diversity and sector-specific details.Strengthening assurance and materiality processes through transparent, comparable, and sector-based analyses stands out as a vital need for both academic development and practical application. Expanding sector-focused content analyses, in particular, will help make sustainability efforts more meaningful, measurable, and strategic.

Lastly, all the studies included in this review are presented in Table 5, organized under research questions, data, methodology, main findings, and future

directions. The table is designed not only to summarize the main characteristics of the studies but also to allow readers to trace common themes and differences across the literature. Since several articles simultaneously address materiality, assurance, and content analysis, a total of 130 studies are compiled, which provides a broad yet detailed picture of the current state of research in this field.

Table 5: Literature Review on Sustainability Reporting

Author	Research Question	Data	Method	Main Findings	Future Directions
Gill, D. L., Dickinson, S. J., & Scharl, A. (2008).	The purpose of this research is to examine how companies demonstrate their sustainability initiatives through triple bottom line reporting on the web (Gill et al.,2008:243).	Website content of the firms was used as data (Gill et al.,2008:247).	An automated content analysis was applied to the websites of 39 oil and gas firms located in Europe, North America, and Asia, measuring disclosures in economic, social, and environmental dimensions. The analysis relied on keywords derived from the Global Reporting Initiative (GRI (Gill et al.,2008:246).	Results indicate that North American firms disclose the most information on economic and environmental indicators, while European companies are most active in reporting social indicators. Asian firms show the strongest commitment toward sustainability reporting overall. (Gill et al.,2008:249-250).	Future research should explore the connection between firms' triple bottom line reporting and their performance, while also encompassing a broader range of countries and industries for the purpose of comparison(Gill et al.,2008:257).
Modapothala, J. R., & Issac, B. (2009).	This study aims to systematically analyze the characteristics of environmental reporting among selected multinational corporations from a global perspective. (Modapothala et al.,2009:541).	A total of 690 reports from the year 2008 were collected from the Corporate Register database (Modapothala et al.,2009:545).	The assessment employed the framework of the Haub Business and Sustainability Program at the Schulich School of Business. Data mining was carried out using a Java-based program, incorporating both linear and binary search techniques (Modapothala et al.,2009:544).	According to the findings, there is difference between the content of the report and nature of businesses (Modapothala et al.,2009:547).	The study is limited to business type as the only dependent variable, with reports assessed on just 10 indicators. Future research should integrate additional demographic aspects such as firm size, geographical location, and longitudinal data. (Modapothala et al.,2009:546-547).

Author	Research Question	Data	Method	Main Findings	Future Directions
Simnett, R., Vanstraelen, A., & Chua, W. F. (2009).	What is the current situation of the new emerging voluntary assurance market (Simnett et al., 2009: 937)?	Two thousand one hundred thirteen companies' sustainability reports from 31 countries between 2002-2004 were used as data(Simnett et al., 2009: 937).	Sequential logit analysis(Simnett et al., 2009: 942).	Results indicate that companies seeking to strengthen the credibility of their disclosures and reinforce corporate image are more likely to obtain assurance for their reports. However, whether the assurer belongs to the auditing profession does not significantly affect this likelihood (Simnett et al., 2009: 937).	N/A
Modapothala, J. R., Issac, B., & Jayamani, E. (2010).	The research has two main objectives: (1) to design a model for text mining and knowledge extraction in sustainability reports, and (2) to identify the most emphasized topics across different sectors (Modapothala et al.,2010:491).	A total of 2,650 reports from the year 2008 were retrieved from the Corporate Register database. (Modapothala et al.,2010:491).	The evaluation approach draws on the GRI sustainability reporting guidelines, covering organizational, economic, environmental, and social dimensions, adapted for effective text-mining. A customized Java program processed the reports, analyzing keywords and related terms for presence and frequency (Modapothala et al.,2010:491).	Findings reveal that organizational performance is the most frequently highlighted area, followed by social, environmental, and economic aspects. Environmental aspects, in particular, emerge as a highly influential factor in explaining sustainability reporting practices (Modapothala et al.,2010:493).	N/A

Author	Research Question	Data	Method	Main Findings	Future Directions
Sawani, Y., Mohamed Zain, M., & Darus, F. (2010).	The study explores the development and progression of sustainability reporting and assurance practices in Malaysia (Sawani et al., 2010:627).	Annual reports of companies that participated in the Malaysian Environmental and Social Reporting Award (2007) (Sawani et al., 2010:627).	Interviews and Questionnaire surveys and Content Analysis	Most sustainability-related disclosures were incorporated into annual reports without accompanying assurance. This pattern is mainly due to limited awareness and the lack of regulatory enforcement (Sawani et al., 2010:627).	Broader investigations are needed to assess the role of data management systems, mimetic influences, and regulatory drivers in shaping reporting and assurance practices (Sawani et al., 2010:641).
Smith, J., Haniffa, R., & Fairbrass, J. (2011).	The research examines how different assurance providers and related bodies interact in the United Kingdom (Smith et al., 2011:425)?	N/A	Semi-structured interviews (Smith et al., 2011:435).	The findings indicate that sustainability assurance is still at an early stage in the UK, practiced mainly by accountants and consultants, but current assurance efforts are perceived as lacking credibility (Smith et al., 2011:436).	Exploring the political dynamics involved in the interactions among the diverse entities operating at both policy and practical levels within the sustainability reporting assurance field holds promise for future research (Smith et al., 2011:436).

Author	Research Question	Data	Method	Main Findings	Future Directions
O'Dwyer, B. (2011).	How have practitioners of assurance endeavored to establish sustainability assurance(O'Dwyer, 2011: 1231)?	Thirty-six in-depth interviews are data source of this study (O'Dwyer, 2011: 1231).	Depth interviews (O'Dwyer, 2011: 1231).	The author reveals the complexities encountered in the practice of sustainability assurance when coordinating diverse functional specialties(O'Dwyer, 2011: 1260).	Future research could explore the integration and socialization of non-accountants within Big Four firms. (O'Dwyer, 2011: 1263).
O'Dwyer, B., Owen, D., & Unerman, J. (2011).	The paper examines how legitimacy strategies adopted by assurance practitioners in a large professional services firm have evolved alongside their development of assurance practices, particularly in drafting assurance statements (O'Dwyer et al. 2011:31).	Two joint in-depth interviews and twelve separate interviews (O'Dwyer et al. 2011:38).	In-depth Interviews with sustainability assurance professionals (O'Dwyer et al. 2011:39).	How and why the assurors seek different types of legitimacy, along with the strategies they use to achieve them, vary depending on the audiences they aim to influence(O'Dwyer et al. 2011:48).	Examination of how developments in risk management practice affect sustainability assurance(O'Dwyer et al. 2011:51).

Author	Research Question	Data	Method	Main Findings	Future Directions
Roca, L. C., & Searcy, C. (2012).	What indicators are currently being disclosed in corporate sustainability reports in Canada, and how do they vary across sectors? (Roca & Searcy, 2012: 103).	94 corporate sustainability reports from Canadian corporations, all from 2008, sourced through databases and surveys (GRI, Corporate Register, Stratos, Slater) (Roca & Searcy, 2012: 106).	The study applied a content analysis approach. Researchers carefully read each of the 94 reports and recorded every indicator that was emphasized (such as those in charts, bold text, or tables). These indicators were entered into a searchable database to allow structured comparison (Roca & Searcy, 2012: 106).	The study found significant variation in the number and type of indicators disclosed across industries. While some sectors like oil, gas, and mining reported many indicators, others disclosed fewer. Although many reports used GRI-based indicators, there was no standardization, and the overall diversity of indicators made comparison difficult(Roca & Searcy, 2012: 115–116).	Future studies should investigate the evolution of indicators over time, compare public vs. private sectors, examine determinants of indicator choice across sectors, and explore the impact of mandatory vs. voluntary reporting regimes (Roca & Searcy, 2012: 116).
Simnett, R. (2012).	How might the revision of ISAE 3000 influence assurance on sustainability reports? (Simnett, 2012:89).	International Standard on Assurance Engagements (ISAE) 3000	Archival analysis of International Standard on Assurance Engagements (ISAE) 3000 (Simnett, 2012:89).	Concerns remain regarding distinctions between reasonable and limited assurance, and the sufficiency of procedures and report content under limited assurance engagements (Simnett, 2012:89).	Further studies might focus on assurance report users and assurance practitioners(Simnett, 2012:96)

Author	Research Question	Data	Method	Main Findings	Future Directions
Manetti, G., & Toccafondi, S. (2012).	Are stakeholders substantially engaged by assurance providers in sustainability assurance processes? (Manetti & Toccafondi, 2012:363)?	One hundred sixty-one assurance statements were used as data (Manetti & Toccafondi, 2012:363).	Empirical research through content analysis reports is the method of this study(Manetti & Toccafondi, 2012:363).	The study finds a trend toward greater stakeholder involvement throughout all stages of the assurance process (Manetti & Toccafondi, 2012:374).	The authors suggest extending research through qualitative case studies of accountant vs. consultant assurance providers, combining content analysis with interviews (Manetti & Toccafondi, 2012:375).
Srivastava, R. P., Rao, S. S., & Mock, T. J. (2013).	What are the risks of sustainability reporting assurance (Srivastava et al.,2013: 107)?	N/A	A conceptual framework for planning, executing, and evaluating assurance engagements (Srivastava et al.,2013: 107).	Findings provided a generic theoretical model for assurance services with belief-based assessments(Srivastava et al.,2013: 107).	The cost-effectiveness of the assurance process could be explored for future research(Srivastava et al.,2013: 124).

Author	Research Question	Data	Method	Main Findings	Future Directions
Wilson, M. C. (2013).	The paper has two aims: (1) to analyze environmental reporting practices and their inconsistencies among selected U.S. firms, and (2) to outline reporting approaches in the transportation and distribution sectors (Wilson,2013:2).	2011 Sustainability reports of the 26 U.S. Companies which registered to Corporate Register.com. (Wilson,2013:6).	Review of the corporate sustainability reports with respect to carbon and greenhouse gas emissions(Wilson,2013:5).	The results show variation in both the types of emissions disclosed and the level of detail provided. The author concludes that sustainability reports are often used more as public relations instruments than as tools for environmental management. (Wilson,2013:11).	N/A
Hsu, C. W., Lee, W. H., & Chao, W. C. (2013).	How can Failure Modes and Effects Analysis (FMEA) be applied to build a materiality assessment model for identifying significant issues in sustainability reporting? (Hsu et al.,2013:142).	N/A	Failure Modes and Efffect Analysis (Hsu et al.,2013:144).	The study introduces a new model that integrates stakeholder concerns to determine key material issues for sustainability reporting. By combining FMEA with ANP, the model offers a structured approach to identifying and prioritizing material topics. (Hsu et al.,2013:150).	The framework provides a basis for future academic work aimed at refining materiality assessment in sustainability reporting (Hsu et al.,2013:150).

Author	Research Question	Data	Method	Main Findings	Future Directions
Mahoney, L. S., Thorne, L., Cecil, L., & LaGore, W. (2013).	The study examines whether U.S. firms issue standalone CSR reports as authentic demonstrations of social and environmental commitment, or rather as a means to justify concerns over such issues (Mahoney et al.,2013:351).	156 standalone CSR reports from U.S. publicly traded companies in 2006 (Mahoney et al.,2013:353).	CSR performance was measured using KLD database scores. Two analyses were conducted: an independent t-test comparing CSR performance of firms with and without standalone reports, and a logistic regression controlling for profitability, leverage, size, and industry. (Mahoney et al.,2013:354).	Firms publishing standalone CSR reports were found to perform better on CSR measures than those without such reports (Mahoney et al.,2013:355).	Future research should examine additional determinants of standalone reporting in U.S. and international contexts. The study notes limitations regarding measurement, methodology, and sample size (Mahoney et al.,2013:358).
Te Liew, W., Adhitya, A., & Srinivasan, R. (2014).	The research investigates sustainability trends and reporting methods in the process industries using text-mining techniques (Te Liew et al.,2014:394).	112 Companies operating in the process industries (Te Liew et al.,2014:399).	This paper operates on the assumption that when a company uses sustainability-related terms frequently in its sustainability report, it signifies the company's primary focus and emphasis. Essentially, the more often certain terms appear, the more important they are to the company (Te Liew et al.,2014:394).	The most emphasized topics included health and safety, human rights, greenhouse gas reduction, energy conservation and efficiency, community involvement, waste minimization, renewable energy adoption, water management, and employee benefits. (Te Liew et al.,2014:398).	A drawback of using sustainability reports alone is that they often only highlight positive aspects, as companies control the information. To achieve a fuller picture of sustainability, it's beneficial also to consider other sources like NGO reports and news articles(Te Liew et al.,2014:399).

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Castelo Branco, M., Delgado, C., Ferreira Gomes, S., & Cristina Pereira Eugénio, T. (2014).	How did Portuguese firms' participation in sustainability assurance evolve between 2008 and 2011, and what factors influenced these changes (Branco et al., 2014: 237)?	Data consisted of 286 reports from 86 Portuguese companies (Branco et al., 2014: 241).	Bivariate and multivariate non-parametric statistical analyses (Branco et al., 2014: 237).	Firm size, leverage, profitability, stock exchange listing, and industry membership influenced assurance adoption, while ownership structure was not significant (Branco et al., 2014: 237).	Comparative studies could examine how assurance developed in countries more and less impacted by the financial crisis (Branco et al., 2014: 250).
Herda, D. N., Taylor, M. E., & Winterbotham, G. (2014).	How does investor protection at the national level affect firms' voluntary assurance choices? (Herda et al.,2014:209)?	One thousand four hundred eighty-two observations for 618 companies between 2005 and 2009 were used as data(Herda et al.,2014:218).	Binary logistic regression (Herda et al.,2014:214).	Companies in weaker investor protection environments often adopt voluntary assurance as an alternative monitoring tool (Herda et al.,2014:209).	N/A

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Junior, R. M., Best, P. J., & Cotter, J. (2014).	What are the practices of sustainability reporting, assurance, and types of providers among global firms? (Junior et al.,2014:1).	Fortune Global 500 companies (2010) (Junior et al.,2014:1).	A descriptive analysis of these practices was performed (Junior et al.,2014:1).	Although sustainability reporting has grown, the proportion of assured reports has remained stagnant, suggesting limited advancement. (Junior et al.,2014:8).	Future studies should explore motivations and benefits of assured reporting (Junior et al.,2014:10).
Manetti, G., & Toccafondi, S. (2014).	Does stakeholder engagement in nonprofit organizations' sustainability reporting reflect authentic participation or mere management of stakeholders? (Manetti & Toccafondi, 2014: 38).	54 nonprofit sustainability reports listed in the GRI database (2012) (Manetti & Toccafondi, 2014: 35).	Qualitative content analysis of 12 engagement indicators, coded by independent reviewers and validated with organizational feedback. (Manetti & Toccafondi, 2014: 45–46).	Engagement was generally shallow, resembling stakeholder management, with little evidence of genuine feedback or commitments to improve. (Manetti & Toccafondi, 2014: 55).	Future studies should include interviews with nonprofit managers and stakeholder representatives to assess whether reported engagement reflects actual practices, possibly uncovering lower levels of involvement than what reports claim (Manetti & Toccafondi, 2014: 57).

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Gomes, S. F., Eugénio, T. C. P., & Branco, M. C. (2015).	What was the status of sustainability reporting and assurance in Portugal after the latest economic crisis (Gomes et al.,2015:281).	290 sustainability reports (2008–2011) (Gomes et al.,2015:281).	Content analysis of the sustainability reports (Gomes et al.,2015:286).	The Portuguese assurance market followed global patterns: the crisis reduced report publication but did not undermine report quality or assurance (Gomes et al.,2015:281).	More detailed country-level studies could complement cross-national comparisons (Gomes et al.,2015:290).
Jones, P., Comfort, D., & Hillier, D. (2015).	What are the current trends in sustainability reporting?(Jones et al., 2015:282).	United Kingdom's leading commercial property companies are the of this study (Jones et al., 2015:282).	Content Analysis (Jones et al., 2015:282).	About half of the top property companies engaged in materiality or external assurance as part of reporting. (Jones et al., 2015:282).	N/A

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Cho, C. H., Michelon, G., Patten, D. M., & Roberts, R. W. (2015).	Whether corporate social responsibility disclosure has changed since the 1970s, whether legitimacy theory still explains such disclosure, and whether it is valued by investors (Cho et al., 2015: 15).	Matched sample: 213 firms in 2010 and 205 in 1977, with 71 in both years (Cho et al., 2015: 22).	Corporate social responsibility disclosure breadth was measured using a 25-item content score. A second metric weighted disclosures as 1 (qualitative), 2 (quantitative), and 3 (monetary). T-tests and regression analyses were used to compare scores and their relation to firm characteristics. (Cho et al., 2015: 22–23).	CSR disclosure increased significantly in both extent and detail; firm size and industry remained important predictors. However, CSR disclosure was not linked to firm value (Cho et al., 2015: 29).	Future research should examine corporate social responsibility reporting outside the USA, across other industries, and with more detailed disclosure metrics, in order to overcome the study's data limitations and enhance generalizability (Cho et al., 2015: 29).
Peters, G. F., & Romi, A. M. (2015).	Do corporate governance mechanisms with sustainability orientation affect voluntary assurance adoption (Peters & Romi, 2015: 163)?	Data of this study consisted of 912 sustainability reports(Peters & Romi, 2015: 171).	A logistic regression model (Peters & Romi, 2015: 171).	Firms with CSOs and weak environmental performance often disclosed without assurance. Larger U.S. companies were less likely to assure, though this trend declined over time (Peters & Romi, 2015: 163).	Future research should track how governance practices evolve and affect assurance decisions (Peters & Romi, 2015: 191).

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Flower, J. (2015).	The study investigates whether the International Integrated Reporting Council maintained its initial sustainability-oriented objectives or shifted toward promoting investor value and corporate interests (Flower, 2015: 1).	Official documents of the International Integrated Reporting Council from 2010 to 2013, such as the 2011 Discussion Paper and the 2013 Framework (Flower, 2015: 2).	The author critically examined official publications of the International Integrated Reporting Council to understand how its objectives and language changed over time. He focused on how the structure, wording, and leadership of the organization contributed to a shift away from sustainability goals (Flower, 2015: 2).	The International Integrated Reporting Council no longer promoted sustainability as its main goal. It defined value only from the investor's point of view, reduced its concern for broader social and environmental impacts, and allowed companies to choose what they report. As a result, its framework became more about serving corporate interests than accountability (Flower, 2015: 3–4).	The author urges readers to take his critique seriously, suggesting that scholars should reflect critically on whether idealistic reporting objectives can survive institutional and professional capture (Flower, 2015: 16).
Thijssens, T., Bollen, L., & Hassink, H. (2016).	What are the internal organisational structures, systems, and processes through which companies manage their sustainability reporting, and how do these vary among firms with exemplary reports? (Thijssens et al., 2016: 88).	Sustainability reports and internal documentation from six Dutch companies recognized for exemplary reporting based on GRI G3 and inclusion in the Dutch Transparency Benchmark. (Thijssens et al., 2016: 89).	Two-stage design: interviews with managers + content analysis using McKinsey 7-S framework. (Thijssens et al., 2016: 89–90).	Companies used varied internal approaches, some integrated sustainability into operations, others treated it separately,but report quality was comparable. A typology of reporting approaches was developed. (Thijssens et al., 2016: 99).	Future research should use longitudinal studies to track how internal reporting practices evolve and expand the analysis to include companies with lower-quality reports, different countries, or smaller firms. (Thijssens et al., 2016: 100).

Author	Research Question	Data	Method	Main Findings	Future Directions
Jones, P., Hillier, D., & Comfort, D. (2016).	To what extent do Europe's leading property companies adopt materiality and external assurance in sustainability reporting (Jones et al., 2016:147).	Europe's top commercial property firms (Jones et al., 2016:147).	Content Analysis (Jones et al., 2016:147).	All major firms disclosed sustainability information, but only half incorporated materiality or external assurance (Jones et al., 2016:165).	N/A
Bepari, M. K., & Mollik, A. T. (2016).	How do assurance statements in sustainability reports contribute to accountability and transparency for stakeholders Bepari&Mollik,2016:655).	Content analysis(Bepari & Hollik,2016:655).	The most recent assurance guidelines were used as data(Bepari & Hollik,2016:655).	Most statements were directed to boards or management, with little reference to broader stakeholders. Limited involvement of stakeholders in identifying material issues was noted (Bepari & Hollik,2016:655).	Future research should investigate firm- and country-level factors shaping the decision to seek assurance (Bepari & Hollik,2016:682).

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Calabrese, A., Costa, R., Levialdi, N., & Menichini, T. (2016).	How can quantitative methods support materiality assessment in sustainability reporting, addressing the current research gap. (Calabrese et al., 2016:248-249).	A fuzzy Analytic Hierarchy Process (AHP) integrating classical AHP with fuzzy logic (Calabrese et al., 2016:251).	N/A	The study introduces a fuzzy AHP model to assess materiality in sustainability reporting. It allows systematic prioritization of issues and indicators, optimizing resource allocation for SMEs, thereby enhancing the credibi (Calabrese et al., 2016:258).	The study emphasizes engaging multiple stakeholder groups through materiality analysis but does not explicitly mention limitations or propose further research directions (Calabrese et al., 2016: 259).
Gürtürk, A., & Hahn, R. (2016).	How do assurance statements reflect content and relevance when analyzed through neo-institutional theory (Gürtürk & Hahn,2016:31).	Assurance statements from sustainability reports of FTSE 100, DAX, and MDAX companies (Gürtürk & Hahn,2016:33).	Deductive content analysis using coding rules adapted from Perego and Kolk (2012) (Gürtürk & Hahn,2016:313).	A differentiation was observed between individuals with a background in accounting and those without in relation to their abilities. While most individuals without a background in accounting explicitly described or at the very least referred to their skills, individuals with a background in accounting seemed to feel less obliged to articulate their proficiency in the statements of assurance. (Gürtürk & Hahn,2016:37).	Further research is needed to confirm possible de-institutionalization in assurance standards (Gürtürk & Hahn,2016:31).

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Khan, M., Serafeim, G., & Yoon, A. (2016).	Do material versus immaterial sustainability investments differ in their implications for future firm performance? (Khan et al., 2016: 1698)	Sustainability data are derived from the MSCI KLD database (1991–2013), covering up to 3,000 U.S. firms, merged with Compustat and CRSP financial data. (Khan et al., 2016: 1702)	The study applies portfolio-level time-series and firm-level panel regressions, controlling for firm characteristics, to estimate performance effects of material versus immaterial sustainability investments. (Khan et al., 2016: 1712)	Firms performing well on material ESG issues have better stock returns and accounting outcomes; immaterial issues show no such effect. (Khan et al., 2016: 1717)	Future research should investigate the structural mechanisms through which material sustainability investments affect intangible drivers such as brand value, employee engagement, or access to finance. (Khan et al., 2016: 1722).
Şahin, Z., Çankaya, F., & Yılmaz, Z. (2016).	What is the scope and quality of Turkish sustainability reports prepared under GRI guide (Şahin et al.,2016:3).	96 sustainability reports retrieved from GRI database (up to 2015) (Şahin et al.,2016:3).	Content analysis of disclosure patterns in strategy/profile, management approach, and performance indicators (Şahin et al.,2016:3-4).	Economic indicators were the most frequently disclosed, while environmental indicators were least reported (Şahin et al.,2016:12).	N/A

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Kocamiş, T. U., & Yildirim, G. (2016).	What are the benefits of sustainability reporting for businesses, and how is it applied in the BIST sustainability inde (Kocamiş et al.,2016:41).	24 sustainability reports (2015) from BIST sustainability index firms (Kocamiş et al.,2016:50).	Content analysis of corporate sustainability reports (Kocamiş et al.,2016:47-48).	Findings show that as the quantity of corporate sustainability reports experiences an upward trajectory, the trust of stakeholders in enterprises is anticipated to witness an augmentation. This amplified trust is expected to foster a greater influx of financial investments towards these enterprises (Kocamiş et al.,2016:50).	N/A
Fasan, M., & Mio, C. (2017).	What factors drive materiality disclosure in integrated reporting, and do IIRC Pilot Program firms disclose more than non-IIRC peers (Fasan & Mio, 2016: 289).	65 IIRC Pilot Program firms (2012–2013) and matched non-IIRC firms; data include reports and board characteristics (Fasan & Mio, 2016: 294).	Content analysis and OLS regressions; fixed effects panel data analysis; t-tests and Wilcoxon rank tests to compare groups (Fasan & Mio, 2016: 296).	Materiality disclosure is influenced more by industry and board characteristics than legal environment. IIRC companies improved their disclosure in 2013 (Fasan & Mio, 2016: 302).	Further research could explore how report characteristics evolve over time and why companies in different sectors vary in their materiality disclosure practices (Fasan & Mio, 2016: 303).

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Cuadrado-Ballesteros, B., Martínez-Ferrero, J., & García-Sánchez, I. M. (2017).	How does sustainability reporting reduce information asymmetry? (Cuadrado-Ballesteros et al., 2017:1141).	Economic,financial and accounting data of World's largest 1404 companies for the period 2007-2014(Cuadrado-Ballesteros et al., 2017:1144).	Empirical Instruments (Cuadrado-Ballesteros et al., 2017:1144).	Assurance significantly reduces information asymmetry, reinforcing the informational value of sustainability reporting (Cuadrado-Ballesteros et al., 2017:1144).	Replication with alternative measures of asymmetry is recommended (Cuadrado-Ballesteros et al., 2017:1155).
Rossi, A., & Tarquinio, L. (2017).	What are the trends in external assurance of sustainability reports among Italian listed companies (2008–2012), and how do content levels vary by corporate characteristics and practitioner type (Rossi &Tarquinio, 2017:578)?	95 sustainability reports possess an assurance statements was used as data (Rossi &Tarquinio, 2017:589).	Thematic content analysis and ordinary least square (OLS) regression techniques were used(Rossi &Tarquinio, 2017:589).	Wide variation in assurance statement content was observed; CSR committee presence and expertise correlated positively with disclosure quality (Rossi &Tarquinio, 2017:578).	Analysis of more corporate governance variables is suggested for future research (Rossi &Tarquinio, 2017:597).

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Kaya, I. (2017).	What are the central themes and problem areas in empirical studies on sustainability assurance (Kaya,2017: 33)?	Review of academic journal articles (2005–2015) (Kaya,2017: 33).	Systematic Literature Review (Kaya,2017: 35-36).	Assurance of sustainability reports has gained importance, with firms facing increasing pressure to disclose social and environmental information (Kaya,2017: 36).	N/A
Gillet-Monjarret, C., & Rivière-Giordano, G. (2017).	What is the current state of sustainability assurance research (Gillet-Monjarret & Rivière-Giordano, 2017:11)?	Fifty-six articles were published in 33 journals over the period 1985-2015 used as data for the study(Gillet-Monjarret & Rivière-Giordano, 2017:11).	Structured literature review (Gillet-Monjarret & Rivière-Giordano, 2017:11).	This literature review also demonstrates consistency among the topics covered, the referenced theoretical frameworks, and the methodologies employed (Gillet-Monjarret & Rivière-Giordano, 2017:29).	Future research should address the relevance of assurance for non-financial stakeholders (Gillet-Monjarret & Rivière-Giordano, 2017:29)?

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Brown, V. L., & Kohlbeck, M. J. (2017).	How is assurance for sustainability reports provided(Brown & Kohlbeck, 2017:95)?	N/A	Case Study (Brown & Kohlbeck, 2017:99).	The instructional case demonstrates challenges students face when engaging with assurance of nonfinancial reports (Brown & Kohlbeck, 2017:97).	N/A
Martínez-Ferrero, J., & García-Sánchez, I. M. (2017).	How do corporate governance structures influence assurance adoption and provider choice (Martínez-Ferrero & García-Sánchez, 2017:647)?	3,241 firm-year observations from 610 international companies (2007–2014) (Martínez-Ferrero & García-Sánchez, 2017:651).	Logit analysis models(Martínez-Ferrero & García-Sánchez, 2017:647).	Assurance adoption is positively associated with board independence and active sustainability committees, and firms often select accounting professionals as providers (Martínez-Ferrero & García-Sánchez, 2017:665-666).	Future studies should develop improved proxies for sustainability assurance (Martínez-Ferrero & García-Sánchez, 2017:666).

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Aureli, S. (2017).	Are content analysis and text mining irreconcilable research methods, or can they be integrated to analyze sustainability disclosures (Aureli,2017:4-5).	20 annual sustainability reports from four oil corporations (Aureli,2017:15).	An experimental comparison of content analysis and text mining applied to disclosure patterns before and after industrial incidents (Aureli,2017:13-14).	Findings of the study reveals that content analysis is effective in highlighting the importance and frequency of certain topics because human coders can detect concepts regardless of the specific wording(Aureli,2017:22).	The primary constraint of the study is found in the limited number of companies examined. Subsequent investigations should strive to rectify this issue through the utilization of sophisticated text mining instruments, such as natural language processing, to scrutinize word combinations(Aureli,2017:24).
Calabrese, A., Costa, R., Ghiron, N. L., & Menichini, T. (2017).	How can a new method for materiality analysis be developed (Calabrese et al.,2017:439).	N/A	Analyzing and comparing different methods for materiality assessment in the literature (Calabrese et al.,2017:441).	The study suggests improvements for materiality assessment including balancing accuracy with computational effort, incorporating multi-stakeholder views, addressing multidimensionality, and managing subjectivity (Calabrese et al.,2017:445).	N/A

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Maroun, W. (2017).	The study investigates how an integrated report can be credibly assured and explores potential assurance models through the perspectives of auditors and report preparers (Maroun, 2017: 330).	Interviews with 20 assurance specialists from six audit firms and 20 report preparers from 14 listed firms (Maroun, 2017: 334).	Semi-structured interviews analyzed through open and axial coding; three assurance models proposed (Maroun, 2017: 335).	Models include: a restricted (financial-focused), an integrated (multiple assurance sources), and a Delphi-inspired (expert panels) approach, each addressing quantitative and qualitative content (Maroun, 2017: 336–342).	Future research should examine how these proposed assurance models function in practice across different jurisdictions, especially regarding the role of auditors in evaluating narrative and forward-looking information (Maroun, 2017: 343).
Boiral, O., & Henri, J. F. (2017).	Are GRI-based sustainability reports of mining companies comparable, and what causes lack of comparability (Boiral & Henri, 2017: 285).	12 sustainability reports from mining firms published in 2007, all prepared using the GRI G3 guidelines at A or A+ application level, with the mining and metals sector supplement (Boiral & Henri, 2017: 295).	Content analysis based on a three-step process involving indicator categorization and qualitative interpretation of reporting data using 92 GRI indicators(Boiral & Henri, 2017: 296–297).	The study shows that sustainability performance in GRI-based reports from mining firms cannot be meaningfully compared. This is due to the presence of vague and non-quantifiable indicators, inconsistencies in measurement units, incomplete or missing data, and an overly selective emphasis on positive outcomes (Boiral & Henri, 2017: 307).	Future research should expand this comparative approach by analyzing more recent reports, a wider time frame, or different sectors to determine whether comparability challenges persist (Boiral & Henri, 2017: 312).

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Fuhrmann, S., Ott, C., Looks, E., & Guenther, T. W. (2017).	Does assurance enhance the credibility of sustainability reports for investors (Fuhrmann et al.,2017:369)?	231 sustainability reports which have assurance statements(Fuhrmann et al.,2017:376).	Content and regression Analysis(Fuhrmann et al.,2017:377).	High-quality assurance processes reduce information asymmetry (Fuhrmann et al.,2017:369).	N/A
Al-Shaer, H., & Zaman, M. (2018).	How are audit committees related to sustainability assurance (Al-Shaer & Zaman, 2018:972)?	Sustainability reports of London Stock Exchange–listed companies (Al-Shaer & Zaman, 2018:977).	Regression models were used as the research method (Al-Shaer & Zaman, 2018:977).	Audit committee independence was positively linked to selecting Big Four assurers, while sustainability committees correlated negatively with assurance, suggesting challenges for smaller firms (Al-Shaer & Zaman, 2018:977).	Future work could use interviews with committee members to explore contextual roles in assurance (Al-Shaer & Zaman, 2018:983).

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Haffar, M., & Searcy, C. (2018)	Do environmental indicators in corporate sustainability reports provide sufficient context (Haffar & Searcy,2018:495).	108 sustainability-related documents from Canadian companies (2015) (Haffar & Searcy,2018:501).	Content analysis of context-based vs. non-context indicators (Haffar & Searcy,2018:501).	Reports relied mostly on absolute/relative indicators; few context-based or benchmark measures were included (Haffar & Searcy,2018:495).	Future studies should extend to broader industries, geographies, and reporting frameworks (Haffar & Searcy,2018:510).
Steenkamp, N. (2018).	How do companies disclose material issues, their determination processes, and definitions of materiality in integrated reports (Steenkamp, 2018: 237-238)?	2014–2015 integrated reports from 10 South African companies (Steenkamp,2018:239).	Content analysis of determination processes, issues, and definitions (Steenkamp,2018:230).	Substantial variation in processes and disclosures; main issues identified included employees, social and environmental topics, and customers (Steenkamp,2018:230).	Limited sample; larger-scale studies recommended (Steenkamp,2018:244).

Author	Research Question	Data	Method	Main Findings	Future Directions
Landrum, N. E., & Ohsowski, B. (2018).	What is corporate sustainability and how is it reflected in reporting (Landrum & Ohsowski,2018:128).	122 non-GRI and 108 GRI sustainability reports (Landrum & Ohsowski,2018:133).	Content analysis (Landrum & Ohsowski,2018:132).	Sustainability worldviews coexist but remain far from ecological concerns; corporate interests dominate (Landrum & Ohsowski,2018:143).	Sample limited to large North American firms; future work should include SMEs and global perspectives (Landrum & Ohsowski,2018:142).
Amini, M., Bienstock, C. C., & Narcum, J. A. (2018)	There are two research questions of the study. First, which of the given themes in the study characterize Corporate Sustainability reports? Second,do the themes and concepts in corporate sustainability reports remain consistent? (Amini et al.,2018:1452).	39 reports from 2013 Fortune 500 firms (20 GRI, 19 non-GRI) (Amini et al.,2018:1454).	Content analysis of the reports were made by using Leximancer software program(Amini et al.,2018:1453).	Three recurring themes were business, employees, and energy/environment; business was dominant across all industries (Amini et al.,2018:1459).	Sample size is the limitation of the study. This constraints validty of the research's conclusions. İndustry.Future studies that explore other distinguishing factors, such as the type of markets catered to, the characteristics of customers, and the priority placed on sustainability by stakeholders are beneficial for theoretical and practical aspects (Amini et al.,2018:1460).

Author	Research Question	Data	Method	Main Findings	Future Directions
Wu, S. R., Shao, C., & Chen, J. (2018).	How do stakeholders define materiality, avoid redundancy, and identify key topics consistently across methods (Wu et al.,2018:2).	Sustainability reports from textile, apparel, and energy firms in GRI database (post-2016 (Wu et al.,2018:7).	Content analysis identifying frequent terms and categorizing 15 themes under five sustainability domains (Wu et al.,2018:6).	Reports emphasized management, labor, and compliance; GRI Topics highlighted management, energy, and water (Wu et al.,2018:8).	Proposes advanced algorithms for improved analysis;limitations not addressed. (Wu et al.,2018:11).
Shin, S. H., Kwon, O. K., Ruan, X., Chhetri, P., Lee, P. T. W., & Shahparvari, S. (2018).	What concepts and terms define maritime sustainability in academic research (Shin et al.,2018:3).	155 articles from 48 journals (1993–2017) (Shin et al.,2018:5).	Topic modeling using Latent Dirichlet Allocation and computational methods (Shin et al.,2018:3).	Maritime sustainability literature focused on economic/environmental issues; social aspects (labor, working conditions) were underrepresented (Shin et al.,2018:13).	Social aspects of maritime management was proposed for future research(Shin et al.,2018:13).

Author	Research Question	Data	Method	Main Findings	Future Directions
Martínez-Ferrero, J., & García-Sánchez, I. M. (2018).	How do assurance provider attributes influence the level of assurance (Martínez-Ferrero & García-Sánchez, 2018:971)?	1,233 firm-year observations (2007–2014) (Martínez-Ferrero & García-Sánchez, 2018:971).	Panel econometric models (Martínez-Ferrero & García-Sánchez, 2018:987).	Provider reputation and industry expertise were associated with higher assurance levels (Martínez-Ferrero & García-Sánchez, 2018:971).	Future studies should develop proxies for assurance quality (Martínez-Ferrero & García-Sánchez, 2018:988).
Martínez-Ferrero, J., García-Sánchez, I. M., & Ruiz-Barbadillo, E. (2018).	What is the current quality of sustainability assurance reports (Martinez-Ferrero et al., 2018:1181)?	901 firm-year observations from 242 firms across 17 countries (2007–2014) (Martinez-Ferrero et al., 2018:1183).	Content analysis of assurance reports (Martinez-Ferrero et al., 2018:1183).	Assurance reports were higher quality when providers specialized in the client's industry and had longer assurance relationships Martinez-Ferrero et al., 2018:1181).	Factors which contribute assurance quality are alternative area for future research(Martinez-Ferrero et al., 2018:1193).

Author	Research Question	Data	Method	Main Findings	Future Directions
Seguí-Mas, E., Polo-Garrido, F., & Bollas-Araya, H. M. (2018).	What is the current situation of assurance practices worldwide in the financial services sector(Seguí-Mas et al.,2018:1)	Sustainability reports were prepared using G3, G3.1, or G4 guidelines registered in Global Reporting Initiatives' sustainability disclosure database between 2012 and 2015(Seguí-Mas et al.,2018:7).	Regression Models(Seguí-Mas et al.,2018:8).	Adoption of assurance is positively associated with firm size; users of the financial services sector supplement are more likely to seek assurance (Seguí-Mas et al.,2018:1).	Examine additional determinants of assurance adoption and provider choice (Seguí-Mas et al.,2018:18).
Channuntapipat, C., Samsonova-Taddei, A., & Turley, S. (2019).	What is sustainability assurance and how diverse are its practices (Channuntapipat et al., 2019:556).	21 sustainability assurance providers (Channuntapipat et al., 2019:556).	Semi-structured interviews and textual analysis (Channuntapipat et al., 2019:556)..	Providers hold differing views of what assurance entails, and these views materially shape practice design and delivery (Channuntapipat et al., 2019:556).	Investigate relationships between assurers and other stakeholders to illuminate practice foundations (Channuntapipat et al., 2019:556).

Author	Research Question	Data	Method	Main Findings	Future Directions
Puroila, J., & Mäkelä, H. (2019).	What is the socio-political significance of materiality assessment, and can it support more dialogic, comprehensive accounting (Puroila & Mäkelä,2019:1050).	44 sustainability reports from leading firms (Puroila & Mäkelä,2019:1050).	Literature synthesis (materiality, stakeholder engagement, commensuration, dialogic accounting) and qualitative content analysis of reports (Puroila & Mäkelä,2019:1051).	A technical-rational framing depicts materiality as neutral and consensual (via matrices), yet in practice it reflects biased prioritization of corporate concerns (Puroila & Mäkelä,2019:1052).	Use critical dialogic accounting to re-conceptualize materiality in ways that strengthen democratic stakeholder engagement (Puroila & Mäkelä,2019:1043).
Saber, M., & Weber, A. (2019).	What is the quality of sustainability reporting by German grocery retailers, how are negative aspects disclosed, and do formats (supermarket/discount/organic) differ (Saber & Weber,2019:480).	2016 reports from six discount chains and two organic retailers (Saber & Weber,2019:483).	The methodology consisted of two steps. The first step is to screen sustainability reports with respect to GRI standards. The second is the analysis of the sustainability reports on how retailers disclose their negative aspects in their reports. Expanding on their study, the researchers conducted a search of sustainability reports using the German translations of keywords such as "negative," "incident," "accident," "adverse," "harm," "risk," and "conflict," as well as topics including "corruption," "spill," "child labor," and "discrimination(Saber & Weber,2019:485).	Supply chain/procurement and energy/emissions dominate; negative issues are discussed ambiguously, firms recognize impacts but distance themselves from responsibility (Saber & Weber, 2019:491).	The selection of only German retailer companies and the usage of standalone sustainability reports limits this study. To eliminate these limits, the outcomes of this research should be analyzed further for other geographic regions(Saber & Weber,2019:493).

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Farooq, M. B., & De Villiers, C. (2019).	How does competition between accounting (ASAPs) and non-accounting (NASAPs) assurers shape the institutionalization of sustainability assurance (Farooq & de Villiers,2019:307).	15 assurance providers and 35 sustainability managers (Farooq & de Villiers,2019:307).	Interviews(Farooq & de Villiers,2019:307).	ASAPs gravitate to ISAE 3000; NASAPs favor AA1000AS, reflecting competing logics in the field Farooq & de Villiers,2019:307).	Comparision of the competitive dynamics across countries and explore heterogeneity among NASAP sub-types (Farooq & de Villiers,2019:307).
García-Sánchez, I. M., Hussain, N., Martínez-Ferrero, J., & Ruiz-Barbadillo, E. (2019).	How do CSR disclosure quantity, quality, and external assurance relate to capital constraints (García-Sánchez et al., 2019:832)?	Firm-level data on CSR disclosure/assurance and financing frictions (García-Sánchez et al., 2019:832)?	Regression models are the method of this study (García-Sánchez et al., 2019:836).	Higher-quality, externally assured CSR disclosure strengthens the link between disclosure and improved access to finance (García-Sánchez et al., 2019:832).	Employment of the alternative measures of CSR and assurance quality beyond single composite indices (García-Sánchez et al., 2019:845).

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Michelon, G., Patten, D. M., & Romi, A. M. (2019).	How do sustainability restatements relate to the use of assurance in the developing Sustainability reporting assurance market (Michelon et al., 2019: 395)?	Sustainability reports of US S&P500 firms for 2010-2014(Michelon et al., 2019: 396).	Logistic regression model (Michelon et al., 2019: 405).	Assurance of sustainability reporting is connected with an elevated likelihood of sustainability restatements, with a more robust association observed for restatements arising from errors than for those resulting from methodological updates(Michelon et al., 2019: 395).	Future research could concentrate on countries with a more extended tenure and history of reporting and sustainability reporting assurance without changing the meaning(Michelon et al., 2019: 418).
Canning, M., O'Dwyer, B., & Georgakopoulos, G. (2019).	How are financial audit concepts such asmateriality translated into non-financial assurance contexts (Canning et al.,2019:1).	N/A	In-depth interviews within the sustainability assurance departments were performed as a method (Canning et al.,2019:7).	The author established and extended Power's theorization of how new areas become auditable(Canning et al.,2019:22).	Examination of the materiality assessments within engagements as a distinct research stream (Canning et al.,2019:23).

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Hummel, K., Schlick, C., & Fifka, M. (2019).	What determines the quality of sustainability assurance (Hummel et al., 2019:733)?	Assurance statements of the 122 European firms (Hummel et al., 2019:733).	Literature review and regression analysis (Hummel et al., 2019:740).	Lower sustainability performance is linked to deeper assurance procedures; affiliation with the accounting profession correlates with narrower statement breadt (Hummel et al., 2019:733).	Analysis of the client–assurer negotiations over engagement scope and terms (Hummel et al., 2019:740).
Boiral, O., Heras-Saizarbitoria, I., & Brotherton, M. C. (2019a).	How do assurance providers assess the quality and limitations of sustainability reports (Boiral et al.,2019a:703)?	Data comprised of 301 assurance statements (Boiral et al.,2019a:703).	Qualitative content analysis (Boiral et al.,2019a:703).	Materiality is the most frequently evaluated principle (two-thirds of statements), reflecting its centrality for judging indicator significance (Boiral et al.,2019a:710).	Combine provider and manager interviews to compare public statements with private assessments of report quality (Boiral et al.,2019a:719).

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Boiral, O., Heras-Saizarbitoria, I., Brotherton, M. C., & Bernard, J. (2019b).	How are ethical issues in verifying sustainability reports perceived and managed by practitioners (Boiral et al.,2019b:1111)?	Thirty-eight agents are data of this study (Boiral et al.,2019b:1111).	Semi-structured Interviews(Boiral et al.,2019b:1111).	Four intertwined ethical concerns dominate: commercial pressures, symbolic verification, audit–consulting interdependence, and familiarity with clients (Boiral et al.,2019b:1111).	Explore reporting companies' perspectives and implications for stronger regulation (Boiral et al.,2019b:1121).
Boiral, O., & Heras-Saizarbitoria, I. (2020a).	How reliable are assurance statements and how do they contribute to stakeholder accountability (Boiral and Heras-Saizarbitoria, 2020a:1)?	337 assured reports from mining and energy sectors (Boiral and Heras-Saizarbitoria, 2020a:1).	Qualitative content analysis (Boiral and Heras-Saizarbitoria, 202a0:1).	Many assurance statements do not evidence a material, substantive, and credible verification process (Boiral and Heras-Saizarbitoria, 2020a:1).	Quantitative studies should investigate drivers of reliability/credibility in assurance statements (Boiral and Heras-Saizarbitoria, 2020a:13).

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Boiral, O., Heras-Saizarbitoria, I., & Brotherton, M. C. (2020b).	How do auditors involved in sustainability assurance perceive professionalism and the professionalization of assurance providers (Boiral et al., 2020b:309).	38 Assurance service providers(Boiral et al., 2020b:309).	Semi-directed interviews (Boiral et al., 2020b:309).	Core standards are used largely as legitimacy devices to bolster credibility rather than as blueprints for rigorous verification; sustainability assurance demands multifaceted competencies (Boiral et al., 2020b:309).	Examine both assurers' public statements and diverse stakeholder perspectives to assess expectations and practice (Boiral et al., 2020b:328).
Ruiz-Barbadillo, E., & Martínez-Ferrero, J. (2020).	Does joint provision of financial audit and sustainability assurance by the same incumbent improve assurance quality, and is this moderated by industry specialization (Ruiz-Barbadillo and Martínez-Ferrero, 2020:1)?	Panel of 976 firm-year observations (Ruiz-Barbadillo and Martínez-Ferrero, 2020:3).	Regression analyses (Ruiz-Barbadillo and Martínez-Ferrero, 2020:9).	Joint provision by the incumbent auditor is associated with higher assurance quality; industry specialization further strengthens this effect via deeper topic knowledge (Ruiz-Barbadillo and Martínez-Ferrero, 2020:1).	Explore country-level institutional pressures (e.g., mandatory assurance, stakeholder orientation) and firm-level information asymmetries (Ruiz-Barbadillo and Martínez-Ferrero, 2020:21).

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Farooq, M. B., & De Villiers, C. (2020).	How do SAPs' promotional efforts affect engagement scope and the credibility of sustainability assurance (Farooq & de Villiers,2020:417).	15 assurance providers and 35 reporting managers (Farooq & de Villiers,2020:424).	In-depth Interviews(Farooq & de Villiers,2020:424).	Client pressure and revenue ambitions can compromise independence and the quality of assurance work (Farooq & de Villiers,2020:417).	N/A
Bakarich, K. M., Castonguay, J. J., & O'Brien, P. E. (2020).	How might blockchain augmentation address shortcomings in sustainability reporting (Bakarich et al., 2020: 389)?	N/A	Exploratory content analysis (Bakarich et al., 2020: 389).	Greater blockchain integration could expand verifiable, high-quality information in reports and broaden what assurers can test (Bakarich et al., 2020: 407-408).	Study targeted blockchain use cases in reporting and procedures assurers can apply to evaluate blockchain evidence (Bakarich et al., 2020: 407).

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Maroun, W. (2020).	What drives the practice of CSR assurance (Maroun, 2020:187)?	N/A	Literature Review (Maroun, 2020:187).	Increasing board-level attention to CSR issues is evident and influences assurance adoption (Maroun, 2020:201).	Further conceptual and empirical work on CSR assurance models is needed (Maroun, 2020:205).
Haider, M. B., & Nishitani, K. (2020).	How do corporate managers in Japan view the status and prospects of sustainability assurance (Haider & Nishitani, 2020:1)?	Top 500 Tokyo Stock Exchange firms (Haider & Nishitani, 2020:1).	Semi-structured interviews and a questionnaire survey (Haider & Nishitani, 2020:6).	High fees, limited stakeholder demand, and lengthy processes are key barriers to adoption (Haider & Nishitani, 2020:15-16).	Investigate assurance and Total Productive Compliance (TPC) dynamics in the changing environment and compare with current findings (Haider & Nishitani, 2020:16).

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Luccioni, A., Baylor, E., & Duchene, N. (2020).	Their primary purpose is to develop a user-friendly sustainability reporting tool accessible to analysts with ease (Luccioni et al.,2020:4).	Two thousand two hundred forty-ninepublicly available financial and sustainability reports were used as data from the Global Reporting Initiative databases(Luccioni et al.,2020:2).	They used Transformer-based approach to improve Climate Quality, their tool was dedicated to extract climate-relevant passages in financial documents for natural languge processing tasks(Luccioni et al.,2020:2).	Differences can be observed among sectors in terms of the terminology used and the types of disclosures made (Luccioni et al.,2020:3).	N/A
Mio, C., Fasan, M., & Costantini, A. (2020).	Do material topics identified via integrated reporting differ from those identified via sustainability reporting (Mio et al.,2020:307).	Data was collected from Assicurazioni Generali corporation(Mio et al.,2020:313).	A single case study "Generali" approach was employed to test hypothesis. Twenty material topics were identified and content analysis was carried out through Nvivo software (Mio et al.,2020:313-314).	Materiality under integrated reporting is more market-oriented, while sustainability reporting is more stakeholder-oriented, yielding distinct topic sets (Mio et al.,2020:318).	From a quantitative perspective, the differences in materiality process under integrated reporting and sustainability reporting future studies could be made(Mio et al.,2020:318).

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Torelli, R., Balluchi, F., & Furlotti, K. (2020).	How do stakeholder engagement and industry context shape application of materiality in sustainability reporting (Torelli et al., 2020: 470).	152 Italian public-interest entities (2017), excluding banks/insurers (Torelli et al., 2020: 475).	Manual content analysis and Ordinary Least Squares regression applied to coded nonfinancial disclosures (Torelli et al., 2020: 476).	Engagement intensity, industry, and GRI application level are central drivers of materiality assessment (Torelli et al., 2020: 480).	The authors recommend that future research expand the country coverage and time period studied, and focus more closely on the internal mechanisms and effects of stakeholder involvement in materiality processes (Torelli et al., 2020: 481).
Nechita, E., Manea, C. L., Irimescu, A. M., & Nichita, E. M. (2020).	How do Premium-tier Bucharest Stock Exchange firms report on the UN SDGs? (Nechita et al.,2020:836).	27 reports (2017–2019) (Nechita et al.,2020:837).	Content analysis of SDGs, actions, and indicators; mixed quantitative/qualitative assessment (Nechita et al.,2020:848).	12 of 17 SDGs were reported; 787 SDG-related actions and 1,463 indicators identified (Nechita et al.,2020:849).	Small number of selected companies for analysis was regarded as limitation.Broadening the sample both on the national level and from other countries was proposed as avenue for future research(Nechita et al.,2020:850).

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Harymawan, I., Soeprajitno, N., Widya, R. R., Ratri, M. C., & Paramitasari, Y. I. (2020).	Aim of the study is to describe trends and information disclosure pattern of construction companies' sustainability reports (Harymawan et al.,2020:49).	152 reports from IDX-listed firms (2010–2018) (Harymawan et al.,2020:50).	Text mining was used as a method of the study with the help of Python software (Harymawan et al.,2020:49).	Firms tend to describe issues with negative terms, while portraying efforts and diligence positively (Harymawan et al.,2020:53).	N/A
Jindřichovská, I., Kubíčková, D., & Mocanu, M. (2020).	How does a major agri-food corporation address rising sustainability expectations and communicate to stakeholders (Jindřichovská et al.,2020:1).	Sustainability reports of the Cargill between the years 2014-2018 (Jindřichovská et al.,2020:4).	Content analysis was employed to the Cargill's sustainability report. Keywords were extracted from Global Reporting Initiative Framework and relevant international academic literature. In addition to that thirty-nine keywords that were identified by the BCLC of the US Chamber of Commerce(Jindřichovská et al.,2020:6).	There is a remarkable improvement in sustainability reporting of Cargill from 2014 to 2018. Adaptation of Cargill to the Corporate Social Reporting measures was so quick.Company involved the stakeholders to the sustainability reporting process(Jindřichovská et al.,2020:14).	Limit of this study pertains to the methodology employed for examining narrative information. Future work should use larger, cross-country samples (Jindřichovská et al.,2020:14).

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Uyar, A., Karaman, A. S., & Kilic, M. (2020).	Is higher CSR performance associated with more transparent/comprehensive CSR reporting, external validation, and GRI adherence in logistics firms?) (Uyar et al., 2020:2).	Thomson Reuters EIKON data on reporting behavior, ESG scores, governance, and financials (Uyar et al., 2020:5).	Statistical models with controls (board size, gender diversity, independence, CEO duality, CSR committee). (Uyar et al., 2020:4).	High-performing firms are more likely to publish and to publish more CSR reports, consistent with signaling and inconsistent with greenwashing (Uyar et al., 2020:8).	Results are limited to listed logistics firms; study investor views and the role of external assurance (Uyar et al., 2020:10).
Beske, F., Haustein, E., & Lorson, P. C. (2020).	How are materiality assessments disclosed, how are stakeholders/topics identified, and does GRI G4 affect disclosure depth (Beske et al., 2020: 171).	The dataset includes 132 sustainability and integrated reports published between 2014 and 2017 by 33 publicly traded German companies. (Beske et al., 2020: 172).	A combination of qualitative content analysis and binary disclosure scoring was used, supported by statistical testing to examine patterns in materiality disclosure. (Beske et al., 2020: 172–173).	Companies actively identify stakeholders and topics but often fail to describe their methods, suggesting that materiality disclosure functions more as a tool of legitimacy than a means of true accountability. (Beske et al., 2020: 174).	Further studies should compare companies with varying characteristics and analyze how conflicting stakeholder interests are considered during materiality assessments. (Beske et al., 2020: 180).

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Karaman, A. S., Orazalin, N., Uyar, A., & Shahbaz, M. (2021).	Does actual CSR performance correlate with greater transparency and completeness in CSR reporting, with GRI adoption and external assurance as potential channels? (GRI) (Karaman et al.,2021:2).	Unbalanced panel of 2,244 firm-year observations (2012–2018) (Karaman et al.,2021:6).	Four regression specifications aligned with prior studies (Karaman et al.,2021:5).	Firms with stronger CSR performance are more likely to publish CSR reports; among reporters, high performers more often adopt GRI and obtain external assurance. GRI adoption itself increases the propensity to assure.. (Karaman et al.,2021:7).	Future work could examine performance-related benefits of CSR practices, including financing terms, stakeholder legitimacy, competitive advantage, and contractual outcomes (Karaman et al.,2021:11).
Farooq, M. B., Zaman, R., Sarraj, D., & Khalid, F. (2021).	Study explores the degree of materiality assessment disclosures, identifies company-level factors that influence these disclosures among listed companies in Gulf countries. (Farooq et al., 2021: 966–967).	The data consists of 1,147 sustainability reports published by 704 listed companies from Gulf countries between 2013-2017. (Farooq et al., 2021: 977).	The authors applied content analysis using a five-point scoring index. Company-level determinants were analyzed through fixed-effect ordered logit and poisson regression models. (Farooq et al., 2021: 978–980).	Although sustainability reporting has increased, most companies do not explain their materiality assessment process. Financial performance, low leverage, and strong governance are associated with greater disclosure, while firm size and market-to-book ratio are not. (Farooq et al., 2021: 981–982).	Future research should examine materiality disclosures in other developing regions and adopt more detailed scoring systems to assess disclosure quality. (Farooq et al., 2021: 968).

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Machado, B. A. A., Dias, L. C. P., & Fonseca, A. (2021).	Which stakeholders and engagement techniques are most used in materiality analysis; how transparently do leading GRI reporters disclose six materiality indicators; and does third-party assurance matter? (Machado et al., 2021:571).	140 English-language reports from large/multinational organizations with GRI for materiality disclosure (Machado et al., 2021:573).	Two-round content analysis focused on stakeholder groups, engagement techniques, and GRI Content Index–referenced sections (Machado et al., 2021:573).	About 22% of assessed indicators were inadequate. Third-party validation, HQ location, and GRI version (G4 vs Standards) did not consistently raise transparency (Machado et al., 2021:578).	Comparision of the materiality analysis in GRI vs non-GRI reports (Machado et al., 2021:578).
Grewal, J., Hauptmann, C., & Serafeim, G. (2021).	Do SASB-identified material disclosures enhance stock price informativeness (Grewal et al., 2021: 520).	The final dataset includes 11,334 firm-year observations from U.S. firms between 2007–2015. (Grewal et al., 2021: 521).	The authors estimate 1-year ahead synchronicity regressions using SASB-aligned disclosure data. (Grewal et al., 2021: 524).	SASB-aligned disclosure improves firm-level information reflected in stock prices. (Grewal et al., 2021: 524).	Future research should explore which SASB topics affect price informativeness, adoption patterns, and comparability. (Grewal et al., 2021: 536).

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Khan, H. Z., Bose, S., Mollik, A. T., & Harun, H. (2021).	What is the quality of sustainability reporting (QSR) in Bangladeshi banks, and how do regulation, social performance, and GRI use influence QSR (Khan et al.,2021:338).	Banks listed on the Dhaka Stock Exchange; 315 bank-year observations (2002–2014) (Khan et al.,2021:349).	Content analysis to build an 11-item QSR index; hypotheses tested via regression (Khan et al.,2021:350-351).	Results show that the quality of sustainability reporting (QSR) among banks in Bangladesh initially showed symbolic progress, but over time, there has been a gradual enhancement in QSR indicators, leading to more significant trends. Factors such as regulatory guidelines on sustainable banking practices, social performance, and adherence to GRI guidelines influence QSR. (Khan et al.,2021:359-360).	For future research, more empirical studies are required to authenticate other features of the quality sustainability reporting such as stakeholders' perceptions about QSR and its impact on organisational performance(Khan et al.,2021:361).
Ngu, S. B., & Amran, A. (2021).	Which factors determine disclosure of materiality in Malaysian sustainability reporting? (Ngu & Amran,2021:228).	2016 annual reports of 113 Malaysian companies that issued a sustainability statement (Ngu & Amran,2021:238).	Content analysis; materiality/relevance index per Fasan & Mio (2020), scaled by report length; determinants tested statistically (Ngu & Amran,2021:238-239).	Board activity and independence predict higher materiality disclosure; board size, profitability, leverage, firm size, and industry are not significant (Ngu & Amran,2021:245).	Future research could explore additional factors influencing materiality disclosure. This study's limitations include generalization and sample size; increasing sample sizes could enhance generalization Moreover, findings are limited to Malaysia, so comparing materiality disclosure in other countries could enrich sustainability reporting literature (Ngu & Amran,2021:246).

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Baboukardos, D., Mangena, M., & Ishola, A. (2021).	Does integrated thinking affect the decision to issue an assured sustainability report? (Baboukardos et al., 2021:1580).	19,076 firm-year observations from 2,774 firms across 47 countries and 10 industries (Baboukardos et al., 2021:1584).	19,076 firm-year observations from 2,774 firms across 47 countries and 10 industries (Baboukardos et al., 2021:1585).	Integrated thinking is positively associated with obtaining assurance (Baboukardos et al., 2021:1581).	Clarify and operationalize the construct of integrated thinking through deeper conceptual work (Baboukardos et al., 2021:1592).
Zaman, R., Farooq, M. B., Khalid, F., & Mahmood, Z. (2021).	What are the determinants and extent of sustainability assurance quality in Australia and New Zealand (Zaman et al., 2021:2887)?	Assurance statements from top 100 listed firms (2017–2019) (Zaman et al., 2021:2887).	Content Analysis (Zaman et al., 2021:2895).	Australia outperforms New Zealand in assurance; despite more reporting, assurance remains scarce. Accountants dominate the market and incumbents are frequently chosen as assurers (Zaman et al., 2021:2887).	Examine effects of ownership, media attention, gender diversity, and other traits on assurance quality (Zaman et al., 2021:2902).

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Jørgensen, S., Mjøs, A., & Pedersen, L.J.T. (2021).	How do parallel notions of materiality (GRI vs SASB) create confusion in practice? (Jørgensen et al., 2022: 342).	Survey and interviews with financial actors in Norway (Jørgensen et al., 2022: 348).	Mixed-method: descriptive statistics + semi-structured interviews (Jørgensen et al., 2022: 348–350).	Professionals struggle to separate financial and stakeholder-driven materiality this often led to misinterpretation of sustainability data (Jørgensen et al., 2022: 343–344, 349).	A harmonized framework integrating double and dynamic materiality is needed to improve sustainability disclosure clarity and comparability (Jørgensen et al., 2022: 357).
Clark, C. E. (2021).	The article investigates how materiality definitions affect ethical responsibilities and managerial disclosure practices. (Clark, 2021: 379).	Comparative analysis of definitions from FASB, IASB, GRI, SASB, IIRC, and the European Commission (Clark, 2021: 381).	Thematic analysis of definition elements: wording, conditions for action, time horizon, and frequency. (Clark, 2021: 384).	Ethical issues emerge when materiality judgments lead to actions like selective disclosure, under-reporting, or avoidance of unfavorable information. (Clark, 2021: 379).	Future research should address ethical concerns related to materiality judgments rather than solely regulatory inconsistencies. (Clark, 2021: 379).

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Donkor, A., Djajadikerta, H. G., & Mat Roni, S. (2021).	How does combined assurance affect external reporting qualities(Donkor et al.,2021:475)?	Firm-level reporting samples (as specified in the study) (Donkor et al.,2021:475)?	Content Analysis and Ordinary least square (OLS) regression (Donkor et al.,2021:475)	Findings presents there is a strong relationship between the combined assurance and sustainability reporting. In addition, combined assurance rises the credibility of the sustainability reports (Donkor et al.,2021:475).	Incorporate alternative financial reporting quality metrics for a fuller view of the relationship (Donkor et al.,2021:498).
Yan, M., Jia, F., Chen, L., & Yan, F. (2022).	How is an assurance statement produced throughout the assurance process, and what challenges do reporting firms face? (Yan et al., 2022:11).	Data consisted of 87 identified papers on between the periods 2003–2021(Yan et al., 2022:11). .	Systematic Literature Review (Yan et al., 2022:11).	A five-stage assurance framework is proposed: selection, identification, screening, validation, evaluation. Benefits are constrained by weak stakeholder engagement and assurer independence (Yan et al., 2022:1). .	More empirical work is needed to unpack the complexities of the assurance process (Yan et al., 2022:11).

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Fiandrino, S., Tonelli, A., & Devalle, A. (2022).	What is the current situation of sustainability materiality research in accordance with methods, theories, and academic themes? (Fiandrino et al., 2022: 671).	90 journal articles (2010–2021) (Fiandrino et al., 2022: 673).	Protocol-based systematic review with content analysis and coding (Fiandrino et al., 2022: 672).	The field is growing yet fragmented; many studies lack strong theory. Recent emphasis on stakeholder engagement, double materiality, and integrating social/environmental impacts in long-term decisions Fiandrino et al., 2022: 683–684).	Future research should examine how companies identify which sustainability topics are most important by considering both risks and long-term value, especially in relation to the United Nations' sustainability goals (Fiandrino et al., 2022: 685).
Ruiz-Lozano, De Vicente-Lama, Tirado-Valencia & Cordobés-Madueño. (2022).	This study investigates how Spanish state-owned enterprises disclose the materiality determination process and how regulation and sector guidelines affect this disclosure. (Ruiz-Lozano et al., 2022: 385).	Data consists of 64 sustainability reports from Spanish state-owned enterprises selected based on availability and compliance with national reporting obligations. (Ruiz-Lozano et al., 2022: 393).	15-item content index; t-tests and Wilcoxon tests for group comparisons (Ruiz-Lozano et al., 2022: 396).	Spanish state-owned enterprises disclose material issues but rarely explain the assessment process, indicating symbolic legitimacy. Empirical results also indicate that disclosure levels tend to be higher in organizations with external assurance, larger size, or adoption of reporting frameworks. (Ruiz-Lozano et al., 2022: 397, 400).	Future studies are required to better figüre out how each stage of the materiality process is communicated in reports. (Ruiz-Lozano et al., 2022: 391).

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Karagiannis, I., Vouros, P., Sioutas, N., & Evangelinos, K. (2022).	What are the most important features of the shipping in terms of CSR, and how do different segments of the industry differ in their sustainability priorities? (Karagiannis et al., 2022: 2).	90 sustainability reports (2016 reporting period), out of which 42 met sampling criteria (GRI-compliant and containing materiality assessment); data drawn from shipping, port, supplier and consultancy companies (Karagiannis et al., 2022: 5).	Weber-based content analysis plus MCDA; expert survey (Karagiannis et al., 2022: 5).	Occupational H&S, air emissions, energy management, and digital innovation are central across segments; the sector shows inconsistent GRI application and low stakeholder pressure (Karagiannis et al., 2022: 12).	Develop sector-specific standards; test links between CSR engagement, performance, and outcomes (Karagiannis et al., 2022: 13).
Abhayawansa, S. (2022).	The study questions how materiality could be redefined to overcome the conceptual issues of both financial and non-financial materiality frameworks (Abhayawansa, 2022: 1361).	The author examines academic literature, global sustainability standards, and responses to regulatory drafts such as the ISSB Exposure Draft (Abhayawansa, 2022: 1363).	The paper uses a critical theoretical lens to evaluate how materiality has been defined in the literature and proposes an alternative approach (Abhayawansa, 2022: 1363).	A materiality approach that focuses not on providing decision-useful information to any specific stakeholder, but instead on the organization's responsibility to account for the financial and non-financial resources it uses from capital providers, society, and the environment, is more probable to reach sustainable development (Abhayawansa, 2022: 1379).	Future research is encouraged to refine the proposed accountability-based definition of materiality and develop clear criteria for each capital type. A common interpretation of materiality is essential to achieve fairness and support sustainability goals across jurisdictions.(Abhayawansa, 2022: 1380).

Author	Research Question	Data	Method	Main Findings	Future Directions
Elaigwu, M., Abdulmalik, S. O., & Talab, H. R. (2022).	How do corporate integrity and external assurance affect sustainability reporting quality (SRQ) in Malaysia? (Elaigwu et al., 2022:1).	Two thousand four hundred sixty-three firm-year observations (Elaigwu et al., 2022:1).	Panel regression(Elaigwu et al., 2022:1).	Both corporate integrity and external assurance have positive, significant effects on SRQ (Elaigwu et al., 2022:1).	Complement quantitative results with qualitative inquiries into mechanisms (Elaigwu et al., 2022:1).
Ottenstein, P., Erben, S., Jost, S., Weuster, C. W., & Zülch, H. (2022).	What is the impact of the EU Non-financial Reporting Directive (2014/95/EU) on reporting quantity and quality (Ottenstein et al., 2022:55)?	905 treated firms (Ottenstein et al., 2022:55).	Regression analysis(Ottenstein et al., 2022:55).	The Directive increases both the extent and quality of sustainability reporting (Ottenstein et al., 2022:55).	Examination on SMEs, private firms, and cross-cultural factors shaping reporting (Ottenstein et al., 2022:55)

Author	Research Question	Data	Method	Main Findings	Future Directions
Alsahali, K. F., & Malagueño, R. (2022).	What are the global trends in assurance of sustainability reports?(Alsahali & Malagueño, 2022:617).	Data was collected from 12,783 companies(Alsahali & Malagueño, 2022:617).	Exploratory, descriptive analyses of assurance practices (Alsahali & Malagueño, 2022:617).	Assurance growth lags reporting growth; frequent provider switching; non-accounting assurers increasingly adopt ISAE 3000 (Alsahali & Malagueño, 2022:617).	Investigation on drivers of provider switching and standard adoption (Alsahali & Malagueño, 2022:637).
Ruiz-Barbadillo, E., & Martínez-Ferrero, J. (2022).	From a legitimacy lens, why do firms voluntarily appoint their financial auditor to also provide sustainability assurance, and what does this imply for assurance quality? (Ruiz-Barbadillo & Martinez-Ferrero, 2022:459).	9,744 firm-year observations from 3,594 firms (2007–2016) (Ruiz-Barbadillo & Martinez-Ferrero, 2022:469).	Regression models of provider choice (Ruiz-Barbadillo & Martinez-Ferrero, 2022:459).	Selecting the incumbent auditor is more likely when the auditor has strong industry specialization; independence concerns appear less decisive (Ruiz-Barbadillo & Martinez-Ferrero, 2022:484-485).	Examine additional drivers such as ownership structure, family control, industry granularity, financial reporting quality, cultural systems, corruption/transparency indices, and assurer market experience (Ruiz-Barbadillo & Martinez-Ferrero, 2022:484-485).

Author	Research Question	Data	Method	Main Findings	Future Directions
Thompson, E. K., Ashimwe, O., Buertey, S., & Kim, S. Y. (2022).	Is sustainability reporting associated with firm value, and do assurance and assurer type matter? (Thompson et al., 2022:858).	Firms listed on the Johannesburg Stock Exchange (Thompson et al., 2022:858).	Fixed-effects panel estimation (Thompson et al., 2022:858).	Sustainability reporting shows a positive association with firm value; assurance further helps explain value differences (Thompson et al., 2022:871-872).	Test country-level and cross-country settings to assess whether assurance moderates the CSR disclosure–value link (Thompson et al., 2022:872).
Hazaea, S. A., Zhu, J., Khatib, S. F., Bazhair, A. H., & Elamer, A. A. (2022).	Current state of the sustainability assurance literature (Hazaea et al.,2022:4843)?	Ninety-four academic papers were taken from the Scopus database between 1993 and 2021(Hazaea et al.,2022:4843).	Systematic Literature Review (Hazaea et al.,2022:4845).	Publications have risen markedly; research on private and nonprofit organizations remains sparse (Hazaea et al.,2022:4843).	For future research, expand evidence on governance aspects within sustainability assurance research a(Hazaea et al.,2022:4860).

Author	Research Question	Data	Method	Main Findings	Future Directions
Karagiannis, I., Vouros, P., Sioutas, N., & Evangelinos, K. (2022).	What does the maritime sector's CSR agenda look like in the short and long term? (Karagiannis et al.,2022:1).	90 sustainability reports from diverse maritime organizations (2017). (Karagiannis et al., 2022:5).	Qualitative content analysis with coding of report components (Karagiannis et al., 2022:5).	The sector is a relative latecomer to CSR/non-financial reporting; most material topics are occupational H&S, air emissions control, and energy management, with small differences across segments (Karagiannis et al., 2022:13).	Analysis of the same issue with more extended data is proposed for validation of the results for future research(Karagiannis et al., 2022:13).
Bektaş, O., & Yücel, E. (2022).	To what extent do Turkish organizations that regularly publish integrated reports disclose contributions to sustainability? (Bektaş& Yücel, 2022: 74).	Thirteen businesses and institutions that continuously published integrated reports between 2019, 2020, and 2021 were identified, and a total of 39 integrated reports from these thirteen entities were examined (Bektaş& Yücel,2022:67).	In the study, a content analysis approach using the MAXQDA software was employed to assess 39 integrated reports (Bektaş&Yücel,2022:68).	According to the findings, contributions made by the enterprises were most significant in the sub-dimensions of education and equality regarding social sustainability (Bektaş& Yücel, 2022: 75).	N/A

Author	Research Question	Data	Method	Main Findings	Future Directions
Jayarathna, C. P., Agdas, D., Dawes, L., & Miska, M. (2022).	Which sustainability indicators are most material for the logistics sector, and how should they be prioritized? (Jayarathna et al.,2022:321).	Data of the study consisted of GRI standard reports and (Jayarathna et al.,2022:327).	Leximancer-assisted qualitative content analysis (Jayarathna et al.,2022:325).	Economic performance and energy emerge as most material; reporting nonetheless emphasizes social information. Environmental and social topics dominate overall disclosures. (Jayarathna et al.,2022:321).	Future research is required to improve sector-specific sustainability indicators for consistent reporting and policy development. Despite the voluntary nature of sustainability reporting, logistics companies do not fully utilize the GRI standard, indicating the necessity for tailored sustainability metrics. (Jayarathna et al.,2022:334).
Kolnhofer-Derecskei, A.N.I.T.A.& Reicher, R.(2022).	Purpose of the study is to review literature relating with operational areas which could be analyzed and improved from the context of Corporate Social Responsibility (CSR) (Kolnhofer-Derecskei & Reicher,2022:431).	N/A	Systematic Literature Review (Kolnhofer-Derecskei & Reicher,2022:432-433).	According to the findings, It is recommended to shift the economy towards prioritizing the development of the manufacturing industry, particularly high-tech sectors. However, these industries should primarily focus on exports. The growth of export-oriented production should not solely rely on natural comparative advantages but should also consider acquired comparative advantages for efficiency(Kolnhofer-Derecskei & Reicher,2022:431).	N/A

Author	Research Question	Data	Method	Main Findings	Future Directions
Clark, T. P., Smolski, A. R., Allen, J. S., Hedlund, J., & Sanchez, H. (2022).	The paper has two purposes. The first is to provide an update on environmental sociology, political economy, and sustainability (Clark et al.,2022:159).	The total data is 136 articles from 17 journals (Clark et al.,2022:165).	Keyword-guided content analysis; categories for outcomes, mechanisms, agents, magnitude, scale, temporality (cross-sectional/longitudinal) (Clark et al.,2022:166).	Reflexive political economy does not constitute a theory of ecological change and this applies to sociology and adjacent fields as well (Clark et al.,2022:175).	Studies engage with structural analysis of critical political economy for ongoing environmental degradation (Clark et al.,2022:175).
Kang, H., & Kim, J. (2022).	Primary purpose of the study is to propose an approach which use sentence similarity method and sentiment analysis. (Kang & Kim,2022:1).	60 sustainability reports were obtained from six prominent multinational corporations renowned for their leadership in sustainable practices. These companies were selected because they have consistently ranked within the top 10 positions in the SustainAbility Institute survey from 2011 to 2020(Kang & Kim,2022:16).	Sentence-level similarity metrics with a pre-trained language model; sentiment analysis (Kang & Kim,2022:2).	The approach is useful; firms actively leverage reporting to protect and improve reputations during crises Kang & Kim,2022:1).	The investigation was limited to solely six target companies in order to showcase the efficiency of the novel methodology. For future research, it is imperative to broaden the ambit by incorporating a greater number of target companies or undertaking comprehensive examinations of various companies within a designated industry(Kang & Kim,2022:16).

Author	Research Question	Data	Method	Main Findings	Future Directions
Haider, M. B., & Nishitani, K. (2022).	How do ownership structure and governance relate to assurance adoption in Japan (Haider & Nishitani, 2022:374).	2019 sustainability reports of Nikkei 500 firms (Haider & Nishitani, 2022:374).	Logit regression model (Haider & Nishitani, 2022:381).	Institutional ownership and board independence encourage assured reporting; together they strengthen managerial accountability to external stakeholders (Haider & Nishitani, 2022:383-384).	Usage of longitudinal data to test persistence of assurance decisions over time is suggested for future research (Haider & Nishitani, 2022:385).
Vander Bauwhede, H., & Van Cauwenberge, P. (2022).	What are the drivers of sustainability report assurance (Vander Bauwhede & Van Cauwenberge,2022:1)?	1,832 firm-years from 660 listed firms (2017–2020) (Vander Bauwhede & Van Cauwenberge,2022:1).	Logistic regression analysis (Vander Bauwhede & Van Cauwenberge,2022:5).	Firm scale, ESG performance, and industry affiliation are key determinants of assurance demand (Vander Bauwhede & Van Cauwenberge,2022:12).	Repetition of the analysis in other contexts are proposed for future research(Vander Bauwhede & Van Cauwenberge,2022:12).

Author	Research Question	Data	Method	Main Findings	Future Directions
Li, T., Hidayah, N. N., Lyu, O., & Lowe, A. (2023).	Why do corporate managers in China hesitate to adopt sustainability reporting assurance (SRA) provided by independent third-party assurers, and how is this reluctance expressed? (Li et al., 2023:1221).	25 managers directly involved in sustainability reporting activities (Li et al., 2023:1221).	Semistructured interviews and analysis of archival documents(Li et al., 2023:1221).	Managers recognize that external SRA could strengthen the credibility of sustainability accountability, yet they resist adoption due to strong adherence to existing sociopolitical stability norms in China (Li et al., 2023:1221).	Further studies should examine the development and consequences of both voluntary and mandatory CSR and sustainability reporting practices across diverse organizational and national settings (Li et al., 2023:1240).
Mnif, Y., & Kchaou, J. (2023)	What is the link between the readability of sustainability reports and the level of effort exerted by assurance providers? (Mnif & Kchaou, 2023:712).	Data comprised 882 observations from 39 Countries(Mnif & Kchaou, 2023:719).	Regression Analysis(Mnif & Kchaou, 2023:720).	When sustainability reports are harder to read, assurance providers dedicate greater effort to ensure verification quality, as reflected in longer assurance delays (Mnif & Kchaou, 2023:712).	Future work should explore additional distinguishing characteristics in the assurance market, such as provider independence, tenure, or gender, which extend beyond provider type (Mnif & Kchaou, 2023:725).

Author	Research Question	Data	Method	Main Findings	Future Directions
Rezaee, Z., Homayoun, S., Rezaee, N. J., & Poursoleyman, E. (2023).	Is there a measurable link between the adoption of Sustainable Development Goals (SDGs) at the firm level and the likelihood of engaging in sustainability reporting and seeking sustainability assurance? (Rezaee et al., 2023:973).	44 countries from 2016–2021 (Rezaee et al., 2023:973).	Probit models and logistic regression models (Rezaee et al., 2023:973).	Firms that integrate SDGs into their practices are more likely to issue sustainability reports and obtain external assurance. This relationship is stronger in countries with stakeholder-oriented systems (Rezaee et al., 2023:989).	Future studies could analyze how firms from different institutional contexts disclose ESG practices to broaden comparative insights (Rezaee et al., 2023:976).
Bakry, A. E. A., Azhar, Z., & Kishan, K. (2023).	How do the Sustainability Reporting Guide 2.0 and external assurance jointly influence the readability of corporate social responsibility (CSR) reporting? (Bakry et al., 2023:3493).	Fortune 500 corporations that released stand-alone corporate sustainability reports between years 2002-2014 (Bakry et al., 2023:3497).	Two readability indices and multivariate regression analysis were employed to compare the readability of csr reporting (Bakry et al., 2023:3493).	The combined impact of the Sustainability Reporting Guide 2.0 and assurance improves the clarity of CSR reporting (Bakry et al., 2023:3513).	Reinvestigating same issue by evaluating companies of different sizes could be considered an alternative area for future research. (Bakry et al., 2023:3513).

Author	Research Question	Data	Method	Main Findings	Future Directions
Farooq, M. B., Azantouti, A. S. A., & Zaman, R. (2023).	What are the current trends in the literature on non-financial information, with emphasis on external assurance of sustainability and integrated reports? (Farooq et al., 2023:1).	Data consisted of 179 articles published from 1999 to 2023 (Farooq et al., 2023:1).	A structured literature review (Farooq et al., 2023:1).	Assurance engagements are conceptualized around five elements: tripartite arrangement, subject matter, suitable criteria, sufficient evidence, and a written assurance report (Farooq et al., 2023:1).	Five component of assurance process described, are offered for future research(Farooq et al., 2023:27).
Hay, D. C., Kend, M., Sierra-García, L., & Subramaniam, N. (2023).	What determines the choice and quality of sustainability assurance providers? (Hay et al., 2023:1183).	160 academic papers on sustainability reporting (Hay et al., 2023:1192).	Meta-regression analysis (Hay et al., 2023:1183).	Limited evidence is found to confirm hypothesized links between governance/agency-related factors and assurance choices (Hay et al., 2023:1183).	Authors suggest revisiting methodological approaches to better explain provider selection and assurance quality (Hay et al., 2023:1200).

Author	Research Question	Data	Method	Main Findings	Future Directions
Dilla, W., Janvrin, D., Perkins, J., & Raschke, R. (2023).	Does the format and level of sustainability assurance reports influence non-professional investors' judgments? (Dilla et al., 2023:1209).	Data consisted of 2 x 2 between-participants experiments with 436 US non-professional investors(Dilla et al., 2023:1209).	Online Survey (Dilla et al., 2023:1217)?	Report format matters: when financial and sustainability assurance reports are presented separately, limited assurance reports are seen as more credible than reasonable assurance reports (Dilla et al., 2023:1225–1226).	For future research, under what conditions might investors perceive heightened confidence in a limited sustainability assurance report are proposed(Dilla et al., 2023: 1226).
Issa, A., & Hanaysha, J. R. (2023).	What is the relationship between emissions reduction initiatives and external assurance of sustainability performance? (Issa & Hanaysha, 2023:3095).	Firms' data on emissions reduction initiatives (Issa & Hanaysha, 2023:3095).	Regression Models (Issa & Hanaysha,2023: 3098).	External assurance significantly supports emissions reduction initiatives. CSR strategies also strengthen this relationship (Issa & Hanaysha, 2023:3095).	Expanding the sample to firms from multiple regions would improve generalizability of the findings (Issa & Hanaysha, 2023:3107).

Author	Research Question	Data	Method	Main Findings	Future Directions
Alomran, A. A., & Alsahali, K. F. (2023).	How does long-term ownership affect firms' decisions to seek sustainability report assurance? (Alomran & Alsahali, 2023:1)	16,395 firm-year observations from 3,446 companies in 31 countries, covering 2010–2020 (Alomran & Alsahali, 2023:6).	Logistic regression analysis (Alomran & Alsahali,2023:6).	A significant positive relationship is observed between long-term ownership and the likelihood of obtaining external assurance. The effect is particularly strong at high ownership levels, less so at medium or low levels (Alomran & Alsahali, 2023:1).	Further studies could explore the mechanisms through which long-term institutional investors shape firms' assurance decisions (Alomran & Alsahali, 2023:15).
Krasodomska, J., Zarzycka, E., & Zieniuk, P. (2023).	How do Sustainable Development Goals impact European Union companies' sustainability reporting assurance decision (Krasodomska et al.,2023:1)?	The dataset comprises 960 companies located in the European Union and encompasses the years 2020 to 2022(Krasodomska et al.,2023:1).	Regression analysis(Krasodomska et al.,2023:4).	Sustainable Development Goals influence companies' assurance decisions on firm and country level(Krasodomska et al.,2023:8-9).	Future research could employ surveys or interviews to investigate drivers behind companies' decisions to obtain assurance (Krasodomska et al., 2023:9).

Author	Research Question	Data	Method	Main Findings	Future Directions
Jeriji, M., & Nasfi, A. (2023).	How does compulsory sustainability reporting assurance affect firm value (Jeriji & Nasfi, 2023: 122)?	88 Johannesburg Stock Exchange (JSE) firms, 2007–2018 (Jeriji & Nasfi, 2023:128).	Fixed-effects OLS panel model (Jeriji & Nasfi, 2023:127).	Mandatory sustainability assurance positively influences investor perceptions and enhances firm value (Jeriji & Nasfi, 2023:122).	Future work could explore the assurance–firm value link in different contexts and markets (Jeriji & Nasfi, 2023:135).
Dewi, A. A., Saraswati, E., Rahman, A. F., & Atmini, S. (2023).	Which factors drive the quality of sustainability reporting? (Dewi et al., 2023:2).	172 reports from non-financial sector firms on the Indonesia Stock Exchange, 2016–2020 (Dewi et al., 2023:6).	Content analysis based on Krippendorff (2004), with coding of sentences; quality assessed through indices for disclosure quantity, density, accuracy, and managerial orientation; multivariate analysis applied (Dewi et al., 2023:6–7).	Findings show that higher materiality can increase disclosure volume but not accuracy or depth. Stakeholder engagement and governance variables had limited influence on reporting quality (Dewi et al., 2023:18).	Future research should examine reporting quality across industries, including firms that do not follow GRI standards, to capture broader sectoral differences (Dewi et al., 2023:18).

Author	Research Question	Data	Method	Main Findings	Future Directions
Mezzanotte, F. E. (2023).	How does legal ambiguity in applying double materiality affect firms' exposure to legal risk? (Mezzanotte, 2023:633).	The analysis is grounded in the CSRD, ESRS, and legal doctrine concerning materiality and disclosure obligations. (Mezzanotte, 2023: 633)	Conceptual legal analysis of EU sustainability regulation and its implications for corporate compliance. (Mezzanotte, 2023: 635)	Companies face legal uncertainty due to vague definitions in the ESRS, especially in determining relevant impacts and stakeholder input. (Mezzanotte, 2023: 635)	Future work should explore enforcement mechanisms, greenwashing risks, and the role of assurance in improving legal certainty. (Mezzanotte, 2023: 633).
Setia, N., Abhayawansa, S., Joshi, M., & Wasantha Pathiranage, N. (2024).	What is the effect of the Integrated Reporting Framework on the disclosure of financial and impact-material sustainability information? (Setia et al., 2024:10).	Integrated reports from 40 firms in the IIRC Pilot Programme, 2015–2017 (Setia et al., 2024:10).	Content analysis of integrated reports from these firms (Setia et al., 2024:15).	Impact-material disclosures were more common than financial ones; environmental and labor-related issues dominated reporting (Setia et al., 2024:15).	Future studies should refine the coding index, extend empirical testing across settings, and use interviews/case studies to explain variation in disclosure levels (Setia et al., 2024:25).

Author	Research Question	Data	Method	Main Findings	Future Directions
Hehenberger, L., & Andreoli, C. (2024).	What is the main source for tension between impact measurement and materiality, and how can these be addressed through future research? (Hehenberger & Andreoli, 2024: 2).	Recent academic literature on impact measurement and sustainability reporting, with focus on 2020–2023 period (Hehenberger & Andreoli, 2024: 2).	Critical and synthetic literature review, with conceptual mapping of tensions between materiality and impact measurement (Hehenberger & Andreoli, 2024: 2–3).	Tensions stem from conflicting stakeholder expectations, measurement standard inconsistencies, and the subjective nature of materiality itself (Hehenberger & Andreoli, 2024: 3–4).	Four research directions are proposed, including empirical studies on how multistakeholder materiality is embedded in decisions and how conflicting standards shape investment outcomes (Hehenberger & Andreoli, 2024: 4).
Tan, F., & Dipendra, K. C. (2024).	How do materiality assessments and stakeholder engagement disclosures interact in Thai corporate reports? (Tan & Dipendra, 2024:2).	Sustainability reports of Thai companies recognized by both S&P Global Gold Class and the Thailand Sustainability Investment (TSI) index (Tan & Dipendra, 2024: 7).	Structured content analysis using a custom scoring framework aligned with GRI standards to assess both stakeholder engagement and materiality (Tan & Dipendra, 2024: 8).	Firms often list stakeholders and material topics separately but lack transparency on how stakeholder input shapes materiality outcomes (Tan & Dipendra, 2024: 11).	Future research should examine whether rigorous materiality assessments reduce meaningful stakeholder engagement by favoring key stakeholder demands over inclusive participation (Tan & Dipendra, 2024: 15).

Author	Research Question	Data	Method	Main Findings	Future Directions
Padilla-Garrido, N., Aguado-Correa, F., Rabadán-Martín, I., López-Jiménez, J. M., de la Vega-Jiménez, J. J., & Peletier-Ribera, I. (2024).	How do Spanish listed companies disclose materiality analysis and align material topics with GRI standards? (Padilla-Garrido et al., 2024: 5391).	Sustainability reports (2018–2021) from Spanish listed firms applying GRI Standards (Padilla-Garrido et al., 2024:5391).	Materiality Disclosure Assessment (MDA) index to evaluate quality and scope of disclosure (Padilla-Garrido et al., 2024:5392).	The average MDA index score was slightly above 50%. Also, 20% of material topics had no direct match with GRI standards (Padilla-Garrido et al., 2024: 5391–5393).	Future researchers are encouraged to explore how materiality analyses are conducted across different industries and to identify which issues are considered most important within each sector. (Padilla-Garrido et al., 2024: 5408).
Huq, A. M., & Mohammadrezaei, M. (2024).	How is materiality defined and measured in sustainability reporting, and what influences disclosures and outcomes? (Huq & Mohammadrezaei, 2025:72).	A systematic review of 39 peer-reviewed studies from Scopus (Huq & Mohammadrezaei, 2025:74).	The authors follow a structured review process inspired by Kitchenham et al. (2009), using predefined criteria to evaluate and classify existing research (Huq & Mohammadrezaei, 2025: 74).	Ex-ante models are more sophisticated but under-validated, while ex-post measures oversimplify and often neglect stakeholder input (Huq & Mohammadrezaei, 2025:92).	The authors recommend empirical testing of materiality models that involve broader stakeholder perspectives (Huq & Mohammadrezaei, 2025: 91).

Author	Research Question	Data	Method	Main Findings	Future Directions
Oll, J., Spandel, T., Schiemann, F., & Akkermann, J. (2025).	Is a unified understanding of materiality possible in sustainability reporting despite conceptual pluralism? (Oll et al., 2025:322).	134 academic articles and regulatory standards including GRI, IFRS, and ESRS collected via keyword search in 32 accounting journals (Oll et al., 2025:322).	Systematic literature review with Gallie's (1956) contested concepts framework to distinguish confusion from essential contestation (Oll et al., 2025:323).	The lack of consensus on materiality arises from essential contestation, not confusion. Thus, conceptual plurality is inevitable and enduring (Oll et al., 2025:338).	Scholars should embrace plural understandings of materiality and pursue interdisciplinary work to better understand differing conceptions and their implications (Oll et al., 2025:323).
Giacomini, D., Rocca, L., & Tonoli, D. (2025).	How materiality assessments and stakeholder engagement practices are implemented by European water utilities in sustainability reporting, and whether these processes have evolved between 2020 and 2022. (Giacomini et al., 2025: 2608).	Sustainability and integrated reports of 26 water utilities from 8 European countries (2020–2022), totaling 74 reports (Giacomini et al., 2025:2615).	Manual content analysis of 74 reports over three years. The analysis involved classification of material topics and categorization of stakeholder engagement processes. It was conducted independently by two authors and validated through iterative discussion. (Giacomini et al., 2025: 2614–2615).	The study found that while a majority of companies adopted a dialogic model of stakeholder engagement, fewer than one in four implemented a truly multi-directional dialogue approach. Environmental themes were prioritized across disclosures, whereas economic and governance topics were treated as lower priorities. These findings suggest a tendency toward isomorphic behavior in how material topics are selected and communicated. (Giacomini et al., 2025: 2621).	The authors suggest that further research should investigate how different approaches to materiality emerge, develop and are applied in practice. They also emphasize the need to explore perceptions, tensions and resolutions around the evolving relationship between materiality and stakeholder engagement, particularly across varying countries and ownership structures. (Giacomini et al., 2025: 2622).

Source: Processed by Author

CHAPTER THREE
ANALYSIS OF CONTAINER SHIPPING COMPANIES

3.1. RESEARCH QUESTION AND PURPOSE OF THE STUDY

Considering the importance of container shipping in global trade and sustainability, this doctoral dissertation is formulated around the following research question: What are the material sustainability issues presented in the sustainability reports of companies operating in the container shipping industry, and to what extent are these issues subject to independent assurance? The aim of the study has been developed in direct relation to this question.

The purpose of this research is to identify the material issues addressed in the sustainability reports of companies within the container shipping sector and to assess the extent to which these issues are independently assured. In addition, the study seeks to evaluate the quality of reporting by focusing on how companies approach materiality and assurance dimensions. Through this approach, the research expected to provide an in-depth assessment of current sustainability reporting practices specific to the container shipping and to offer empirical insights that may support the development of future regulatory frameworks and sector-wide standards.

The study will systematically analyze which material sustainability topics are reported by companies in this sector and evaluate the degree to which these topics are subject to verification through independent assurance services. The overall quality of the sustainability reports will be assessed through two key dimensions: the identification of material issues and the presence of external assurance. Moreover, the research will explore how sustainability reporting practices in the container shipping sector have evolved over time. By doing so, it clarifies the ways in which corporate strategies and actions related to sustainability goals have developed, while also offering findings that may inform stakeholder decision-making processes.

3.2. RESEARCH SAMPLE

The sample consists of the world's ten largest container shipping companies. While various institutions may rank global container shipping companies differently, our study is based on the 2022 ranking compiled by Alphaliner (Alphaliner, 2022).

The primary reason for selecting companies according to Alphaliner's ranking is that the Review of Maritime Transport reports, published by the United Nations Conference on Trade and Development (UNCTAD), rely on Alphaliner's data when presenting rankings related to container shipping (UNCTAD, 2022:27).

The rationale behind limiting the sample to only the top ten container shipping companies is that these firms collectively account for approximately 85% of the market in terms of TEU capacity. Moreover, beyond the tenth-ranked company, the incremental informational value becomes marginal. Table 6 presents the top 10 container shipping companies for the year 2022, along with their TEU capacities and market shares.

Table 6: TEU Capacity and Market Share of the Top Ten Companies

Operators	TEU	Share (%)
Mediterranean Shipping Company	4,609,915	17.64
Maersk	4,220,012	16.1
CMA CGM Group	3,402,212	13
Cosco Shipping Lines	2,869,477	10.9
Hapag-Lloyd	1,796,163	6.8
ONE (One Ocean Network Express)	1,661,865	6.34
Evergreen Line	1,528,921	5.8
HMM Co Ltd.	816,365	3.1
Yang Ming Marine Transport Corp.	705,614	2.7
Zim Line	533,823	2.04
Total	21,144,367	84.42

Source: Adapted from Alphaliner,2022

Mediterranean Shipping Company was founded in Brussels in 1970. Today, the company operates a fleet of 900 vessels, providing container shipping services across 300 trade routes and calling at 520 ports in 155 countries (Mediterranean Shipping Company, 2024). As shown in Table 6, it holds the leading position in the industry with a market share amounting to 17.64 percent.

Maersk was founded as a family-owned company on April 16, 1904, in Svendborg, Denmark. Following the loss of much of its fleet during World War II, the company transitioned into container shipping in the 1970s. Today, it operates a fleet of 700 container vessels, providing services in 130 countries. The company has announced its commitment to achieving net-zero carbon emissions by 2040(Maersk,2024).As shown in Table 6, Maersk is currently the world's second-largest container shipping company, with a market share of 16.1 percent.

CMA CGM was originally established in 1978 in Marseille by Jacques Saadé under the name Compagnie Maritime d'Affrètement (CMA). The company later merged with Compagnie Générale Maritime (CGM) in 1999, giving rise to the current CMA CGM Group. Today, the company operates a fleet of approximately 650 container vessels, offering services across 250 shipping lines and calling at 420 ports worldwide (CMA CGM,2024). As indicated in Table 6, CMA CGM ranks as the third-largest container shipping company globally, holding a market share of 13 percent.

COSCO SHIPPING Lines was established in Shanghai on March 1, 2016, following the merger of COSCO Container Lines and China SHIPPING Container Lines. The company currently operates a fleet of 551 vessels, providing container shipping services across 404 routes, calling at 641 ports in 146 countries (COSCO Shipping Lines, 2022). As shown in Table 6, it ranks as the fourth-largest container shipping company in the world, with a market share of 10.9 percent.

Hapag-Lloyd AG was established in 1970 through the merger of HAPAG, founded in 1847, and Norddeutscher Lloyd, founded in 1857. Today, the company operates a fleet of 308 vessels, providing container shipping services in 140 countries(Hapag-LIoyd,2024). As indicated in Table 6, Hapag-Lloyd ranks as the fifth-largest container shipping company in the world, with a market share of 6.8 percent.

Ocean Network Express (ONE) was established in Singapore on July 7, 2017, through the merger of three major Japanese shipping companies: K Line, MOL, and NYK. The company currently operates a fleet of 240 vessels, providing container shipping services to more than 120 countries(Ocean Network Express,2024). As shown in Table 6, ONE ranks as the sixth-largest container shipping company in the world, with a market share of 6.34 percent.

Evergreen Marine was founded on September 1, 1968, in Taiwan by Dr. Yung-Fa Chang. Today, the company operates a fleet of 200 container vessels, providing shipping services across five continents. Evergreen has set a target to achieve net-zero carbon emissions by 2050 (Evergreen,2024). As shown in Table 6, the company ranks as the seventh-largest container shipping firm in the world, with a market share of 5.8 percent.

Founded as Asia Merchant Marine on March 25, 1976, the company entered the container shipping industry in 1978. In 2020, it was rebranded as Hyundai Merchant Marine (HMM). Today, the company operates a substantial fleet of container vessels, offering shipping services worldwide(Hyundai Merchant Marine, 2024). With a market share of 3.1 percent, HMM ranks as the eighth-largest container shipping company globally.

Yang Ming Marine Transport Corp. was founded in Taiwan in 1972. The company operates a fleet of 100 container vessels and provides shipping services through 241 offices established across 87 countries. As shown in Table 6, Yang Ming holds a market share of 2.7 percent, making it the ninth-largest container shipping company in the world (Yang Ming, 2024).

ZIM Line was established in Israel in 1945. Today, the company provides container shipping services on more than 300 routes, covering over 90 countries (ZIM Line, 2023). As shown in Table 6, ZIM ranks as the tenth-largest container shipping company in the world, with a market share of 2.04 percent.

3.3. DATA OF THE RESEARCH

The data for this study consist of the sustainability reports published between 2018 and 2022 by the world's top ten container shipping companies, as identified by

Alphaliner in its 2022 ranking. According to Alphaliner's 2022 list, these ten companies together account for 84.5% of the global container fleet's total TEU capacity (Alphaliner, 2022).

The selection of 2018 as the starting year is based on the 2017 release of the recommendations by the Task Force on Climate-related Financial Disclosures (TCFD), which urged companies to prioritize environmental transparency and align their practices with broader sustainability goals. As a result, the sustainability reports covering the period from 2018 to 2022 form the core dataset of this research(TCFD,2018).

Table 7: Data of the Study

Years	2018		2019		2020		2021		2022	
Situation of the Report	Published	Assured	Published	Assured	Published	Assured	Published	Assured	Published	Assured
MSC	✓	×	✓	×	✓	×	✓	×	✓	✓
Maersk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CMA CGM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
COSCO Shipping Lines	×	×	×	×	✓	✓	✓	✓	✓	✓
Hapag- Lloyd	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
One Ocean Network Express	✓	×	✓	×	✓	×	✓	×	✓	✓
Evergreen	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HMM Co Ltd	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Yang Ming	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zim Lines	✓	×	✓	×	✓	×	✓	×	✓	×

Source: Processed by Author

As shown in Table 7, a total of 47 sustainability reports were published by the selected companies between 2018 and 2022. Among these, 34 reports included external assurance. Therefore, the analysis in this study is based on the 34 assured

sustainability reports. Tables 8 to 17 present information on the standards applied in preparing the companies' sustainability reports for the period 2018–2022, the external assurance providers involved, and the countries in which the companies' headquarters are located.

Table 8: Mediterranean Shipping Company

Mediterranen Shipping Company	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	GRI Standards	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	No Assurance	No Assurance	No Assurance	No Assurance	Ernst&Young
HQ Country	Switzerland	Switzerland	Switzerland	Switzerland	Switzerland

Source: Processed by Author

Table 9: Maersk

Maersk	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	ESG frameworks, including TCFD, SASB, GRI	ESG frameworks, including TCFD, SASB, GRI	ESG frameworks, including TCFD, SASB, GRI	ESG frameworks, including TCFD, SASB, GRI	ESG frameworks, including TCFD, SASB, GRI
Assurance Company	Pricewaterhouse Coopers	Pricewaterhouse Coopers	Pricewaterhouse Coopers	Pricewaterhouse Coopers	Pricewaterhouse Coopers
HQ Country	Denmark	Denmark	Denmark	Denmark	Denmark

Source: Processed by Author

Table 10: CMA CGM

CMA CGM	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	ESG, GRI, French Law, European Union's Non-Financial Reporting Directive	ESG, GRI, French Law, European Union's Non-Financial Reporting Directive	ESG, GRI, French Law, European Union's Non-Financial Reporting Directive	ESG, GRI, French Law, European Union's Non-Financial Reporting Directive	ESG, GRI, French Law, European Union's Non-Financial Reporting Directive
Assurance Company	KPMG S.A.	KPMG S.A.	KPMG S.A	KPMG S.A.	KPMG S.A.
HQ Country	France	France	France	France	France

Source: Processed by Author

Table 11: Cosco Shipping Lines

COSCO Shipping Lines	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	No Report Published	No Report Published	GRI Standards	GRI Standards	GRI Standards
Assurance Company	No Report Published	No Report Published	CECEP (HK) Advisory Company Limited	CECEP (HK) Advisory Company Limited	CECEP (HK) Advisory Company Limited
HQ Country	China	China	China	China	China

Source: Processed by Author

Table 12: Hapag Lloyd

Hapag-Lloyd	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	GRI Standards	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	PricewaterhouseCoopers	PricewaterhouseCoopers	PricewaterhouseCoopers	PricewaterhouseCoopers	KPMG S.A.
HQ Country	Germany	Germany	Germany	Germany	Germany

Source: Processed by Author

Table 13:ONE (Ocean Network Express)

One Ocean Network Express (ONE)	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	GRI Standards	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	No Assurance	No Assurance	No Assurance	No Assurance	PricewaterhouseCoopers
HQ Country	Japan	Japan	Japan	Japan	Japan

Source: Processed by Author

Table 14: Evergreen Line

Evergreen	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	GRI Standards	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	Deloitte	Deloitte	Deloitte	Deloitte	PricewaterhouseCoopers
HQ Country	Taiwan	Taiwan	Taiwan	Taiwan	Taiwan

Source: Processed by Author

Table 15:HMM Co Ltd.

HMM Co Ltd	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	No Report Published	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	No Report Published	Korea Management Registrar	Lloyd's Register Quality Assurance Limited	Korea Management Registrar	The Korean Standards Association
HQ Country	Republic of Korea	Republic of Korea	Republic of Korea	Republic of Korea	Republic of Korea

Source: Processed by Author

Table 16: Yang Ming Marine Transport Corp.

Yang Ming	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	GRI Standards	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	DNV GL Business Assurance Co Ltd.	DNV GL Business Assurance Co Ltd.	DNV GL Business Assurance Co Ltd.	DNV GL Business Assurance Co Ltd.	DNV GL Business Assurance Co Ltd.
HQ Country	Taiwan	Taiwan	Taiwan	Taiwan	Taiwan

Source: Processed by Author

Table 17: ZIM Line

ZIM Lines	2018	2019	2020	2021	2022
Reference Sustainability Reporting Standard	GRI Standards	GRI Standards	GRI Standards	GRI Standards	GRI Standards
Assurance Company	No Assurance	No Assurance	No Assurance	No Assurance	No Assurance
HQ Country	Israel	Israel	Israel	Israel	Israel

Source: Processed by Author

3.4. METHOD OF THE RESEARCH

A brief overview of the research methodology was provided in the literature review section. This section presents a detailed explanation of the research method adopted. The study employs content analysis as its primary methodological approach.

Content analysis was used to identify which sustainability issues were prioritized by the companies and to evaluate the extent to which the disclosed information was subject to independent assurance. In this way, the quality of sustainability reports is assessed through the dual dimensions of materiality and assurance.

Perego and Kolk (2012) examined the quality of sustainability assurance by considering changes in auditing practices, particularly the diversity of assurance provider types. They developed a checklist for measuring assurance quality in sustainability reports (Perego & Kolk, 2012:173) .

The checklist developed by Perego and Kolk (2012) was revised and expanded to reflect both assurance and materiality aspects, and to offer a clearer understanding of sustainability reporting quality in these areas. Through these revisions and additions, the final version of the checklist was adapted to meet the specific requirements of container shipping companies.

The additional criteria included in the checklist to address the specific needs of the container shipping industry were primarily adapted from the Sustainability Disclosure Industry-based Guidance on Implementing Climate-related Disclosures published by the International Financial Reporting Standards (IFRS) Foundation (IFRS, 2023c). In particular, the Sustainability Disclosure Topics & Metrics and Activity Metrics identified for marine transportation formed the basis of these additions. In addition, for topics not defined by the IFRS framework, the study uses the Global Reporting Initiative standards, which are commonly followed by container shipping companies.

Table 18: Final Version Of The Checklist

Ranking Criteria	Definition	Scale
1.Title	Title of the assurance statement	0 No reference 1 Reference
2.Addressee	Party to whom the assurance statement is formally addressed (either in title separate addressee line or within text)	0 No reference line 1 Addressee is internal or "the readers" 2 Stakeholders mentioned in the addressee
3. Name of assuror	Name of the firm that conducts the assurance engagement	0 No reference 1 Reference
4. Location of the Assurer	Location of the office of the assurance provider	0 No reference 1 Reference
5. Report Date	Reference to the date at which the assurance exercise was finished	0 No reference 1 Reference
6. Responsibilities of reporter	Explicit statement that reporter is responsible for preparation of report (keywords: responsible, responsibility)	0 No reference 1 Reference
7. Responsibilities of assurer	Explicit statement that the reporter is responsible to express an (independent) opinion on the subject matter (the sustainability/environmental/social report)	0 No reference 1 Reference
8.Independence of assurer from reporting organization	Statement expressing the independence of the two parties involved (a 1 is assigned as soon word(s) independent or independence appear anywhere in the assurance statement or its title. Thus,remarks such as "this is an independent opinion …" already qualifies for a 1)	0 No reference 1 Reference
9.Impartiality of assuror towards stakeholders	Assuror's declaration of impartiality with respect to stakeholder interests	0 No reference 1 Reference

10.Scope of the assurance engagement	Assurance statement coverage (a 1 is assigned if anywhere in the assurance statement the coverage of assurance exercise is stated)	0 No reference 1 Reference
11. Objective of the assurance engagement	Objective to be achieved through the engagement (indicating the level of assurance intended)	0 No reference 1 Review, limited assurance, independent opinion, independent assurance, external verification, external assurance or validation 2 Reasonable Assurance or reasonable and limited assurance (e.g., two different levels of assurance for different parts of the report)
12. Competencies of assuror	Description of the professional skills that enable the engagement team to conduct the assurance exercise	0 No reference 1 Statement claiming competency (but no explanatory note) or mere reference to an internet site 2 Explanatory statement of competencies based on prior experience/engagements
13. Criteria used to asses evidence and reach conclusion	A statement that makes reference to particular criteria against which the sustainability report has been prepared (e.g. GRI and often internally developed standards)	0 No reference 1 Reference to publicly unavailable criteria 2 Reference to publicly available criteria (e.g., internally developed criteria that are published anywhere in the report or GRI)
14.Assurance standard used	Standards used which govern the work of the assurance provider (e.g. AA1000AS or ISAE3000)	0 No reference 1 Reference to publicly unavailable criteria 2 Reference to publicly available criteria
15.Assurance on Greenhouse Gas Emissions	Assurance of the statement expressing gross global Scope 1 greenhouse gas emissions in metric tons of carbon dioxide equivalents (CO2-e), Total energy consumed as an aggregate figure, in gigajoules (GJ), percentage of energy supplied from non-renewable natural resources and renewable resources.	0 No assurance 1 One of them assured 2 Two of them assured 3 All of them assured
16 Assurance on Fleet Performance	Assurance of the statement expressing shipping fleet performance as total deadweight tonnage of the entity's fleet, number of vessels in shipping fleet, and Twenty-foot equivalent unit (TEU) capacity of the fleet.	0 No assurance 1 One of them assured 2 Two of them assured 3 All of them assured

17 Assurance on Water, Effluent and Biodiversity	Assurance of the type and amount of water used (consumed, withdrawned or discharged) by the company in megaliters and number of measures taken to conserve biodiversity.	0 No assurance 1 One of them assured 2 Two of them assured
18. Assurance on Occupational Health and Safety	Assurance of the information on number of the occupational health and safety trainings provided to employees, number and rate of fatalities as a result of work-related injury,number and rate of recordable work-related injuries and number of hours worked.	0 No assurance 1 One of them assured 2 Two of them assured 3 Three of them assured 4 All of them assured
19. Assurance on Waste Management	Assurance on information of total weight of waste generated in metric tons, total weight of waste diverted from disposal in metric tons for reuse, recycling or recovery and total weight of waste directed to disposal in metric tons	0 No assurance 1 One of them assured 2 Two of them assured 3 All of them assured
20. Assurance on Employment and Labor Management	Assurance of the statements providing information on topics: total number and rate of new employee hires during the reporting period, total number and rate of employee turnover during the reporting period, percentage of individuals within the organization's governance bodies by gender, percentage of employees per employee category by gender and age groups	0 No assurance 1 One of them assured 2 Two of them assured 3 Three of them assured 4 All of them assured
21. Assurance on Training and Education	Assurance of the statements providing information on topics: Average hours of training provided for each employee of the organization during the specified reporting period, number of training programs provided to develop employee skills during the reporting period, percentage of total employees who received regular performance and career development review during the reporting period	0 No assurance 1 One of them assured 2 Two of them assured 3 All of them assured

22. Assurance on Local Communities and Public Policy	Assurance of the statements providing information on topics: Total monetary value of direct and indirect contributions by the organization to local communities and countries; Number of projects implemented by organization to develop collaboration with local communities; Percentage of seniore management that are hired from the local communities.	0 No assurance 1 One of them assured 2 Two of them assured 3 All of them assured
23. Assurance on Diversity and Equal Opportunity	Assurance of the statements providing information on topics: Ratio of basic salaries and remunerationof women to men for each category of employees; Total number of incidents of discrimination that occurred during the reporting period; Total number of violations of indigenous peoples' rights identified during the reporting period.	0 No assurance 1 One of them assured 2 Two of them assured 3 All of them assured
24.Summary of work performed	Statement explaining the actions taken to arrive at a conclusion	0 No reference 1 Reference
25. General Conclusion/Opinion	Statement expressing the result of the assurance exercise.	0 No reference 1 Mere statement expressing the opinion of the assuror (e.g.. ""XY's report is a fair presentation of XY's CSR performance""). A 1 is assigned only if the conclusion consists only of one sentence 2 Explanatory statement (more than one sentence, but recommendations for improvement are not considered part of the conclusion)

Source: Processed by Author

Table 18 presents the final version of the checklist, originally developed by Perego and Kolk (2012), with adjustments made for the container shipping sector. This version is used to examine the materiality and assurance dimensions of the companies' sustainability reports and to assess the quality of the reports based on these dimensions.

In this checklist, each criterion is assessed based on whether the required information has been independently assured. One point is granted for each assured disclosure. Under this scoring method, companies can receive a minimum of 0 and a maximum of 50 points across the 25 criteria.

Criteria 1 to 14, together with criteria 24 and 25, focus on the assurance of sustainability reports. These criteria were directly taken from the original checklist developed by Perego and Kolk (2012), without any modification. In the checklist presented in Table 18, several elements are reviewed to assess the quality of assurance disclosures. Criterion 1 considers whether the assurance statement appears under a distinct heading in the report. Criterion 2 examines to whom the assurance statement is addressed. Criterion 3 looks at whether the name of the assurance provider is specified. Criterion 4 checks if any information is provided about the address of the assurance provider. Finally, Criterion 5 focuses on whether the completion date of the assurance process is clearly stated in the report.

Criteria 6 to 9 address the overall reliability and independence of assurance statements included in sustainability reports. Criterion 6 looks at whether the report makes it clear that the company itself is responsible for its content. Criterion 7 checks if the assurance provider has acknowledged their role in offering an independent opinion on the report. Criterion 8 considers whether the relationship between the reporting company and the assurance provider is addressed in a way that demonstrates independence. Finally, Criterion 9 focuses on whether the assurer clearly states that they remain impartial in relation to all stakeholders.

Criteria 10 to 14 explore the scope, intent, and foundations of the assurance process. Criterion 10 examines whether the assurance statement clearly states which parts of the report are included and which are not. Criterion 11 considers whether the objective of the assurance activity is explained. Criterion 12 reviews whether the individuals conducting the assurance are described as having appropriate professional skills or whether any justification of their qualifications is provided. Criterion 13 focuses on whether the report specifies which sustainability standards were used in its preparation. Criterion 14 looks at whether the assurance provider identifies the international assurance standard applied, such as AA1000AS or ISAE 3000.

Criteria 15 to 23 were initially adapted from the Sustainability Disclosure Industry-based Guidance on Implementing Climate-related Disclosures in IFRS S2(IFRS,2023c), based on the specific needs of the container shipping industry. The remaining criteria were later based on the Topic Standards published by the Global Reporting Initiative (GRI, 2021), which provide guidance for reporting specific information related to material sustainability topics.A detailed explanation will be provided on how these criteria were developed.

Criterion 15 focuses on assurance of greenhouse gas emissions and is based on the IFRS S2 guidance. It examines whether external assurance is provided for disclosures related to Scope 1 emissions (direct emissions), total energy consumption, and the sources of energy used (IFRS, 2023c: 521).

Criterion 16 addresses assurance on fleet performance and is also based on the IFRS S2 guidance. It considers whether companies obtain assurance for performance indicators related to their fleet. This includes total deadweight tonnage, TEU (Twenty-foot Equivalent Unit) capacity, and the number of vessels, and assesses whether these data are subject to external assurance (IFRS, 2023c: 521).

Criterion 17 focuses on the assurance of water, wastewater, and biodiversity-related disclosures. It was developed based on GRI 303: Water and Effluents (GRI, 2021: 514) and GRI 304: Biodiversity (GRI, 2021: 540). This criterion assesses whether the information provided by companies regarding water usage and biodiversity conservation measures has been externally assured.

Criterion 18 addresses the assurance of occupational health and safety. It was developed based on GRI 403: Occupational Health and Safety (GRI, 2021: 655). This criterion examines whether external assurance has been provided for indicators such as employee health and safety training, fatalities resulting from workplace accidents, injuries, and total hours worked.

Criterion 19 was developed for the topic of waste management, based on GRI 306: Waste (GRI, 2021: 590). It examines whether the information provided by companies on total waste generation, recycling or diversion efforts, and waste disposal is supported by external assurance.

Criterion 20 focuses on the assurance of employment and labor management. It is based on GRI 401: Employment (GRI,2021:630) and GRI 402:

Labor/Management Relations(GRI,2021:642). This criterion considers whether external assurance is provided for disclosures related to new hires, employee turnover, and diversity indicators.

Criterion 21 is based on GRI 404: Training and Education (GRI, 2021: 688). It examines whether external assurance has been provided for information shared by companies on average training hours, the training programs implemented, and performance review processes.

Criterion 22 was developed using GRI 413: Local Communities (GRI, 2021: 779) and GRI 415: Public Policy (GRI, 2021: 805). This criterion reviews whether the information disclosed on contributions to local communities, collaborative projects, and local employment practices is supported by external assurance.

Criterion 23 was developed by adapting elements from GRI 405: Diversity and Equal Opportunity (GRI,2021:701) and GRI 406: Non-discrimination (GRI,2021:714) . It analyzes whether the information provided by companies on topics such as salary ratios, reported cases of discrimination, and violations of the rights of Indigenous peoples has been externally assured.

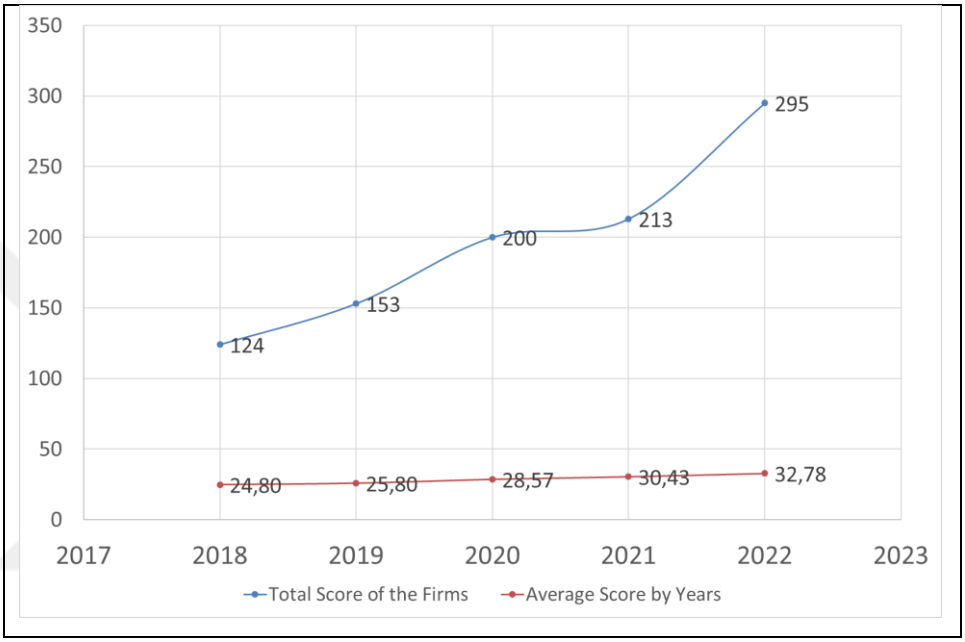
Criterion 24 examines whether the assurance provider explains the steps taken and the procedures carried out to reach their conclusion. Criterion 25 focuses on whether a general opinion or overall conclusion is presented at the end of the assurance process. If the conclusion is expressed in only one sentence, it is considered a basic statement of opinion. However, if it is presented in multiple sentences and includes a more detailed assessment of the process, it reflects a higher level of transparency and depth. Any improvement suggestions offered in the statement, if present, are not treated as part of the conclusion for the purposes of this criterion.

Based on the scores obtained from this checklist, the study will also examine whether there is a relationship between companies' scores and their market share, TEU capacity, and fleet size.

3.5. FINDINGS OF THE RESEARCH

In this section, the findings derived from the research method used in the study are presented.

Figure 18: Total Score By Years

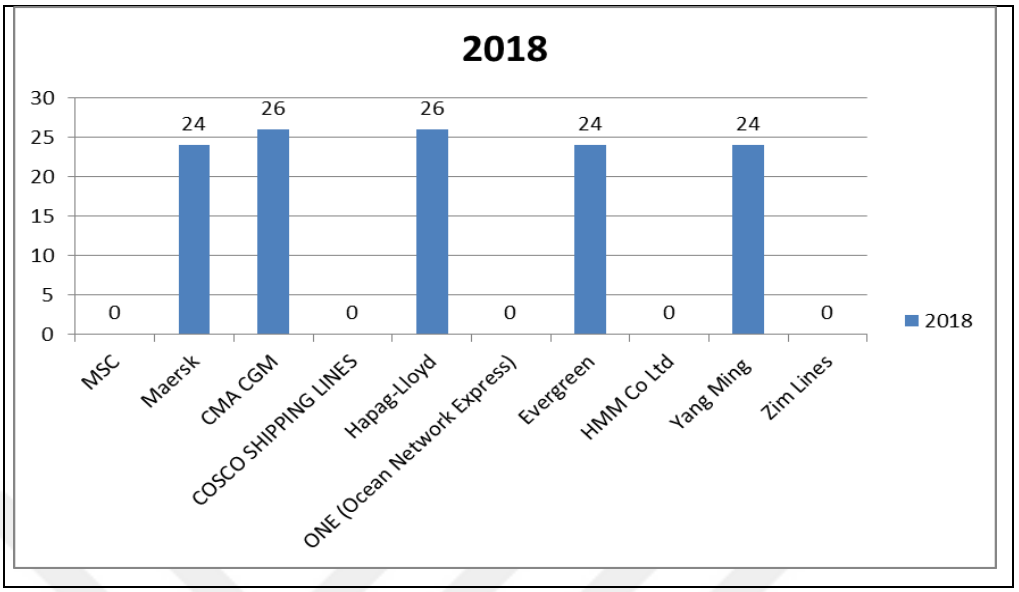


Source: Processed by Author

Figure 18 presents the total scores obtained by the companies for each year. It also shows the average score of the reports in the corresponding years. When the results are examined, an upward trend is observed in both the total annual scores of the companies and the average scores of the reports over time.

Based on these findings, it can be suggested that the overall quality of sustainability reporting, in terms of assurance and materiality dimensions, has improved over the years. It also appears that container shipping companies have increasingly prioritized the assurance of material information in their sustainability reports. To understand which companies contributed to the annual scores, the results will be presented by showing the scores each company received in each year.

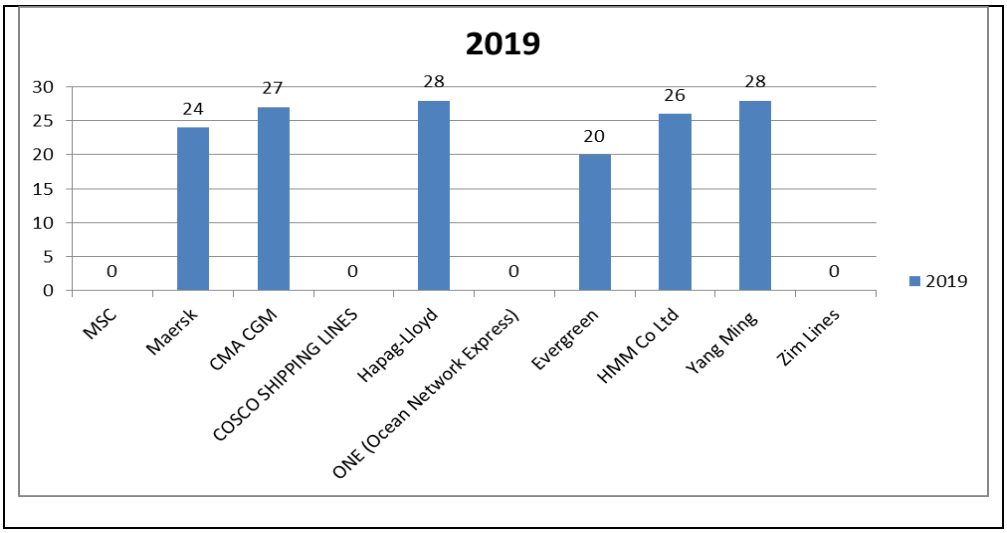
Figure 19: 2018 Score Of The Firms



Source: Processed by Author

As illustrated in Figure 19, in the year 2018, a total of five companies had sustainability reports that could be assessed using the assurance-based checklist. Among these, three companies received a score of 24, while the other two scored 26. The remaining five companies either did not publish a sustainability report or issued reports without any assurance, and therefore received a score of zero.

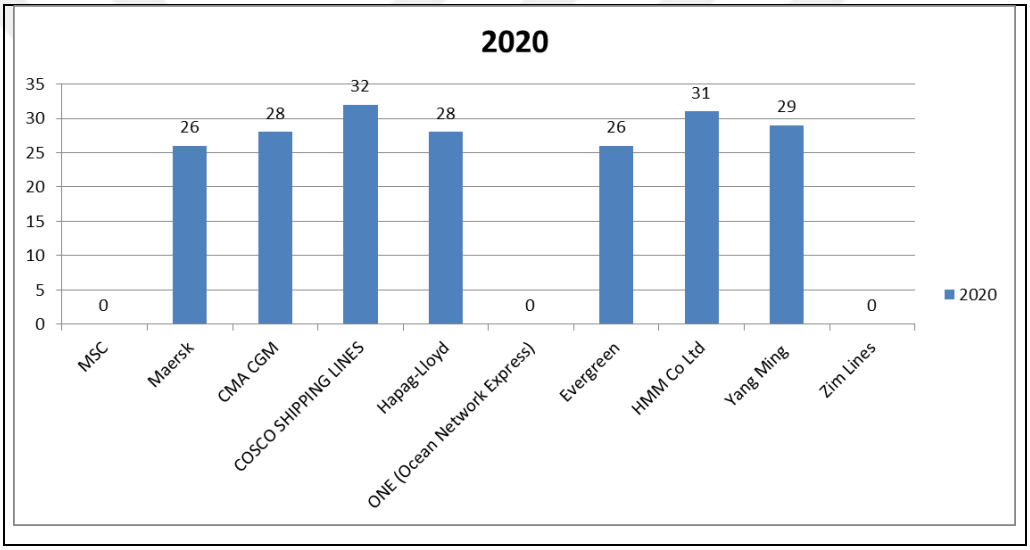
Figure 20: 2019 Score Of The Firms



Source: Processed by Author

Figure 20 presents the scores received by companies in 2019. According to the results, six companies had sustainability reports that included external assurance. The highest score in that year was 28, achieved by two companies. In addition, one company received 27 points, one received 26, another received 24, and one company scored 20. The remaining companies received zero, either because they did not publish a sustainability report or because their reports were not externally assured. Compared to 2018, the number of companies with externally assured sustainability reports increased from five to six.

Figure 21: 2020 Score Of The Firms



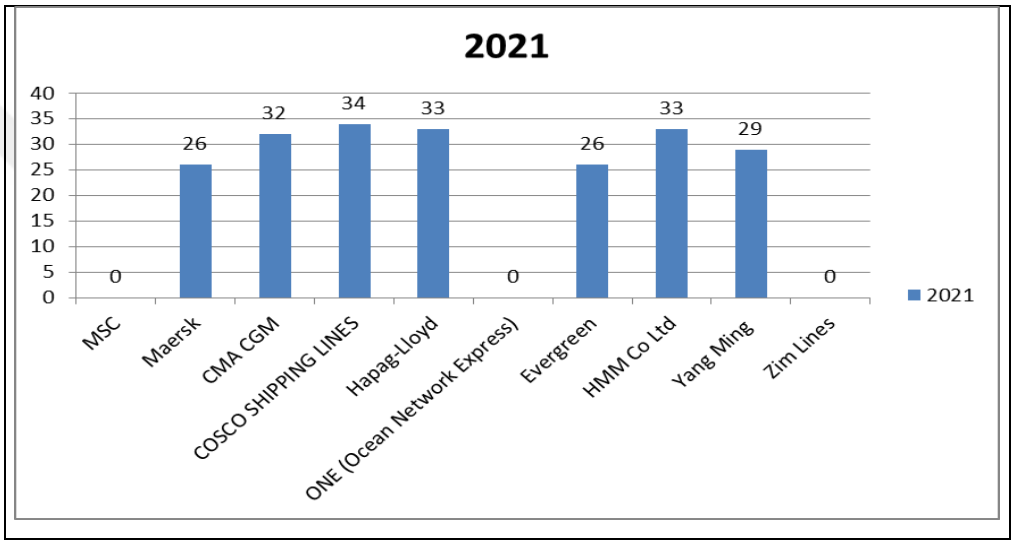
Source: Processed by Author

Figure 21 presents the scores achieved by companies in 2020. In that year, seven companies published sustainability reports that were externally assured. The highest score was 32, obtained by one company. One company received 31 points, another received 29, two companies scored 28, and the remaining two received 26. Compared to 2019, the number of companies with externally assured sustainability reports increased to seven. Additionally, the number of companies that received a score of zero, due either to the absence of a sustainability report or the lack of external assurance, decreased by three.

Figure 22 provides the scores received by companies for the year 2021. Compared to 2020, there is no observed change in the number of companies that

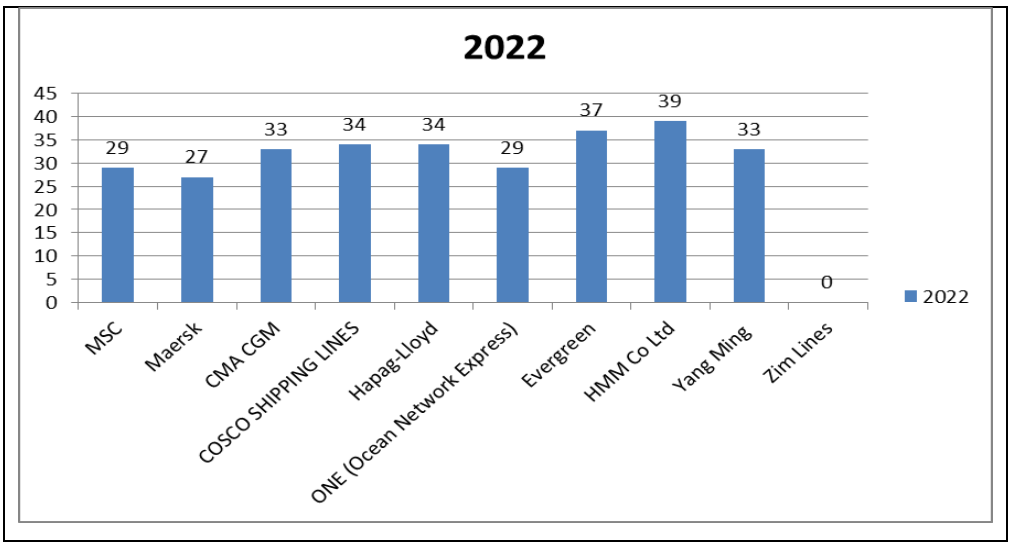
published externally assured sustainability reports. However, as also shown in Figure 18, the average score per report increased in 2021 relative to the previous year. In terms of individual scores, one company received the highest score of 34, two companies scored 33, one received 32, another received 29, and two companies obtained 26. The number of companies that scored zero, either due to not publishing a sustainability report or lacking external assurance, remained at three.

Figure 22: 2021 Score Of The Firms



Source: Processed by Author

Figure 23: 2022 Score Of The Firms

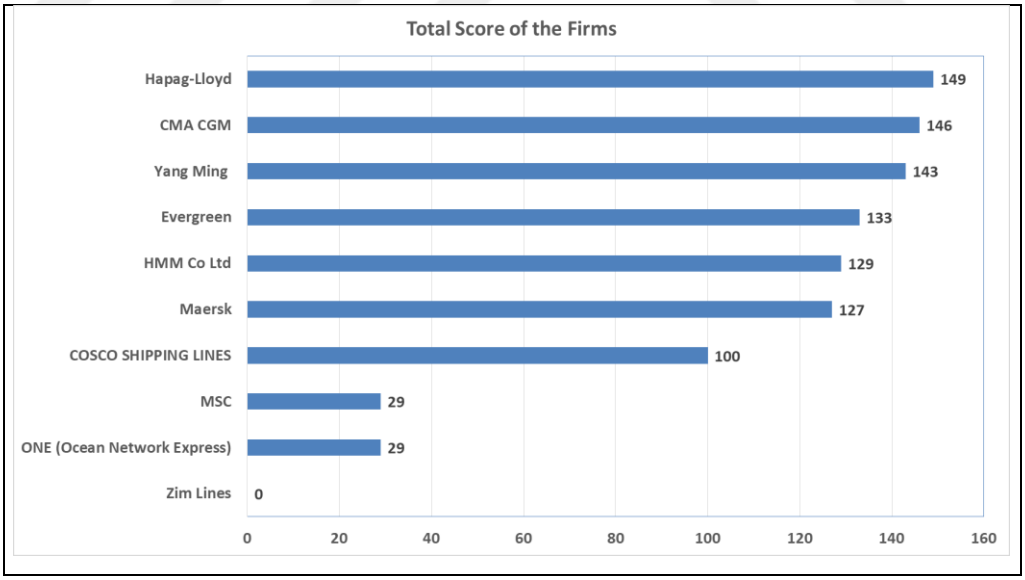


Source: Processed by Author

Figure 23 presents the scores received by companies in 2022. Nine companies had sustainability reports that were externally assured, while only one company scored zero due to the absence of such assurance. The highest score was 39, recorded by one company. One company received 37 points, two companies scored 34, another two received 33, and one company obtained 27. Compared to 2021, the number of companies with externally assured sustainability reports increased to nine. In line with this, as illustrated in Figure 18, the average score per report also rose in 2022 compared to the previous year.

When the scores received by companies over the years are considered, it becomes clear that the number of firms obtaining external assurance for their sustainability reports has consistently increased. There is also a noticeable shift toward giving greater importance to materiality, along with a continuous improvement in the quality of sustainability reporting in terms of both assurance and materiality dimensions.

Figure 24: Total Score Of The Firms

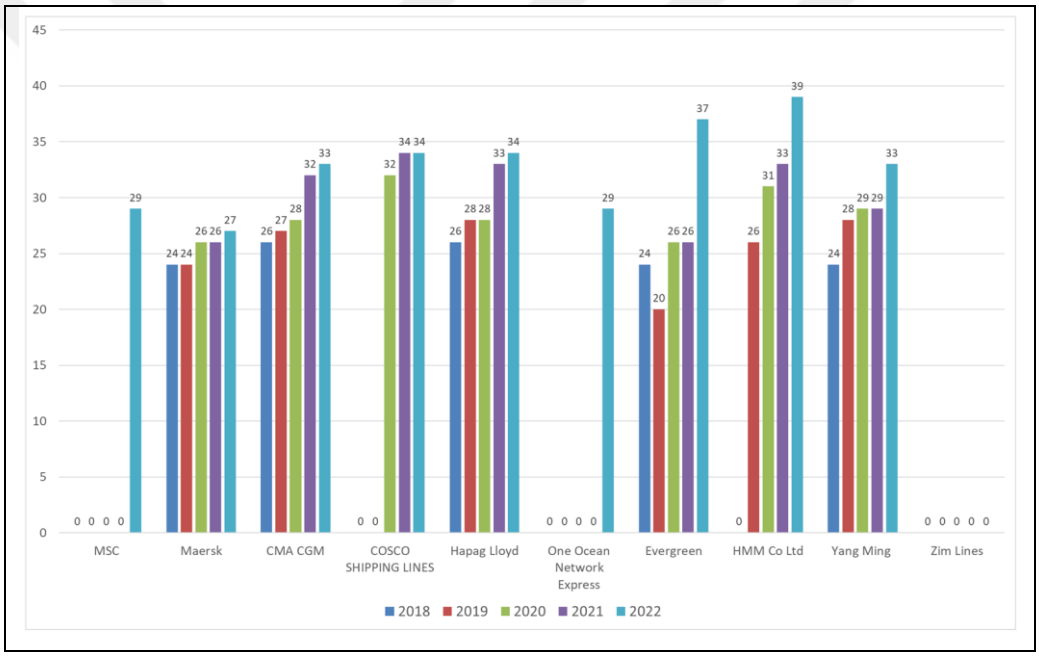


Source: Processed by Author

Figure 24 presents the total scores that each company received for each year. Based on these results, companies have been ranked from highest to lowest according to their overall performance on the checklist outlined in Table 18 for the

period between 2018 and 2022. Hapag-Lloyd ranked first with 149 points, followed by CMA CGM with 146 points and Yang Ming with 143. Other scores include Evergreen with 133, HMM Co. Ltd with 129, Maersk with 127, and COSCO Shipping Lines with 100. MSC and Ocean Network Express each received 29 points, while ZIM Lines scored zero. ZIM's score reflects the fact that none of its sustainability reports from 2018 to 2022 included external assurance. In the case of MSC and Ocean Network Express, the only externally assured report was published in 2022.

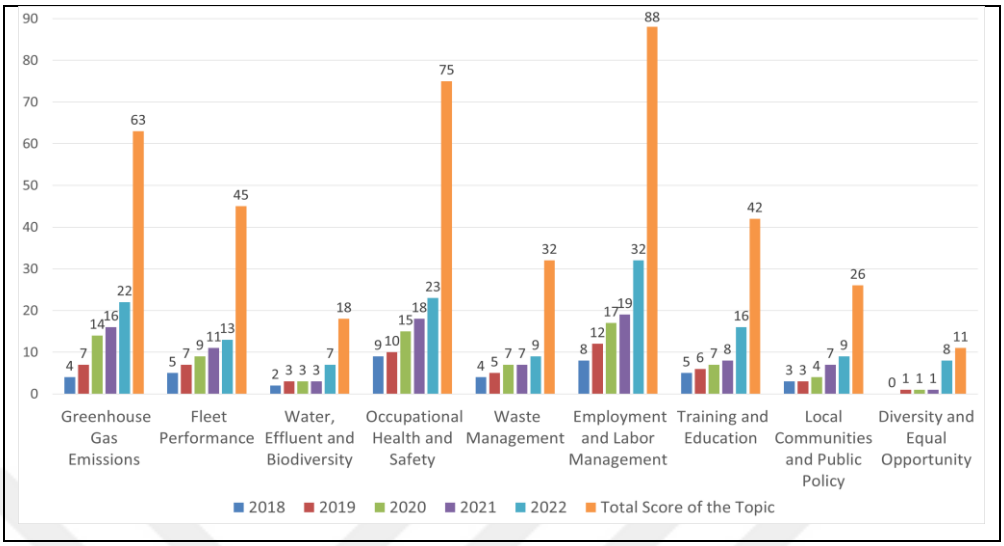
Figure 25: Five-Year Scoring of the Firms



Source: Processed by Author

Figure 25 presents the scores received by each company on a yearly basis. According to these findings, a decline in score is observed only in the case of Evergreen, between 2018 and 2019. Aside from this exception, all other companies show an upward trend in their scores over the years. This suggests that nine companies have demonstrated increased attention to externally assuring their sustainability reports and have gradually improved the quality of their reporting in terms of both materiality and assurance dimensions.

Figure 26: Topic-Based Scoring



Source: Processed by Author

In addition, criteria 15 to 23 in the checklist presented in Table 18 were used to examine the extent to which companies prioritized different sustainability topics. The findings derived from this analysis help identify which topics were emphasized as more material and which were externally assured. Figure 26 shows the annual scores received by each topic, as well as the total score accumulated by each topic across all years.

Figure 26 clearly shows an upward trend in the scores of each sustainability topic during the 2018–2022 period. This suggests that the amount of sustainability information externally assured in the reports has increased year by year.

According to Figure 26, the topic of employment and labor management received the highest total score. With 88 points accumulated over the five-year period, it stands out as the most frequently assured sustainability topic among the companies. Within this area, companies most often provided externally assured information on the total number and rate of new employee hires during the reporting period, the number and rate of employee turnover during the same period, the percentage of individuals in governance bodies by gender, and the percentage of employees by gender and age group across different employee categories.

Occupational health and safety ranks second with a total of 75 points. The scores for this topic increased each year compared to the previous one. This trend suggests that companies have made significant efforts to report on issues such as physical safety, workplace accidents, and health-related measures. It also indicates that disclosures related to the number of training sessions provided to employees, the number and rate of fatalities caused by work-related incidents, the number and rate of recordable injuries, and the total number of hours worked have been increasingly subjected to external assurance each year.

Greenhouse gas emissions rank third with a total of 63 points. The annual scores for this topic have shown a consistent increase, which indicates that it holds significant importance for the companies. This trend reflects an effort by firms to be more transparent in areas such as reducing their carbon footprint and addressing climate change. It has also been observed that external assurance has increased for environmental indicators such as total global Scope 1 greenhouse gas emissions expressed in metric tons of CO_2-equivalent, total energy consumption in gigajoules, and the percentage of energy sourced from renewable and non-renewable natural resources.

Following that, the topic of fleet performance appears with a total of 45 points. It is observed that information such as the size of the company's fleet, the number of vessels, and the fleet's twenty-foot equivalent unit (TEU) capacity has been increasingly subjected to external assurance over the years.

The topic of training and education received a total of 42 points. It has been observed that, year by year, there has been an increase in the assurance of disclosures related to the average hours of training provided per employee during the reporting period, the number of training programs offered to support skill development, and the percentage of employees who received regular performance and career development reviews.

Training and Education is followed by Waste Management with 32 points and Water, Effluent, and Biodiversity with 18 points. Based on the scores received, it can be inferred that these topics are regarded with moderate importance by the companies. While greenhouse gas emissions appear to receive greater attention in terms of environmental impact, these topics seem to be comparatively less

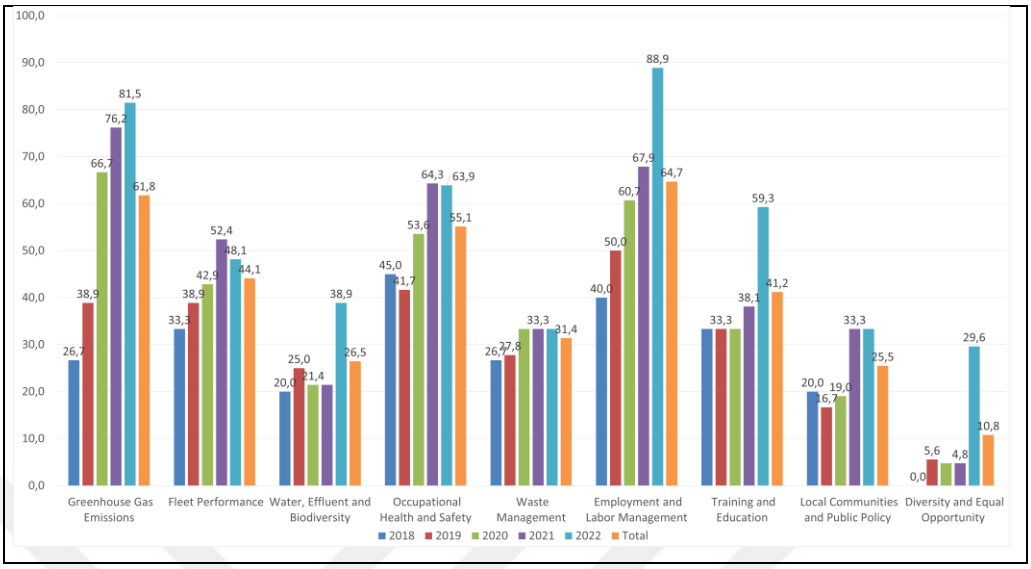
emphasized. Nevertheless, there has been a noticeable increase over the years in the assurance of information related to the type and amount of water used (consumed, withdrawn, or discharged) in megaliters, the number of measures taken to preserve biodiversity, the total weight of waste generated, the amount of waste diverted from disposal through reuse, recycling, or recovery, and the total weight of waste sent for disposal, all reported in metric tons.

Finally, the topics Local Communities and Public Policy and Diversity and Equal Opportunities received the lowest total scores, with 26 and 11 points respectively. This indicates that, compared to technical and environmental topics, social issues and disclosures related to equality are addressed with less transparency. The assurance of information concerning the total monetary value of direct and indirect contributions to local communities and countries, the number of projects aimed at fostering collaboration with local communities, the percentage of senior management hired from local populations, the ratio of basic salaries and remuneration between women and men across employee categories, the total number of discrimination incidents during the reporting period, and the number of identified violations of Indigenous peoples' rights is notably less frequent than for other topics.

Assessing the significance attributed to a particular sustainability topic solely through the raw score it receives may lead to analytical distortions. This is because the maximum attainable score differs across topics; while some allow a maximum of four points, others are limited to three or two. To mitigate potential misinterpretations, this study evaluates the proportion of the score received relative to the highest possible score for each topic. This proportion offers a more accurate and comparable reflection of how comprehensively the criteria have been met.

Figure 27 illustrates the fulfillment rate for criteria under topic, derived by dividing the score obtained by the maximum possible score for that specific topic. This approach enables a more balanced assessment of the extent to which each criterion under topics was fulfilled.

Figure 27: Topic-Based Fulfillment Ratio



Source: Processed by Author

As presented in Figure 27, the extent to which the reports fulfill the criteria of different sustainability topics is demonstrated both annually and cumulatively. When compared to the score-based evaluation shown in Figure 26, Employment and Labor Management remains the topic with the highest fulfillment rate. However, unlike the previous ranking, the second-highest fulfillment rate is observed in Greenhouse Gas Emissions instead of Occupational Health and Safety.

When comparing the fulfillment rates, a shift in ranking is observed between Water, Effluent, and Biodiversity and Local Communities and Public Policy, despite being placed eighth and ninth, respectively, in the score-based evaluation. Apart from this, the order of topics based on their relative importance remains consistent between the score analysis and the fulfillment rate assessment.

It is observed that companies have achieved higher fulfillment rates, particularly in environmental and employee-related topics, whereas they have fallen significantly behind in social and equality-based areas. For instance, the topic of Employment and Labor Management, which holds the highest fulfillment rate, shows a steady increase from 40 percent of criteria met in 2018 to 88.9 percent in 2022. Similarly, the fulfillment rate for the criteria under the topic of Greenhouse Gas Emissions increased from just 26.7 percent in 2018 to 81.5 percent in 2022.

This upward trend reflects a notable improvement in the transparency and commitment of companies in reporting their efforts to reduce carbon emissions. Occupational Health and Safety followed a similar pattern, rising from 41.7 percent in 2018 to 64.3 percent in 2021, before experiencing a slight decline to 63.9 percent in 2022. This pattern suggests an increased emphasis on employee safety, particularly in the aftermath of the pandemic. The topics of Training and Development and Fleet Performance demonstrated a gradual improvement in the fulfillment of their respective criteria, following a relatively slow start. This suggests that in recent years, companies have made greater efforts to provide externally assured information regarding the enhancement of employee competencies, indicating a growing commitment in this area.

However, certain areas remain notably underdeveloped. In particular, the criteria related to Diversity and Equal Opportunities have consistently ranked among the least addressed topics over the past five years. These criteria were entirely unfulfilled in 2018 and remained below 5% between 2019 and 2021, rising only to 29.6% in 2022. While this recent improvement is a promising sign, the overall average of just 10.8% suggests that companies are still not taking sufficient responsibility when it comes to reporting on equality-based approaches. A similar trend is observed in the topics of Local Communities and Public Policy, where the criteria have mostly stayed below the 20% threshold throughout the years, reaching 33.3% only in the last two years. This indicates that issues related to social engagement and contribution to society are still considered of secondary importance by many companies.

Criteria under Waste Management, on the other hand, have shown relatively steady performance, typically remained approximately at 30%. As for the topic encompassing Water, Effluent, and Biodiversity, the fulfillment rates have fluctuated significantly. A notable increase occurred in 2022, when the criteria fulfilled 38.9%, marking a clear improvement compared to previous years. Nevertheless, it remains evident that such topics are not prioritized to the same extent as core environmental issues like greenhouse gas emissions.

Taken as a whole, the findings suggests that companies tend to concentrate their sustainability efforts on environmental performance and employee welfare,

while placing less emphasis on softer, participation-driven areas such as social justice, diversity, and community responsibility. The year 2022 saw considerable progress across many themes, signaling a shift toward a more comprehensive and integrated sustainability reporting approach. Yet, despite this positive momentum, key social issues continue to be significantly underrepresented, highlighting them as priority areas for improvement going forward. At the same time, despite the issues outlined above, the quality of sustainability reports, measured through the assurance and materiality dimensions, also showed an upward trend in 2018 and 2022.

To explore whether a relationship exists between the sustainability reporting scores and the TEU capacities of the companies, a series of analyses were conducted. For the period spanning 2018 to 2022, data were gathered from the Alphaliner database covering the following variables: Total TEU, Total Number of Ships, Market Share, Owned TEU, Owned Ships, Chartered TEU, and Chartered Ships. However, due to data unavailability, the indicators Owned TEU, Owned Ships, and Chartered TEU could not be retrieved for the year 2018.

To assess whether the difference between two groups is statistically meaningful, appropriate statistical tests are applied. These tests are broadly categorized as parametric and non-parametric. When the data do not follow a normal distribution, non-parametric methods are more suitable than their parametric counterparts, as they do not rely on assumptions of normality (Bircan et al., 2003; Ghasemi & Zahediasl, 2012).

To determine whether a dataset conforms to a normal distribution, the Kolmogorov-Smirnov or Shapiro-Wilk test can be used. The Shapiro-Wilk test is generally considered more reliable when the number of observations is fewer than 50 (Razali&Wah,2011). If the data meet the assumption of normality, the paired t-test is suitable for evaluating differences between two groups. If the normality assumption is not met, the Mann-Whitney U test, a non-parametric alternative, should be applied. This method is especially appropriate when the sample size is smaller than 30 (Nachar,2008; Büyüköztürk, 2011; Mayers, 2013).

Accordingly, the analysis will commence with a review of descriptive statistics, after which an appropriate statistical method will be selected in light of the

normality test results. All statistical analyses in this doctoral dissertation were conducted using IBM SPSS Statistics version 22.

Table 19: Tests of Normality

	Kolmogorov-Smirnov Statistic	Kolmogorov-Smirnov Sig.	df	Shapiro-Wilk Statistic	Shapiro-Wilk Sig.	df	Normality
Total TEU	0,5192	0,001	40	0,88	0,001	40	No
Total Ships	0,232	0	40	0,863	0	40	No
Market Share	0,174	0,004	40	0,902	0,002	40	No
Owned TEU	0,121	0,142	40	0,934	0,022	40	No
Owned Ships	0,148	0,027	40	0,91	0,004	40	No
Chartered TEU	0,22	0	40	0,885	0,001	40	No
Chartered Ships	0,249	0	40	0,833	0	40	No

Source:Processed by Author

Table 19 presents the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests applied to assess whether the sample data follow a normal distribution. Given that the number of observations does not exceed 50, the Shapiro-Wilk test is considered more appropriate for testing normality. According to the results, a p-value higher than 0.05 suggests that the data do not significantly deviate from a normal distribution. However, based on Table 19, the variables Total TEU, Total Ships, Owned TEU, Owned Ships, Market Share, Chartered TEU, and Chartered Ships do not follow a normal distribution.

Based on this outcome, the Mann-Whitney U test, which is a non-parametric statistical method, is selected to evaluate whether there are significant differences in the variables Total TEU, Total Ships, Owned TEU, Owned Ships, Market Share, Chartered TEU, and Chartered Ships between reports that received external assurance and those that did not.

Table 20: Mann Whitney-U Test

	Total TEU	Total Ships	Market Share	Owned TEU	Owned Ships	Chartered TEU	Chartered Ships
Mann-Whitney U	208,000	230,000	228,500	93,000	110,500	147,000	136,500
Wilcoxon W	344,000	366,000	364,500	159,000	176,500	582,000	571,500
Zz	-1,331	-0,874	-0,905	-2,014	-1,484	-0,379	-0,697
Asymp. Sig. (2-tailed)	0,183	0,382	0,366	0,044	0,138	0,571	0,486
Exact Sig. [2* (1-tailed Sig.)]	0,440	0,139	–	–	–	0,720	0,492

Source: Processed by Author

Table 20 presents the results of the Mann-Whitney U test. A significance level below 0.05 indicates a statistically significant difference. According to the results, only the variable Owned TEU has a p-value of 0.044, which meets the threshold for significance. For all other variables, the significance levels are above 0.05. Therefore, it can be concluded that a statistically significant difference exists between assured and non-assured reports in terms of the Owned TEU variable.

Table 21: Mean Comparison of the Owned TEU Capacity

Assurance	Mean
Non-Assured Reports	625,615.27
Assured Reports	1,088,090.21
Total	960,909.60

Source: Processed by Author

When examining the mean values, the average Owned TEU capacity for non-assured reports is 625,615 TEU, whereas this figure rises to 1,088,090 TEU for assured reports. The overall average across all companies stands at 960,909 TEU. This suggests that companies with larger Owned TEU capacities tend to place greater emphasis on materiality and assurance aspects in their sustainability reports. Consequently, it may be inferred that large container shipping companies demonstrate a stronger commitment to these critical elements of sustainability disclosure.

In this doctoral dissertation, a scoring system was developed based on the checklist presented in Table 18, which is structured around the dimensions of materiality and assurance in sustainability reporting. This method was used to identify which topics container shipping companies consider material, based on whether or not the disclosed information was externally assured. Accordingly, the quality of sustainability reports was assessed specifically through the lens of the materiality and assurance dimensions.Furthermore, the rankings obtained through this methodology were compared with those provided by prominent international sustainability rating agencies to examine potential differences in evaluation outcomes. In this context, two organizations were identified that publicly and freely disclose their sustainability scores: Sustainalytics and S&P Global. Although other institutions also conduct such assessments, no additional sources were found that make their results publicly accessible.

Table 22: Comparison of Companies Based on Different Sustainability Scoring Methods

Ranking of this Study (2018-2022 Total Score)		Sustainalytics 2024 Ranking			S&P Corporate Sustainability Assessment Score 2024 Ranking	
Firms	Score of the Firms	Sustainability Risk Score	Risk Degree	Rank	CSA Score	Rank
Hapag-Lloyd	149	19.4	Low Risk	5	36	4
CMA CGM	146	21.1	Medium Risk	7	N/A	N/A
Yang Ming	143	20.5	Medium Risk	6	59	1
Evergreen	133	19.0	Low Risk	3	57	2
HMM Co Ltd	129	13.3	Low Risk	1	41	3
Maersk	127	16.4	Low Risk	2	N/A	N/A
COSCO SHIPPING LINES	100	22.4	Medium Risk	8	24	6
MSC	29	N/A	N/A	N/A	N/A	N/A
ONE (Ocean Network Express)	29	N/A	N/A	N/A	N/A	N/A
Zim Lines	0	19.3	Low Risk	4	31	5

Source: Processed by Author

In Table 22, ranking of companies, based on the aggregate scores they obtained over the 2018-2022 period withn the scope of this study, is presented in the leftmost column of Table 22. For comparative purposes, Table 22 also includes the risk scores assigned by Sustainalytics for 2024 together with the associated rankings, as well as the 2024 Corporate Sustainability Assessment scores provided by S&P and the related rankings derived from those scores.

Table 22 presents a comparison of the sustainability performance of leading companies in the container shipping industry included in the sample, based on three different assessment frameworks: the Sustainalytics ESG Risk Ratings, the S&P Global Corporate Sustainability Assessment (CSA), and an independent scoring method developed within the scope of this doctoral study. The main objective of this table is to highlight the similarities and differences between the rankings produced by these approaches and to discuss the methodological factors that may explain the variations in how the sustainability risks and performance of container shipping companies are evaluated.

Sustainalytics' ESG Risk Ratings framework evaluates how unmanaged environmental, social, and governance (ESG) risks may potentially affect a company's economic value. This system focuses on what it identifies as Material ESG Issues (MEIs), which are assessed across two core dimensions: exposure and management. Exposure represents the level of inherent risk based on industry characteristics, business model, and geographical operations, while the management dimension reflects the company's ability to handle these risks effectively through policies, procedures, and responses to ESG-related incidents.By combining these two dimensions, the methodology calculates an unmanaged risk score for each material ESG issue. These individual risk scores are then aggregated to determine the company's overall ESG Risk Score. The model is designed to support comparability across industries by using a single-scale risk currency, which provides a standardized way to measure ESG vulnerability (Sustainalytics,2024).

The ESG Risk Score is calculated on an open scale beginning at zero, with most scores falling between 0 and 50. A higher score indicates a greater degree of vulnerability to ESG risks. Based on this score, companies are categorized into five risk levels: negligible (0–9.99), low (10–19.99), medium (20–29.99), high (30–39.99), and severe (40 and above). These categories enable analysts and stakeholders to compare ESG risk exposure across companies operating in different sectors, including those with highly divergent risk profiles.Ultimately, this rating system provides a quantitative indication of how prepared a company is to face ESG-related challenges. A lower ESG Risk Score reflects stronger governance and effective risk

management, whereas a higher score suggests the presence of material risks that have not been adequately addressed (Sustainalytics,2024).

Table 22 presents the 2024 evaluations for the companies listed on the Sustainalytics platform (Sustainalytics, 2025). The companies were ranked based on their ESG risk scores, the severity of their risk levels, and their positions within the container shipping sector. For two companies, data could not be retrieved; thus, they were placed at the end of the table. Of the ten companies examined, five were classified as low risk and three as medium risk. The order resulting from Sustainalytics' scoring differs from the one derived through the methodology applied in this study.

The Corporate Sustainability Assessment (CSA) by S&P Global assigns a score on a scale from 0 to 100, based on a structured, rule-based methodology that ensures consistency. Each company's evaluation relies on approximately 1,000 data points. The assessment is tailored to 62 industry-specific questionnaires, comprising around 100 to 130 questions that address an average of 23 core themes within the economic, environmental, and social domains. The indicators, question sets, and evaluation criteria that shape the final score are weighted according to their sectoral relevance and material impact(S&P,2025a).

In addition, based on the methodology outlined by S&P Global, the 2024 Corporate Sustainability Assessment (CSA) scores for the companies in the sample were retrieved from the system and used for ranking purposes (S&P Global, 2025b). Four of the companies included in the sample were not listed in S&P Global's CSA database and were therefore placed at the bottom of the table. The remaining firms were ranked according to their CSA scores. The ranking derived from S&P Global's assessment does not correspond to the order established through the scoring method used in this study. Furthermore, the company rankings based on Sustainalytics' ESG risk scores also diverge from those based on S&P Global's CSA scores.

Sustainalytics assesses unmanaged risks related to environmental, social, and governance (ESG) issues and assigns companies a numerical score, categorizing them into five levels of risk. Lower scores reflect reduced exposure and stronger ESG management. For instance, HMM Co Ltd stands out in the "Low Risk" category with a score of 13.3, while Yang Ming, with a score of 20.5, falls into the "Medium

Risk" category. In contrast, the S&P Global CSA methodology evaluates companies' sustainability performance using a score ranging from 0 to 100. These scores are based on publicly available disclosures, policies, and practices across environmental, social, and economic dimensions. According to CSA results, Yang Ming ranks among the top performers with a score of 59, whereas HMM Co Ltd has a CSA score of 41. This contrast highlights the difference between a risk-based assessment and one focused on actual sustainability performance.

In the original scoring approach adopted in this study, container shipping companies were evaluated based on various criteria such as the scope of their sustainability reports, transparency of disclosed information, existence of verification mechanisms, and consistency of their reporting processes. This method not only aims to identify the ESG risks that companies are exposed to, but also to assess whether the strategies developed in response to these risks are implemented within a coherent and institutionalized sustainability framework. In fact, some firms that are classified as high-risk by Sustainalytics have achieved higher scores in this study due to their consistent and verifiable sustainability reporting practices. Yang Ming and CMA CGM are prominent examples of this situation.

The fact that different assessment systems produce markedly different rankings for the same companies is largely attributable to methodological differences in how each system approaches the concept of sustainability. While Sustainalytics primarily seeks to answer the question "To what extent is the company exposed to ESG risks?", S&P Global CSA focuses on "How effectively does the company manage these risks?". The scoring framework used in this study, on the other hand, is centered around the question "To what degree does the company report on its sustainability issues in a transparent, consistent, and externally verifiable manner?". Given the distinct nature of these three approaches, variations in the resulting rankings are to be expected. Therefore, to conduct a more comprehensive evaluation of corporate sustainability, it is essential to employ multidimensional assessment models in parallel, as they provide more meaningful and comparable results. These findings support the view that different sustainability assessment methods are not substitutes for one another but rather function as complementary approaches.

CONCLUSION

This research examines the sustainability reporting practices of companies operating in the container shipping industry, focusing specifically on the dimensions of materiality and assurance. The main goal is to identify which sustainability issues are regarded material in these reports, evaluate whether the information is externally assured or not ?

For this purpose, the sustainability reports of the ten largest container shipping companies published between 2018 and 2022 were analyzed using a customized scoring method based on the checklist developed by Perego and Kolk (2012). With the scores derived from this scoring system, the quality of sustainability reporting and sustainability performance were also analyzed.

The originality of this research can be presented as one of its key contributions. In the existing literature, Karagiannis et al. (2022) emphasized the impact of sectoral differences on sustainability reporting. However, no study has comprehensively analyzed materiality and assurance in sustainability reports within the container shipping industry. This study fills this gap by providing a container shipping industry–focused perspective.

Following the release of the TCFD Recommendations in 2017, the reports of the companies between 2018 and 2022 showed a consistent upward trend in their scores. In addition, the number of reports externally assured increased each year compared to the previous period.These findings are consistent with Khamisu & Paluri (2024) document that sustainability reporting frameworks is associated with improvements in firms' sustainability performance. In parallel, Pizzi et al. (2024) and Kosi & Relard (2025) show that, as sustainability reporting requirements evolve, firms increasingly obtain external assurance of their reports.

Global initiatives such as the TCFD (2017) recommendations and the IMO (2020) environmental rules have encouraged firms to enhance the credibility and transparency of their sustainability disclosures. From the perspective of Political Cost Theory, this behavior reflects a strategic attempt to reduce potential political and regulatory costs through credible sustainability reporting. The study therefore

contributes to the literature by extending the application of Political Cost Theory to the context of sustainability reporting in the container shipping sector.

Boiral & Henri (2017) argued that measuring and improving the sustainability performance of firms using GRI standards is impossible. However, the findings of this study show that container shipping companies, which widely use GRI standards, have improved the quality of their sustainability reports in terms of assurance and materiality, and that their sustainability performance can be compared with each other. Therefore, the findings of this study are not consistent with those of Boiral & Henri (2017).

In this study, it was found that companies whose sustainability reports were externally assured had higher owned TEU capacities. This finding is consistent with Gipper et al. (2025) and Velte (2025), who stated that larger companies are more likely to seek assurance for their sustainability reports

The results of the study indicate that container shipping companies focus mainly on employment and labor management, occupational health and safety, and greenhouse gas emissions in their sustainability reports, which are environmental and social issues. These findings are consistent with Karagiannis et al. (2022), who noted that in high-impact industries such as the maritime sector, sustainability reports tend to focus more on environmental and social issues.

The results indicate that employment and labor management, along with occupational health and safety, are among the three most emphasized sustainability issues in the companies' sustainability reports.This finding is inconsistent with the observations of Dempsey et al. (2011), note that social issues are often considered secondary in sustainability reports.

According to this study, the analyzed companies were ranked based on their total scores between 2018 and 2022. The same companies were ranked again according to the scores they received in 2024 from the sustainability rating agencies Sustainalytics and S&P Global's Corporate Sustainability Assessment. The results showed that the ranking of this study, the ranking of Sustainalytics, and the ranking of S&P Global were completely different from each other.

The differences between the rankings based on the scoring system of this study and those made by sustainability rating agencies are consistent with

Christensen et al. (2022), Berg et al. (2022) and Agosto & Tanda (2022) argue that, due to methodological differences among sustainability rating agencies, the scores assigned to companies may vary, which is consistent with our study.Also, Finding is consistent with Tang et al. (2025) and Li et al. (2024), who note that cross-agency comparisons vary due to agency-specific factors.

As with any research, this study also has certain limitations. It focuses on ten companies over a five-year period and this represents a limitation. The sustainability performance of these companies was evaluated by comparing the rankings based on their total scores between 2018 and 2022 in this study with the rankings they received in 2024 from Sustainalytics and S&P Global. The rankings according to Sustainalytics and S&P Global were based on the 2024 scores, since the ratings of these agencies for the years between 2018 and 2022 were not available. This time difference limits the extent to which a reliable comparison can be made.

Future studies with a larger sample size and longer time period may provide a clearer and more comprehensive understanding of container shipping companies' sustainability reporting quality and performance, particularly in terms of materiality and assurance. This study uses a checklist designed for container shipping. If it is applied to other maritime sectors, it should be adjusted to that sector's rules, operations, and impact profile so the evaluation remains relevant and complete.

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