

Setting the scene: from voluntary to mandatory sustainability reporting in Korea

Large manufacturing Korean firms' sustainability reporting in comparison with Scandinavia and lessons from the best practice

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Abstract

Sustainability Reporting (SR) has hitherto been discretionary in most Asian countries; however, a new paradigm – mandatory SR – is emerging in South Korea, provoked by the EU’s SR regulation, Non-Financial Reporting Directive (NFRD) and Corporate Sustainability Reporting Directive (CSRD). The Korean government plans to enforce SR legislation in 2025, targeting large firms. However, little is known about changing regulatory landscape in Korea. While Korean firms’ lower sustainability performance compared to EU firms and limitations in SR have been pointed out, what and how should be improved are underinvestigated. Thus, this research explored Korean companies’ SR quality in comparison with Scandinavian – consistent SR leader in EU – best practices through a content analysis of 14 sustainability reports in the two regions. Further, 13 online interviews with sustainability professionals, mainly in the Nordic region, were conducted to learn lessons from best practices.

The study revealed no regional difference in report structure and 39 reporting components; however, Korean companies’ disclosure level was lower overall than Scandinavia’s. Moreover, three significant deficiencies in Korean reports were identified: 1) lack of measurable targets and ambiguous goals, 2) tendency to highlight positive performance and lack of negative information, and 3) sharp focus on environmental dimensions than social and governance. Interestingly, interviewees mentioned these limitations as a “Not-To-Do List” to produce high-quality reports. On top of attributes of good SR, interviews uncovered SR improvement measures by SR personnel and the sustainability departments. This study concluded that Korean firms have opportunities to enhance reporting quality further.

The primary practical implication of this research lies in recommendations for Korean firms, collating with current SR limitations and challenges in Korea. From an academic perspective, this research contributes to the methodological development for reporting quality assessment. The existing assessment criteria – reporting quality principles – were revised based on the findings of this study. The more detailed yet straightforward criteria can serve as an analytical framework for SR quality evaluation in future research.

Keywords: sustainability reporting, reporting quality assessment, best practice approach, South Korea, Scandinavia

Executive Summary

As public awareness of environmental and social issues progresses, Sustainability Reporting (SR) by business and public organizations has gained momentum from a wide range of stakeholders. Firms nowadays include information on addressing environmental, social, and governance concerns in annual financial reports or publish standalone sustainability reports. In addition, the European Union (EU) made corporate sustainability disclosure mandatory with the Non-Financial Reporting Directive (NFRD) in 2014 in light of the significance of SR. In 2022, the new EU directive, the Corporate Sustainability Reporting Directive (CSRD), was further adopted to expand the scope of NFRD. EU's two directives have provoked discussion of mandatory corporate SR in East Asia, such as South Korea and Japan. SR has hitherto been considered discretionary and voluntary in most Asian countries; however, a new paradigm – mandatory corporate SR – is emerging, particularly in Korea. In 2021, the Korean government announced that SR legislation would be enforced in 2025, targeting large companies listed in Korea's major stock market. Currently, discussion on regulatory requirements is ongoing.

Problem definition

SR – disclosure on sustainability integration into a business model – has been practiced by Korean firms since the late 2010s. Nowadays, almost half of the large Korean companies voluntarily publish SR in response to the increasing stakeholders' demand to communicate sustainability matters. Nevertheless, SR is still concentrated in a few industries in Korea. Moreover, Korean firms have overall lower SR rates and sustainability performance than EU firms, and limitations in SR have been pointed out, such as lacking disclosure of regulatory risk.

However, little is known about other limitations of Korean firms' SR and reporting trends in general. While SR was extensively studied in the voluntary context, such as motivations for SR and the impacts of reporting, changing regulatory landscape in Korea is underinvestigated. This suggests that there is a need to understand current reporting practices in Korea under the changing regime, moving the research focus from voluntary (“Why engage in SR?”) to mandatory (“How to produce a good report?”) context. Nevertheless, few studies have addressed what defines good SR and how to enhance reporting practices. Thus, this research examines Korean SR and its quality improvement with the best practice approach for knowledge transfer. Since Scandinavia has been a consistent SR leader in the EU, the best practices refer to Scandinavian cases in this research.

Aim and research questions

The aim of this thesis is to explore large Korean manufacturing companies' contemporary SR in comparison with Scandinavian best practices. This study ultimately expects to contribute to SR improvement in Korea by suggesting lessons learned from Scandinavian firms. In essence, the purpose of this study is threefold: 1) map out SR components in Korea and Scandinavia, 2) compare the quality of each reporting component in the two regions, and 3) investigate how Scandinavian firms arrived at best practices. In order to achieve research aims, the following research questions are formulated:

[RQ1] What are the sustainability reporting components in Korea and Scandinavia?

[RQ2] What are the differences between Korean and Scandinavian reporting practices?

RQ2-a: *What are the differences in reporting format between Korea and Scandinavia?*

RQ2-b: *What are the differences in coverage levels of the reported content between Korea and Scandinavia?*

[RQ3] How have Scandinavian firms accomplished the best reporting practices?

RQ3-a: *What are the Scandinavian firms' approaches to sustainability reporting quality?*

RQ3-b: *How can organizations improve sustainability reporting?*

Methodology

This research employs an exploratory qualitative approach, performing content analysis and semi-structured interviews. Firstly, 14 companies' latest sustainability reports (eight large manufacturing Korean companies and six Scandinavian best practice companies) were collected based on several sample selection criteria (see Table 5) and coded to map out reporting components using the software NVivo (RQ1). After identifying all reporting components, a comparative analysis of format-related reporting components was conducted to find differences between Korea and Scandinavia (RQ2-a). Further, the disclosure levels of each component were assessed against reporting quality criteria developed in the literature review, with four indices (0: no meaningful information, 1: patchy information, 2: overall extensive information yet lacking certain areas, and 3: full information). Subsequently, the difference between Korea's and Scandinavia's average scores on each reporting component was calculated for comparison (RQ2-b). Lastly, 13 practitioner interviews, including seven best practice companies' SR specialists and six external experts from sustainability consulting and ESG rating firms, were conducted online to gain deeper insight into Scandinavian firms' approach to reporting (RQ3-a) and SR improvement measures (RQ3-b). Figure I shows the overview of the research design.

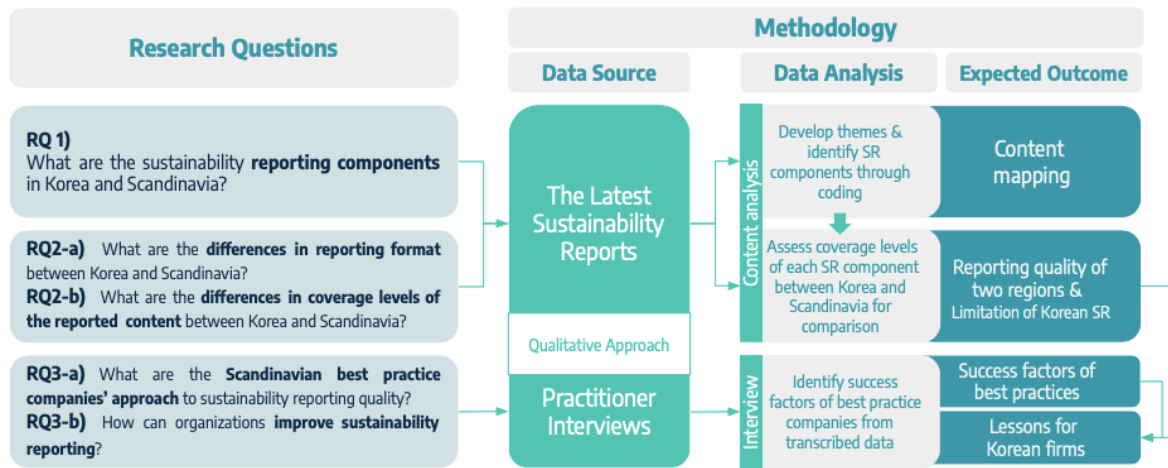


Figure I. Research design overview

Key findings

RQ1: What are the sustainability reporting components in Korea and Scandinavia?

The sustainability report comprises three elements, format, content: general disclosure, and content: topic-specific disclosure with nine themes (reporting format, organizational profile, approach to sustainability, sustainable management, sustainability governance, stakeholder, sustainability practices, environmental performance, and social performance). Those themes are further segmented into 39 reporting components, as shown in Figure II.

Format	Content		
Reporting Format	General Disclosure		Topic-specific Disclosure
	Organizational Profile	Sustainability Governance	Environmental performance
1. Report Title	11. Company Profile	20. Governance Body & Procedure	29. Green Procurement
2. Report Type	12. Sustainability/ESG Recognition	21. Code & Policy	30. Emissions
3. Volume		22. Compliance & Ethics	31. Energy
4. Reporting History		23. Reporting Process	32. Water
5. Reporting Period & Frequency			33. Waste
6. Issue Date			34. Biodiversity
7. Scope & Boundary			
8. Methodology			
9. Reporting Standard & Framework			
10. External Assurance			
	Approach to Sustainability	Stakeholder	Social performance
	13. Initiative & Commitment	24. Stakeholder Analysis	35. Human Rights
	14. Vision & Strategy	25. Stakeholder Engagement	36. Safety & Health
	15. Target & KPIs		37. Diversity & Inclusion
			38. Product Responsibility
			39. Corporate Philanthropy
	Sustainable Management	Sustainability Practices	
	16. Materiality Assessment	26. Sustainable Products & Services	
	17. Risk & Opportunity Analysis	27. Sustainable Operation	
	18. Value Chain Analysis	28. Progress & Achievement	
	19. Supply Chain Management		

Figure II. Components of sustainability reports

Despite varying orders, there was no geographical difference in report structure and components in Korea and Scandinavia since all companies adopt GRI standards as their core reporting principle. The analysis confirmed GRI's significant presence as a worldwide SR framework.

RQ2-a: What are the differences in reporting format between Korea and Scandinavia?

By comparing ten reporting format components in the two regions, the following Korean reports' development areas were identified: large volume, late release date, narrow reporting scope, lacking disclosure of overarching data collection and analysis process, and implicit methodological limitations.

RQ2-b: What are the differences in coverage levels of the reported content between Korea and Scandinavia?

Concerning reported content quality, Korea's coverage level was overall lower than Scandinavia's. The shortcomings of the Korean reports include a lack of quantitative targets and goals, ambiguous/non-timebound target setting, unbalance between quantitative and qualitative data, a greater focus on environmental dimension than social and governance, the tendency to highlight positive performance, lack of disclosure on negative performances, and lack of company-specific information regarding sustainability risks.

Above all, three major deficiencies in Korean reports that showed substantial differences from Scandinavian reports are 1) lack of measurable targets and goals, 2) selective disclosure of positive performance, and 3) sharp focus on environmental dimension. However, despite Korea's overall lower coverage levels, the difference between the two regions was subtle in most reporting components.

RQ3-a: What are the Scandinavian firms' approaches to sustainability reporting quality?

The attributes of high-quality sustainability reports were investigated by interviewing sustainability professionals. While most are associated with GRI principles, interviewees particularly emphasized three prerequisites to making good reports: 1) Clarity - clear roadmap and achievable target setting, 2) Balance - moderate length of the report, a balance between positive and negative impacts/quantitative and qualitative data/ESG topics, 3) Reliability - transparent disclosure on methodology from data collection to analysis process. This indicates that GRI reporting content and quality principles are a valid mechanism to improve reporting quality, as best practices integrate them into their reporting strategy. However, interviews revealed that practitioners could interpret the terminology of current GRI principles differently. Thus, this study proposes revised reporting quality principles for clarification based on interview findings (see Table 14).

RQ3-b: How can organizations improve sustainability reporting?

Concerning reporting improvement, interviewees provided practical advice for personnel in charge of SR (individuals) and the sustainability departments (organizations). At the individual level, SR specialists should be open to learning and keeping abreast of big trends, including regulatory changes and stakeholders' interests in material topics, since sustainability is an ever-changing field. Further, as reporting involves many departments and people in the company, it is critical to engage everyone, helping them to understand how their work contributes to the company's sustainable practices. At the organizational level, the company could leverage its existing human resources to build competency in sustainability and SR. Establishing a solid reporting strategy, including internal SR guidelines and principles, is also essential. Lastly, investment in data management systems was emphasized to cope with increasing data quality requirements under the regulation.

Conclusions and Recommendations

The academic contribution of this study is two-fold. Firstly, a methodology to compare reporting quality was developed. Two indexes used in the thesis – disclosure level score in Table 6 and difference value in Table 7 – enables quantifying reporting quality and facilitate systematic comparative analysis in SR assessment. Secondly, this research revised reporting quality principles (see Table 14), phrasing it more detailed and straightforwardly by incorporating lessons from the best practices companies. Not only can this serve as an analytical framework in SR quality evaluation for future research, but it can also be beneficial for practitioners to self-assess their reports.

Furthermore, this thesis has practical implications for the Korean government. As policymakers are currently discussing the details of the SR legislation, snapshots of Korean companies' contemporary reporting could help set pragmatic expectations and minimum regulatory requirements. Simultaneously, Scandinavian best practices can envisage where Korean companies should move forward through statutory regulation. Most importantly, the research findings can benefit sustainability departments and personnel in Korean firms. For instance, companies that have yet to engage in reporting can learn possible SR challenges and what to avoid for producing high-quality reports from peer companies' limitations. Finally, for those already voluntarily publishing SR, best practice examples are provided as benchmarks as well as recommendations on reporting quality improvement (see Table 15).

Several limitations of this study offer a future research opportunity. For instance, although limitations of current Korean SR were identified through the content analysis, challenges faced by the sustainability department or personnel in the reporting process were outside the scope of this research. Thus, Korea's SR practices can be explored more by interviewing SR specialists in Korean companies. Identifying internal challenges would deepen understanding of limitations in Korean SR and the status quo in general, potentially producing more transferable and suitable solutions in the Korean context. Moreover, future research could investigate reporting practices in other regional or industrial contexts, testing revised reporting quality principles. This may lead to the further development of the SR quality analytical framework. Lastly, as this study focused on reporting quality – coverage level – based on disclosed information in the reports, the actual performance levels were not analyzed. Thus, future researchers could look into how reported practices align with actual performance levels. In addition, reporting quality assessment does not evaluate how sustainable the business model is. Therefore, future research could examine the business model through reporting practices, such as investigating the association between reporting quality and the degree of sustainability integration into a business model.

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Abbreviations

CDP - Carbon Disclosure Project

CO₂ - Carbon dioxide

CSR - Corporate Social Responsibility

CSRD - Corporate Sustainability Reporting Directive

CSV - Creating Shared Value

ESG - Environmental Social Governance

EU - European Union

GDP - Gross Domestic Product

GHG - Greenhouse Gas

GRI - Global Reporting Initiative

IIRC - International Integrated Reporting Council

IR - Integrated Reporting

ISO - International Organization of Standardization

KPIs - Key Performance Indicators

NFI - Non-Financial Information

NFRD - Non-Financial Reporting Directive

NGO - Non-Governmental Organization

NO_x - Nitrogen oxides

NPO - Non-Profit Organization

SASB - Sustainability Accounting Standards Board

SDGs - Sustainability Development Goals

SO_x - Sulfur oxides

SR - Sustainability Reporting

TBL - Triple Bottom Line

TCFD - Task Force on Climate-related Financial Disclosures

UN - United Nations

UNGC - United Nations Global Compact

1 Introduction

The climate change impacts on physical and biological systems on the Earth are increasing, causing extreme weather events such as heavy rainfalls, droughts, and floods (IPCC, 2007). Some business sectors are particularly susceptible to increasing climate change risks. The oil and gas industry, for instance, is exposed to physical risks, experiencing disrupted operations due to severe weather; companies that overlooked the climate risks are already running into financial losses in terms of decreased value of fossil-fuel assets and future profits (i.e., transition risk) (Semieniuk, 2022; Wasim, 2019). This shows climate-related risk could deteriorate firms' long-term profitability; several studies also confirmed transition risk's negative effect on firms' value (e.g., stock return performance) (Berkman et al., 2019; Reboredo & Ugolini, 2022). Recognizing the significance of climate risk management, companies worldwide incorporate environmental aspects into their business strategy for sustainable operations (Nishitani et al., 2021; UN, n.d.). Financial prosperity is no longer the sole focus as it used to be in a traditional management process; companies need to develop economic, environmental, and social dimensions in a balanced manner to foster a more sustainable business (Naskar, 2019).

While the concept of sustainable business is not entirely brand new since the term sustainability appeared at the 1972 UN Stockholm Conference (Kaldas et al., 2021), Sustainability Reporting (SR) has gained momentum in recent years from a wide range of stakeholders, including government, business partners, customers, investors, local communities, and academia (Berniak-Woźny & Kwasek, 2020). Stakeholders are more interested in a firm's approach to sustainable business and the potential for value creation (Balogh et al., 2022; Deloitte, 2020; Naskar, 2019). In response to the increasing demand to communicate sustainability matters, firms include such information in annual financial reports or publish standalone sustainability reports (Nishitani et al., 2021; UN, n.d.).

SR has various labels, including Corporate Social Responsibility (CSR) reporting, social and community reporting, Environmental, Social, and Governance (ESG) disclosure, non-financial information (NFI) disclosure, Triple Bottom Line (TBL): people, planet, profit reporting, and many others. Despite different names, the core concept is similar; firms disclose information on how they address environmental, social, and governance concerns (Kolk, 2008; Berniak-Woźny & Kwasek, 2020). SR enables the identification of sustainability risks in the business and helps firms to measure and monitor their environmental and social performance. Disclosure of such information is also useful for stakeholders, allowing investors, creditors, or consumers to evaluate firms' value and help investment decision-making. Above all, SR plays a significant role in encouraging firms to develop a more responsible approach (Directive 2014/95/EU).

In light of the significance of SR, the European Union (EU) has made corporate sustainability disclosure mandatory with the Non-Financial Reporting Directive (NFRD), enforcing large EU firms to report how they manage social and environmental challenges in annual reports since 2017 (Directive 2014/95/EU). In addition to NFRD, the new EU directive, the Corporate Sustainability Reporting Directive (CSRD), was adopted in 2022 to expand the scope of NFRD (Directive 2022/2464). EU's two directives have provoked discussion of mandatory corporate SR in other regions. For instance, East Asia such as South Korea and Japan, where no regulations directly addressed SR, have begun drawing up a layout of a new SR regulation for the private sector, taking a cue from the EU regulator's vital catalytic role in SR (Choi, 2022; FSA, 2022). SR has hitherto been considered discretionary and voluntary in most Asian countries (Faccia et al., 2021); however, a new paradigm – mandatory corporate SR – is emerging, particularly in Korea. In 2021, the Korean government announced that they will phase in new regulations to mandate SR from 2025 (Choi, 2022), targeting large companies – enterprises with

total assets valued at 2 trillion South Korean won (USD 1.81 billion) and more – listed in Korea's major stock market (Koo & Oh, 2021).

Sustainability reporting in Korea

Even though mandatory SR is a new topic, this does not signify that Korean firms have neglected environmental conservation and social justice efforts while running a business. The significance of CSR has been recognized in Korea since the mid-1990s, and Korean firms' participation in CSR activities has gradually risen since 2002 (Choi et al., 2019). Firms were influenced by the international communities' movement in the early 2000s (Yoshida et al., 2022). For example, United Nations (UN) launched a corporate sustainability initiative, UN Global Compact (UNGC), in 2000 to encourage firms to take action for socially responsible business, providing ten principles on human rights, environment, and anticorruption (UNGC, n.d.a). Moreover, the International Organization of Standardization (ISO) proposed to develop a CSR standard in 2002 to complement the existing ISO standards, such as the environmental management system standard (ISO14001) and quality management system standard (ISO9001), which resulted in the publication of ISO 26000: guidance on social responsibility in 2008 (ISO26000, n.d.).

CSR activities in Korea initially concentrated on donations for social purposes, including support for poor households or the launch of scholarships; this is because firms regarded CSR expenditure as a cost for a social obligation like taxes (i.e., quasi-tax); CSR activities were therefore nearly marketing instruments to enhance firms' reputations (Choi et al., 2019). However, as a broader concept of CSR – such as ESG and sustainable management – popped up in Korea in the late 2010s (Kim, 2022), firms have come to consider integrating CSR in a business model in the last few years (Choi et al., 2019). Despite these changes, Korean companies' two primary motivations for SR have not drastically altered. One is to signal firms' intentions to move towards sustainable business practices (Friske et al., 2022) as well as their high ESG performance levels to attract new institutional investors (Lee & Lee, 2021). Another driver is the consumers' rising preference towards sustainable products and business (KPMG, 2022). Overall, Korean companies view SR as a tool to gain a competitive advantage, which aligns with the initial CSR motivation outlined by Choi et al. (2019).

On the other hand, the EU is a frontrunner in SR in respect of initiating a regulatory framework to encourage transparent information disclosure. Although disclosure levels and trends vary by country and industry within the EU (KPMG, 2022), the Scandinavia region has consistently led SR, among others (EcoVadis, 2022; Lueg & Pesheva, 2021). This is because the Scandinavian governments pioneered introducing sustainability policies, encouraging firms to implement corporate sustainability in business strategy and its disclosure (Vallentin, 2015). In other words, policymakers' leadership made Scandinavian firms top runners in the field of sustainability (Lueg & Pesheva, 2021). EcoVadis, a sustainability rating platform, supports this statement with SR assessment scores of the top five countries: Finland (55.9), Sweden (54.4), France (54.3), Italy (53.6), and Norway (53.5). Not only do Nordic companies show the highest SR rates, but have strong sustainability performance and management systems. In contrast, Korean firms have lower SR rates and performance levels than EU and Scandinavian firms (EcoVadis, 2022). Hetze and Winistörfer (2016) also discern that Asian firms generally lag behind European and US firms regarding CSR communication.

Although Korean firms have practiced CSR reporting since the 2000s, only a few years ago did they dive into SR – disclosure of firms' ESG goal and its alignment with business strategy and operation – (Balogh et al., 2022). Taking SR as an extended and advanced CSR reporting, some firms have shifted CSR reporting into SR. However, the majority of Korean firms are presently at a crossroads of transition to alter their narrow viewpoint on CSR (donation) into SR

(sustainability integration into the business model). In addition, organizational change, such as establishing internal sustainability committees, is a more recent movement in the early 2020s (Lee, 2021). In other words, businesses are gradually embracing environmental and social sustainability in the management process, striving to take a more comprehensive and holistic approach in SR. Accordingly, almost half of the large Korean companies are currently publishing SR (Lee & Lee, 2021).

Nevertheless, it should be noted that SR is still concentrated in a few industries (e.g., chemical and petroleum manufacturers) in Korea due to its nature of voluntary participation. However, considering the industry's great responsibility for environmental and societal impacts, sustainability action and its disclosure should no longer be voluntary. Notably, Korea is the eighth largest GHG emitter in the world (Crippa et al., 2022), and the per capita CO₂ emission in Korea (13.2) exceeds the G20 average (7.5) (Climate Transparency, 2022). Further, Climate Change Performance Index (CCPI) ranked Korea's climate mitigation efforts at *very low* levels (Burck et al., 2022). This Korea's low environmental performances, such as high CO₂ emission levels, stem from excessive reliance on imported fossil fuels for energy supply. Given that the industry is one of the largest energy consumers in Korea, businesses own accountability to perform sustainable operations as well as disclose their activities with SR (Huang et al., 2021).

1.1 Problem Definition

Looking into Korean companies engaging in voluntary SR, there are three characteristics in reporting trends. First, companies combine several international reporting frameworks, such as Global Reporting Initiative (GRI) Standards, Sustainability Accounting Board (SASB), or Task Force on Climate-Related Financial Disclosures (TCFD). Lee and Lee (2021) point out that these multiple standards appeared due to a lack of domestic SR guidance, as the Korean government recommended that companies benchmark international SR initiatives. Secondly, the strong presence of risk management perspectives was brought up. Korean companies tend to prioritize topics that could cause costs and legal disputes (i.e., high-risk topics) (Lee, 2021) to avoid stakeholders' potential boycotts stemming from their poor risk management performance (Kim et al., 2019). Lastly, a high rate (89%) of third-party assurance was highlighted as a recent trend in Korea. This is part of signaling to prove the report's validity, yet the external assurance's scope is uncertain (Lee & Lee, 2021).

Despite Korean companies' efforts, limitations remain in their reporting practices. For example, many companies often omit regulatory risk – a risk that firms are exposed to from a change in legislation – in SR. Although Korean companies put emphasis on risk management, regulatory risk assessment has not come in sight for most of them. Considering significant legislative changes in 2021, such as the Korean green taxonomy introduction and the free carbon allowances reduction in Korean emissions trading systems, information concerning regulatory risks must have been addressed in the latest report (Lee & Lee, 2021). This indicates that there is room for improvement in SR by Korean companies.

However, even though SR has been extensively studied in recent years, little empirical research has been conducted on Korean firms' SR, and the development areas are underinvestigated. Thus, SR trends in the broader regional context – East Asia – were reviewed. As a result, two types of SR limitations were identified: 1) reporting format: quantity over quality, lack of focus area, low reader friendliness, and 2) content: unbalanced materiality, lack of disclosure on overarching strategies, low levels of target/KPI setting (CDSB, 2019; Hosoda, 2020; Lindholm, 2020; Tahara, 2022).

These two limitations are closely interconnected. First, suppose companies are under pressure to publish SR yet lack a sound strategy. Some companies might choose a “quantity over quality”

approach by introducing many small individual practices in SR to justify their legitimacy instead of describing overarching strategy and outcome. Since SR is a tool to present corporate sustainability performance based on solid strategic management, it is essential to have a well-established strategy in the first place. From low sustainability strategy implementation rates and governance capability in East Asian Firms (Damert et al., 2017), the priority task of Korean firms is perhaps to strengthen the sustainability strategy. Faulkner and Badurdeen (2014) suggest assessing the status quo of sustainability practices and levels as an initiating step to develop an effective strategy.

Considering the SR trend is rapidly changing with stakeholders' escalating expectations due to the complexity and ever-shifting nature of sustainability (De Micco et al., 2020), it is evident that demand for good quality SR is increasing. In addition, upcoming SR regulation in Korea corroborates the significance of SR by policymakers. However, most researchers have focused on the impacts of reporting on business (e.g., environmental or financial performance) or firms' motivations for voluntary disclosure; few studies have addressed what defines good SR and how firms can improve SR. Further, SR studies employing best practice approaches for knowledge transfer and capacity development are scarce. In particular, comparative research between Scandinavia (or broadly Europe) and Korea was not found. Thus, SR could be further studied from a regional angle to fill the above research gaps.

1.2 Aim and Research Questions

As the earlier section highlighted, there is a need for an empirical study on Korean firms' current SR practices. It must be noted that the Korean firms' limitations in SR identified in Section 1.1 are from a secondary source, including news media, business articles, and NPO reports. Hence, this research aims to explore Korean companies' SR with primary sources, such as sustainability reports. This thesis expects to contribute to SR improvement in Korea by suggesting lessons learned from Scandinavian firms.

In essence, the purpose of this study is threefold: 1) map out SR components in Korea and Scandinavia, 2) compare coverage levels of each component (i.e., reporting quality) in the two regions, and 3) investigate how Scandinavian firms arrived at best practices. In order to serve the research aims, the following research questions (RQ) are formulated:

[RQ1] What are the sustainability reporting components in Korea and Scandinavia?

[RQ2] What are the differences between Korean and Scandinavian reporting practices?

RQ2-a: What are the differences in reporting format between Korea and Scandinavia?

RQ2-b: What are the differences in coverage levels of the reported content between Korea and Scandinavia?

[RQ3] How have Scandinavian firms accomplished the best reporting practices?

RQ3-a: What are the Scandinavian firms' approaches to sustainability reporting quality?

RQ3-b: How can organizations improve sustainability reporting?

1.3 Scope and Limitations

Scope – This thesis focuses on large enterprises¹ in Korea and Scandinavia in terms of geographical scope. Concerning industry, since environmentally sensitive industries² generally

¹ This research adopts the OECD's definition of a large enterprise, companies with 250 or more persons employed (OECD, 2017) due to different definitions by Korea "companies with total assets valued at 2 trillion won (\$1.81 billion) and more" (Koo & Oh, 2021) and EU "companies meeting two of the conditions among 250 or more employees, net turnover of more than EUR 40 million, assets of more than EUR 20 million" (Directive 2022/2464) in SR regulations.

² Oil, gas, chemical excluding pharmaceutical, mining, paper, and metal industry (Brammer & Pavelin, 2006; da Silva Monteiro & Aibar-Guzmán, 2010; Radhouane et al., 2020)

face greater societal pressure to earn recognition for legitimacy (Brammer & Pavelin, 2006; da Silva Monteiro & Aibar-Guzmán, 2010; Radhouane et al., 2020), SR is a trending topic for those industries. Thus, this research investigates environmentally sensitive industries; however, given that Korea is heavily dependent on export-oriented industries and manufacturing is the centerpiece of the Korean economy (Huang et al., 2021), the scope of this research expands the definition of existing environmentally sensitive industries (oil, gas, chemical excluding pharmaceutical, mining, paper, and metal) by adding manufacturing into a category. First and foremost, it should be noted that manufacturing accounts for 30 % of Korea's GDP and is responsible for 90% of Korea's exports (International Trade Administration, 2022). Further looking into the environmental impacts of the industry sector, mainly consisting of various manufacturing sectors, industry sectors' CO₂ emissions account for 45% (direct emissions: 26% and indirect electricity-related emissions: 19%) of Korea's total CO₂ emissions (Climate Transparency, 2022). Moreover, large manufacturing companies' CO₂ emissions are increasing yearly, recording the highest ever 2022 since emissions began to be tallied (Kang, 2022). This shows that the impact of manufacturing firms cannot be overlooked. Recognizing this, **the thesis views manufacturing as an environmentally sensitive industry in the Korean context.**

Limitations – While this thesis aims to provide an overview of current SR practices in Korea and Scandinavia, the research findings are limited to large environmentally sensitive industries due to the abovementioned narrowed scope. Furthermore, although this research investigates the best practice companies' approach to SR, the transferability of the Scandinavian approach to Korea has limitations. This is because the interviews for RQ3 focus on Scandinavian companies. The assessment of factors influencing transferability is not the scope of this research, which may be explored through interviews with Korean companies in future research. Thus, this research provides lessons from Scandinavian best practices, yet it does not guarantee their successful implementation in Korean companies.

Lastly, this research focalizes on reporting quality – coverage level – in the two regions, analyzing disclosed information in the reports. The thesis does not examine the alignment between reported practices and actual performance or the firm's business model, given insufficient empirical evidence showing a correlation between reported practices and actual performance levels (Damert et al., 2017). However, this research assumes that the best reporting practices derive from solid strategy development and execution.

1.4 Ethical Considerations

The research design was reviewed against research ethics guidelines provided by Lund University, and no ethical problems were identified. Furthermore, as this research was conducted independently without an external organization's funding or support, there is no interest group or individual in a position to influence study results or unduly disrupt the researcher's honesty. The primary ethical consideration required in this thesis was the interview. Hence, the following measures were taken to ensure research ethics.

Participation in interviews was voluntary, and participants were informed about a brief introduction to the thesis, the purpose of the interviews, and how their responses would be used in the research upon interview request. Interview questions were designed and reviewed to avoid reflecting the researcher's expectations of the participant's responses. The names of the interviewees and organizations were anonymized to prevent any potential harm the information in the publication could cause to the participants involved. The disclosure level of the organization (e.g., places of the organization or industry) for company description was determined through discussion with participants. Interviews were audio-recorded and transcribed with the consent of participants before the interviews. Data gathered from

interviews (e.g., recording of the interview, list of interviewees and organizations, interview notes) was stored separately in the author's USB flash drive and protected with a password lock.

The use of sustainability reports for the analysis was deemed non-problematic due to its nature of public disclosure. Nevertheless, sustainability reports owner (i.e., sample companies) were anonymized to avoid potential conflict.

1.5 Audience

The intended audiences of this research are large-sized Korean manufacturing firms, Korean national governments, and academia.

This research outlines current SR practices in two regions, highlighting Korean firms' limitations and the strengths of Scandinavian firms. It would greatly interest the sustainability department of large Korean firms for those already voluntarily publishing SR. The limitations identified in Korean firms' SR could be employed as indicators to evaluate their current practices and identify weaknesses. For those not engaged in SR, peer companies' challenges could be valuable lessons when preparing SR for upcoming regulations to avoid the same mistakes. Further, Scandinavian model cases provide insights into what can be the benchmark to improve current SR.

Moreover, this research can benefit the Korean government when introducing SR regulation. Policymakers need to understand the status quo and firms' capability in SR in order to formulate feasible standards for effective policy implementation. Empirical evidence of current SR practices in Korea and the best SR practices in Scandinavia provide practical guidance for regulators to develop corporate SR guidelines in the regional context.

Lastly, the research expects to contribute to academia. For example, the definition of high-quality SR developed through Scandinavian best practices could apply to future research examining SR practices in other regions beyond Korea.

1.6 Disposition

The remainder of the research proceeds as follows: **Chapter 1** introduces the topic with the aim of the study, the intended audience, and the research questions addressing the research problem. The scope of the study and limitations are also outlined in Chapter 1, along with ethical considerations. **Chapter 2** introduces the conceptual basis of SR, including relevant terms, and provides the background knowledge of reporting framework/standards and quality assessment. It then reviews existing literature on SR employing best practices approach and research on SR in Korea and Scandinavia to understand what is known, as well as to define the research gap. **Chapter 3** outlines the research design and methodology for sampling, data collection, and analysis. In addition, it presents the rationale for chosen data, analysis methods, and limitations. **Chapter 4** presents the findings from the sustainability report content analysis in the two regions and practitioner interviews. **Chapter 5** discusses the significance of the findings and relevance to research questions while calling into question the validity of the methodology and limitations. It then reviews the implications of the study outcome to academia and practitioners. Finally, **Chapter 6** draws a conclusion from data interpretation for each research question and provides recommendations for Korean firms and future researchers.

2 Literature Review

This chapter first introduces SR-related core concepts and their definitions to reach a better understanding of the topic. Subsequently, it explores SR elements, quality principles, and indices relevant to the manufacturing industry to develop content analysis criteria, followed by challenges in SR. Lastly, the previous research on reporting in the two regions and the best practices approach is reviewed to shed light on to what extent the topic – SR – has been studied in the past.

2.1 Conceptual Foundations

2.1.1 Concepts related to Sustainability Disclosure

As introduced in the earlier section, environmental and social disclosure has a variety of labels other than SR. Even though those concepts are often interchangeable, it is not necessarily used in the same context. Thus, the definition of each term and background will be presented to bring some clarity.

Corporate Social Responsibility (CSR)

Since Bowen coined the term CSR in the Social Responsibilities of the Businessman in 1953 (Acquier et al., 2011), the CSR definition and its scope have evolved. Moreover, as CSR activities are adaptive in response to dynamic societal expectations and regulations (Homer & Gill, 2022), what refers to CSR is liable to change. Nonetheless, the following two definitions are widely accepted. One is “*a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis*” (Commissions of the European Communities, p.2), and the other one is by World Business Council for Sustainable Development (WBCSD) as below.

Commitment of businesses to contribute to sustainable economic development by working with employees, their families, the local community and society at large to improve their lives in ways that are good for business and for development (WBCSD, 2002, p.2)

Another concept that evolved from CSR, Creating Shared Value (CSV), is also known, and some firms use the term in the report. For example, Nestlé named their SR title *Creating Shared Value and Sustainability Report* (Nestlé, 2022). Porter and Kramer (2011) argue that firms find it hard to justify continuing CSR programs in the long run when they view CSR separately from the core business. In contrast to CSR of passive nature, CSV goes beyond reputation-driven CSR activities, pursuing to create both economic and social value by addressing societal problems through the firm’s main business (Porter & Kramer, 2011). This indicates that CSV is more integral to profit maximization, regarded as a strategic approach for corporate management (Na, 2021).

Environmental, Social, and Governance (ESG)

ESG is a relatively new concept compared to CSR. The term ESG was mentioned by Who Cases Wins (WCW), a joint initiative of global financial institutions, in 2004 for the first time (Na, 2021). Afterward, ESG issues were brought out in the UN’s Principles for Responsible Investment report in 2006 (Atkins, 2020) to promote sustainable investment, resulting in mainstream attention. ESG issues can influence firms’ financial performance; thus, investors with active ownership must consider ESG factors in investment decisions for their beneficiaries and clients. Examples of ESG factors are shown in Table 1 (UNPRI, 2006).

Table 1. Examples of ESG factors

Environmental	Social	Governance
Climate Change	Human rights	Bribery and corruption
Resource depletion	Modern slavery	Executive pay
Waste	Child labor	Board diversity and structure
Pollution	Working conditions	Political lobbying and donations
Deforestation	Employee relations	Tax strategy

Source: UNPRI, 2006, p.4

ESG disclosure is often interchangeably used with CSR reporting since both present organizations’ non-financial information; however, there is a dissimilarity in that CSR does not include corporate governance in ESG factors (Tsang et al., 2022). Further, as the term stems from the financial institutions’ perspective, the concept of ESG is based initially on shareholder capitalism, stressing maximizing stakeholder value (Na, 2021). On the other hand, environmental themes are deeply rooted in the contemporary era’s CSR (Homer & Gill, 2022).

Non-Financial Information (NFI)

With the adoption of EU Directive 2014/95/EU on the disclosure of non-financial and diversity information (i.e., NFRD), much research has suggested the meaning of NFI. Publicly, NFI is indistinguishable from ESG information (Deloitte, 2021a) in that firms are obliged to contain information on environmental and social topics under NFRD, as well as how they cope with bribery and corruption issues (Aguado-Correa et al., 2023). However, scholars’ understanding of NFI is multifaceted, and the generally accepted definition of NFI is still absent from an academic perspective. This is due to the idea of NFI to complement financial information. Thus, some include intellectual capital information, business strategy, performance, and risk in NFI, along with CSR and ESG information (Tarquinio & Posadas, 2020).

Triple bottom line (TBL)

TBL is a sustainability accounting framework with economic, social, and environmental dimensions. TBL approach prompts firms to shift from the standard bottom line (i.e., company’s profit) to balance all three dimensions in business operations. The three Ps of profit, people, and the planet are key principles of TBL (Andelin et al., 2013).

Profit in TBL is an advanced principle from traditional interpretation, highlighting societal profit. Thus, positive economic impacts of organizations, including tax payment, employment creation, and innovation generation, are seen as Profit in TBL, not limited to financial profit companies make (Kraaijenbrink, 2019). Next, **People** refer to firms’ commitment to people and, broadly, business’s societal impact. TBL takes all stakeholders affected by firms’ decisions into consideration, avoiding favoring shareholder value. For example, practices include fair hiring concerning employees, strategic partnerships with local communities, and NPO for a common societal goal (Miller, 2020). Lastly, **Planet** indicates creating a positive impact on the environment. Firms’ efforts to reduce carbon footprints, such as less energy consumption and streamlining logistics, fit into this category (Miller, 2020).

Sustainability and Corporate Sustainability

The term sustainability was defined in the 1987 Brundtland report as a set of actions to meet the present needs without exploiting future capacity generations (Brundtland et al., 1987). Since sustainable development requires the integration of environmental, social, and economic dimensions (UN, n.d.), there are no differences from TBL.

Corporate sustainability is companies' ability to leverage their governance practices and market presence to contribute to economic, environmental, and social development (Krechovská & Procházková, 2014). As governance is a central piece along with the three pillars of sustainability, it can be stated that corporate sustainability takes in all the abovementioned concepts (i.e., CSR, ESG, NFI, TBL).

There are several types of names for the report, such as an environmental report, CSR report, corporate citizenship, and annual report, including environment and ethics; however, the term sustainability report has gradually gained popularity (Hedberg & von Malmberg, 2003) and more companies nowadays use sustainability reporting broadly (Adams & Larrinaga-González, 2007). Sustainability report is a disclosure of quantitative and qualitative information on how the company managed environmental, social, and economic performances efficiently and effectively in the reporting period (Daub, 2007; Schaltegger et al., 2003).

After reviewing the definitions related to sustainability and SR, corporate sustainability comes across as the umbrella term encompassing others, as illustrated in Figure 1. Hence, the thesis uses corporate Sustainability Reporting (SR) as a representative term for companies' sustainability disclosure. In other words, this research views CSR/TBL reporting and ESG/NFI disclosure as subsidiary concepts to SR.



Figure 1. Authors' perception of concepts related to corporate sustainability

Source: Own illustration

2.1.2 Sustainability Reporting Initiatives, Frameworks and Standards

While annual reports are extensively used for sustainability disclosure, other communication channels exist, such as input to national GHG emissions databases and Carbon Disclosure Project (CDP). Moreover, firms can choose which reporting framework to follow (Andrew & Cortese, 2011; Damert et al., 2017). This section introduces widely used reporting guidelines/standards.

Global Reporting Initiative (GRI)

GRI standards are a comprehensive SR framework, regarded as a main normative body in the reporting field. Since GRI launched its first set of reporting guidelines in 2000, several thousand companies worldwide have adopted GRI standards to develop internal reporting procedures. Nowadays, GRI is considered a means to enhance reporting credibility; thus, more companies produce SR in accordance with GRI standards (Andelin et al., 2013; Barkemeyer et al., 2015; Daub, 2007; GRI, 2022b). According to KPMG's survey, GRI standards are the most prominent reporting framework in all regions, including Europe, America, and Asia-Pacific (GRI, 2022b).

GRI guidelines provide a set of sustainability performance indicators across economic, environmental, and social dimensions as well as sector guidance (Andelin et al., 2013). While the GRI guidelines set out several principles, such as disclosure of the SR publication process, reporting content, and quality criteria (see Section 2.1.4 for details), companies can tailor their reports to suit stakeholders' interests and adapt to the characteristics of business operations (Barkemeyer et al., 2015).

GRI has updated its standards progressively to bridge gaps between existing guidelines and changing intergovernmental expectations of corporate responsibility. For example, in the recent revision in 2021, three series of standards (Universal, Sector, and Topic) were defined. In particular, the minimum reporting requirements were stipulated in Universal standards; companies must use the applicable sector standard provided by GRI for the materiality analysis. Further, revision resulted in 31 topic-specific standards (Jult, 2022). Overall, GRI raised a bar for companies to say, "This report is in accordance with GRI".

United Nations Global Compact (UNGC) Initiative

Despite GRI's popularity, GRI is not the only standard for SR (Andelin et al., 2013). UNGC Initiative is the other widespread standard, along with GRI and UN Sustainable Development Goals (SDGs) (Mattera & Alba Ruiz-Morales, 2021). UNGC is a voluntary initiative launched in 2000 by the UN to encourage firms to work on human rights, labor, environment, and anti-corruption. Businesses report on how they incorporate UNGC's ten principles in their sustainability strategy, internal policy, and activities in alignment with UNGC guidelines (UNGC, 2023). Organizations pledging UNGC must submit annual Communication on Progress (CoP) (i.e., report) as a declaration of commitment to sustainability. Companies must meet reporting criteria to remain UNGC participants; otherwise, they are eliminated from the initiative (UNGC, 2017).

Other than UNGC, SDG reporting is also voluntary disclosure of an organization's efforts related to SDG indicators. The SDGs refer to 17 goals and 169 targets introduced by the UN in 2015 to promote the private sector's sustainable development (UN, 2023). As the UN stresses the role of business as change agents, "*their creativity and innovation to solving sustainable development challenges*" (UN General Assembly, 2015, p. 29), a growing number of companies have adopted SDGs in their business and reporting on the activities (Galeazzo et al., 2023).

Integrated Reporting (IR) Framework

IR is a corporate reporting framework proposed by The International Integrated Reporting Council (IIRC), consolidating financial and non-financial information in a single report (Hosoda, 2020). Integrated thinking is a crucial concept embedded in IR, which refers to "*the active consideration by an organization of the relationships between its various operating and functional units and the capitals that the organization uses or affects*" (IIRC, 2013, p.2). In addition, the IR framework emphasizes providing information to financial capital providers, helping them assess firms' capabilities for value creation, such as potential effects from material externalities and effective resource allocation (IIRC, 2013).

Sustainability Accounting Standards Board (SASB)

SASB standards were developed in 2018 to identify ESG concerns influencing firms' financial performance and materiality. As investors are the target audience for SASB, materiality indicates the financial relevance of the ESG issue. Distinctively, SASB standards are industry specific. In addition to 26 general sustainability issues under five dimensions of sustainability (environment, social, human capital, business model & innovation, and leadership & governance), SASB standards provide a set of topics related to each industry's materiality and accounting metrics

for measurement along with Sustainable Industry Classification System (SICS) (Busco et al., 2020). On the other hand, IIRC and SASB announced their merger by forming a new entity, the Value Reporting Foundation, to provide a more coherent reporting tool for businesses (IFRS Foundation, 2021).

Task Force on Climate-Related Financial Disclosures (TCFD)

TCFD is a disclosure framework of climate-related risks and opportunities. In 2018, TCFD published recommendations on a set of disclosure criteria across four areas: strategy, governance, risk management, and metrics and targets. Information disclosed by TCFD includes the firm's target, actions, outcomes of the given year, transitional and physical risks surrounding climate change, carbon offset strategies, and assumptions of carbon prices. Organizations have implemented TCFD recommendations, tailoring them to firms' circumstances based on the strategic priorities for disclosure. However, this flexibility affected a lack of comparability in disclosures, especially in future forecasts. Hypothetical futures are disparate due to heterogeneous assumptions of uncertainties and methods for scenario analysis (Chua et al., 2022).

Carbon Disclosure Project (CDP)

CDP, an international non-profit organization, operates a platform of environmental disclosure system mainly for investors. Companies report how they identify and manage climate change-related risks and opportunities, including deforestation and water security. This refers to CDP reporting, and the governance body of CDP provides scoring based on evaluation against their criteria (CDP, 2021).

2.1.3 Key Elements of Sustainability Report

Looking at EU's mandatory SR requirements, companies must disclose five themes on the report under NFRD: 1) environmental protection, 2) social responsibility and treatment of employees, 3) respect for human rights, 4) anti-corruption and bribery, and 5) diversity (e.g., age, gender, background) on company boards (Directive 2014/95/EU). These criteria will be further expanded with CSRD (i.e., revised NFRD) by adding disclosures on overall requirements (inclusion in the annual report, reporting principles, format and timing, external assurance) and general disclosures (business model, strategy and policies, KPIs and targets, sustainability governance, double materiality³ assessment, and due diligence, risk, and opportunity management), and sector-specific standards (Directive 2022/2464; KPMG, 2023). Since EU regulators made disclosing the abovementioned information mandatory, they can be seen as key elements of SR.

On the one hand, as GRI standards are the most widespread framework for voluntary reporting (Chen & Bouvain, 2009; Permatasari et al., 2020; Waddock & Googins, 2011), some studies determined categories to analyze sustainability reports with GRI guidelines (Aktaş et al., 2013; Leszczynska, 2012; Şahin et al., 2017). Among numerous categories, Şahin et al. (2017) view 1) strategy and profile, 2) management approach, and 3) performance indicators as significant elements for SR content analysis while examining Turkish firms' reporting practices. Specifically, SR should describe the corporate sustainability strategy with a statement from top management, key impacts, opportunities, and risks. It is also important to include a basic organizational profile with the firm's governance structure and report parameters such as reporting period and process. Performance indicators, composed of three pillars of sustainability (i.e., economic, environmental, and social), are other critical elements of SR. The management approach is a

³ Under the CSRD, "Companies have to report not only on how sustainability issues might create financial risks for the company (financial materiality), but also on the company's own impacts on people and the environment (impact materiality)" (European Commission, 2022b).

prerequisite to indicators as a strategic decision of what to quantitatively measure, monitor, and report should be integrated (Şahin et al., 2017).

In short, the GRI standards are more specific than the mandatory requirements of NFRD, yet the underlying idea is similar. Appendix A compiles key reporting elements from the literature review, which will serve as a backbone of the coding framework for data analysis.

2.1.4 Quality of Sustainability Report and its Assessment

As introduced in Section 2.1.2, numerous frameworks provide SR guidelines. Nevertheless, the quality of SR has been argued due to inconsistencies among firms, as firms have different levels of disclosure; further, there needs to be more information to assess the credibility and reliability of the reports (Daub, 2007; Diouf & Boiral, 2017; Wolniak & Hąbek, 2016).

Several studies have analyzed the quality of SR (Daub, 2007; Komara et al., 2020; Putri et al., 2020; Zhang et al., 2023) in various forms (Romolini et al., 2014), yet most criteria were developed based on GRI G4 guidelines⁴. Moreover, those criteria are overlapped with key principles proposed by Permatasari et al. (2020). Table 2 outlines them, combining four quality good CSR reports defined by Moravcikova et al. (2015).

Table 2. Principles of reporting content and quality assessment

Content		Quality	
Completeness	Reporting sufficient economic, environmental, and social impacts of business operation, including the coverage of material aspects and the scope	Accuracy	Reporting accurate and detailed information for stakeholders
Credibility	Reporting comprehensive description of corporate policy concerning sustainability with commitment of top management and governance structure such as personnel responsibilities in the policy	Appropriate form	Having an appropriate reporting format with clear structure and moderate length
		Balance	Reporting both positive and negative aspects of sustainability performance
Materiality	Reporting how firms perceive the important sustainability issues related to them and their industry	Clarity	Reporting understandable and accessible information for stakeholders' use
Significance	Utilizing quantitative and qualitative indicators increases the quality of reports	Comparability	Reporting information consistently for comparison analysis over time
Stakeholder inclusiveness	Identifying stakeholders of the organization and reporting firms' response to stakeholders' expectations and interests	Reliability	Disclosing information of reporting process from data collection to analysis method, Obtaining third party verification
Sustainability context	Reporting firm's performance in the broad context of sustainability	Timeliness	Reporting timely, so that stakeholders can use it effectively for decision-making

Source: Moravcikova et al., 2015; Permatasari et al., 2020, p. 250-251

Daub (2007) particularly stresses three principles in defining a good SR: 1) Materiality - information should be relevant to the company; 2) Clarity - the stakeholder's use; and 3) Balance - addressing uncomfortable topics. In addition, disclosure of the company's overall sustainability strategy and objectives was also mentioned as a quality of the good report.

⁴ The GRI G4 guideline is the fourth generation of SR guidelines developed in 2016, referred to as GRI Standard (Permatasari et al., 2020).

In essence, a good report should be useful to readers and provide high-quality information (Daub, 2007; Wolniak & Hąbek, 2016). Given that this research aims to explore reporting practices in Korea and ultimately offer recommendations for improvement, it is critical to diagnose current reporting quality. Therefore, the above criteria in Table 2 will be used as an analytical lens to assess coverage levels of Korean and Scandinavian reports (see Appendix C for the assessment criteria).

2.1.5 Sustainability in Manufacturing Firms

This chapter explores the conceptualization of sustainability in the manufacturing industry context. As manufacturing operations require significant resource usage and generate large amounts of waste, numerous manufacturing firms have integrated sustainability into their mission to mitigate those negative environmental and societal consequences. As a result, sustainable manufacturing has become a fundamental principle these days (Digalwar et al., 2020; Lee & Lee, 2014). Among multiple descriptions for sustainable manufacturing, the widespread definition is by the U.S. Department of Commerce’s definition “*sustainable manufacturing is the creations of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers and are economically sound*” (Digalwar et al., 2020, p.592). From an academic perspective, Bhakar et al. (2018) outlined the key concepts of sustainable manufacturing in each product and process management phase, as shown in Table 3.

Table 3. Key concepts of sustainable manufacturing

Product Management		Process Management	
6R principles	Reduce, reuse, recover, redesign, remanufacture, and recycle.	Agile manufacturing	It is well known for its advantages (i.e., cost reduction, flexibility, customer response, delivery conditions and good quality).
Sustainable quality management	It ensures that the organization, product, and service is consistent in all three dimensions of sustainability viz. environmental, economic and social. Further quality management has a positive effect on environmental performance of the sustainability and sustainable quality management is a practical measure.	Life cycle engineering	The assessment of economic and environmental impacts of the product/process life cycle engineering under the defined boundary conditions.
Sustainable maintenance	All required processes for ensuring the acceptable assets condition by eliminating negative environmental impact, prudent in using resources, concern for the safety of employees and stakeholders, while at the same time economically sound.	Lean manufacturing	It is oriented towards reduction of waste to increase productivity and performance of a manufacturing process.

Source: Bhakar et al. (2018), p. 251

These key concepts build a foundation for content analysis, giving a glimpse into SR by manufacturing companies.

2.1.6 Sustainability Assessment of Manufacturing Firms

When the manufacturing company integrates the key concepts above into the operation, it is deemed sustainable practices, yet it can be confirmed through assessment. While there are manifold ways to evaluate how sustainable the business is, Pande and Adil (2022) introduce five methods applicable to manufacturing firms among various approaches: 1) sustainability

indicators and indices, 2) life cycle sustainability assessment, 3) sustainable value stream mapping, 4) sustainable operations maturity model and 5) the extent of implementation of sustainable manufacturing practices. This chapter will highlight the first assessment approach with sustainability indicators and indices. Since KPIs are pivotal in SR (Moldavska & Welo, 2015), it signifies high relevance to the research topic.

While much literature suggests methods and metrics for sustainability assessment (Singh et al., 2012), manufacturing firms face difficulties finding the most appropriate approach for them (Lee & Lee, 2014; Poveda & Lipsett, 2011). This is due to excessive indicators used in the assessment and the lack of completeness in the structure of methodological frameworks; thus, several studies raised an issue of unstandardized indicators and subjectivity embedded in current sustainability rating systems (Bhakar et al., 2018; Pande & Adil, 2022; Saad et al., 2022; Swarnakar et al., 2021), devoting to establishing more effective and standardized sustainability assessment framework for manufacturing firms.

Bhakar et al. (2018) and Kaldas et al. (2021) emphasize the integration of significant sustainable manufacturing concepts, such as 6R, in the full scope of the manufacturing process, reflecting the total life cycle stages (pre-manufacturing, manufacturing, use, and post-use) into assessment indicators. Swarnakar et al. (2021) also suggest adding sustainability indicators related to the manufacturing process. Further, Digalwar et al. (2020) proposed indicators concerning social sustainability for manufacturing firms' assessment, while Saad et al. (2022) developed a sustainability rating tool based on SDGs-targeted sustainability indicators from manufacturing organization perspectives. Table 4 compiles advocated indicators for manufacturing firms' sustainability assessment from the literature.

Table 4. Sustainability assessment indicators for manufacturing firms

Assessment indicators			
Environmental sustainability		Social sustainability	
Policy	Environmental policy Design for lifecycle	Health and Safety	Work related injuries/ incidents rate, Time weighted average to record noise exposure, Perception measures to accidents during operation and exposure to toxic chemicals, Employees receiving safety training (%), Employees exposed to high-risk work environment
Material	Reuse/Recycle raw material ratio Raw material consumption Hazardous material use (per kg of product/%)	Diversity	Gender ratio
Energy	Total energy use Electricity consumption Renewable energy usage (%)	Employee well-being	Training and skill development (total training hours), Employee provided with housing (%), Employee turnover ratio, Paid leave and sick leave offered per year (number of days)
Water	Total water use Recycled water use (%) Toxic discharge to water	Stakeholder development and engagement	Contribution to society rate, Local business support index, National production rate, Community outreach/engagement activities, Customer satisfaction rate
Emission	GHG/CO2/NOx emissions		
Waste	Total waste generation Waste segregation percentage Non-hazardous/hazardous waste Scrap rate		

Source: Author's synthesis, adapted from Bhakar et al., 2018; Digalwar et al., 2020; Lee & Lee, 2014; Pande & Adil, 2022; Saad et al., 2022; Swarnakar et al., 2021

The indicators above were deployed to build the initial coding framework (see Appendix A).

2.1.7 Challenges in Sustainability Reporting

SR can be challenging for companies in terms of sustainability data management and effectiveness of communication (Brusca et al., 2018). Understanding challenges is instrumental in finding suitable mechanisms to overcome them and ultimately improve report quality (De Micco et al., 2020). In that regard, reviewing SR challenges gives a glimpse of the potential difficulties Korean companies could face under regulatory change. De Micco et al. (2020) introduce several SR challenges observed in an Italian oil and gas company.

Heterogeneity of sustainability topics and stakeholders – Companies may struggle to determine what topics to address and whom to report. This process is challenging as it involves top management and employees, requiring a shared vision and approach. The authors suggest that defining stakeholders relevant to the company and analyzing their interests (i.e., Stakeholder mapping) can help cope with the complexity and heterogeneity of sustainability.

Reduction of information asymmetry – SR is a tool to lessen the knowledge imbalance among stakeholders, publicly available on websites. However, information asymmetry could remain because not all stakeholders have time to read the report thoroughly. Thus, companies must adopt different communication strategies to deliver their messages to various stakeholder groups effectively. For instance, the authors recommend arranging interactive communication for shareholders or the local community, such as events and seminars, in addition to newsletters shorter than SR.

Data management – As mentioned earlier, sustainability topics are heterogeneous, creating the other great challenge in SR, particularly in data collection and coordination. SR requires compiling disparate data (e.g., KPIs) from all business areas and regions. Due to its complexity, the authors point out that ensuring data reliability could be arduous.

Organizational learning and mindset change – Since the process of producing SR involves all employees, everyone should be on the same page in terms of sustainability mindset and reporting standards. This may require a great deal of effort for companies to elevate the level of employee sustainability awareness significance of SR and to disseminate reporting principles throughout the organization. In order to shift employees' sustainability mindset (i.e., from passive to proactive attitudes in SR-related tasks), training activities could be helpful to engage employees, enabling a step-by-step learning process (De Micco et al., 2020). Further, it is imperative to introduce SR as a strategic approach to create long-term value (Busco et al., 2017).

The abovementioned challenges evolve with time, predominantly determined by changing regulatory landscape (Bebbington & Larrinaga, 2014; De Micco et al., 2020). For instance, NFRD played a crucial role as a guide to alleviate some challenges. Requirements of NFRD, such as the broader scope of disclosure and data quality, encouraged companies to interact with external experts (i.e., consultancy and audit firms), resulting in notable improvements in data collection and processing. Moreover, NFRD gave SR legitimacy similar to financial reporting, confirming the significance of SR through the regulation. This sped up employees' awareness-raising on sustainability matters with higher proactivity, stimulating the institutionalization of SR in daily tasks and management systems (De Micco et al., 2020).

On the other hand, NFRD intensified a few challenges along with new challenges. One is a preparing disclosure of topics that had been neglected in the past. For example, it is inevitable to address supply chain assessment and anti-corruption policies under NFRD, meaning that companies that have yet to disclose them must work on data collection and reporting. This leads to another challenge, employee workload. As regulatory requirements increase, more data has to be processed within the stricter deadline, which may cause a heavy workload for some.

Further, as the regulation stresses transparency, qualitative information is irreducible (De Micco et al., 2020). Nevertheless, companies can seize business opportunities if the challenges are adequately addressed (Schaltegger et al., 2017).

2.2 Previous Research on Sustainability Reporting

During the past two decades, SR has gained attention in academic literature. Several research streams arose, such as a theoretical explanation of the motivation for SR (Alsayegh et al., 2020; Balogh et al., 2022; Damert et al., 2017; Nishitani et al., 2021), SR's impact on financial performance (Abdi et al., 2022; Alsayegh et al., 2020; Balogh et al., 2022; Damert et al., 2017; Elafify, 2021), and SR assurance (Bauwhede & van Cauwenberge, 2022; Radhouane et al., 2020).

This section reviews peer-reviewed scholarly journals to understand SR better from the regional angle in Sections 2.2.1 (Korea) and 2.2.2 (Scandinavia), as well as previous research focus areas. Furthermore, as this thesis anchors in the best practices transfer, Section 2.2.3 outlines literature employed the best practices approach on SR. This section excludes grey literature such as working papers, news articles, government documents, and white papers.

2.2.1 Sustainability Reporting in Korea

Previous studies have documented Korean firms' SR from various angles: CSR disclosure on websites, cross-national comparison of reporting, impacts of SR on firms' financial performance, and firms' behavior for voluntary reporting.

Beginning with the history of SR in Korea, none of the large Korean firms listed in Fortune Global 250 published SR in 1998 (Kolk, 2003). Since a leading domestic steel manufacturer, POSCO, issued sustainability reports for the first time in 2003, other companies have started voluntary reporting, chasing after the market leader to avoid stakeholder boycotts. However, the movement was concentrated in a few industries, such as chemical and petroleum manufacturers (Kim et al., 2019). While global firms' interest in non-financial disclosure escalated in the early 2000s, Korean firms showed lower environmental awareness than European firms. This is due to the absence of societal developments to raise sustainability issues, including no regulatory actions by the government (Kolk, 2003).

Further, Korean firms' progress on CSR institutionalization (i.e., incorporating non-financial aspects into a core business) was procrastinated compared to North America and Europe, showing lower levels (8%) of seriousness towards CSR than others (e.g., Japan: 90%) (Chapple & Moon, 2005). A comparative study on CSR web reporting by Kane et al. (2017) shows similar results in that Korean firms have lower transparency levels in SR than US firms, especially on CSR governance, principles, and overall approach to stakeholder engagement. The authors explain the gap between US and Korea with different development levels on CSR and history (Kane et al., 2017). In line with Kolk (2003), the role of social support systems such as standards and regulatory systems by policymakers was underlined to improve reporting practices in Korea. In other words, the lack of such a system is one of the obstacles for Korean firms' SR enhancement (Kane et al., 2017).

Another topic explored in Korean firms' SR is the relationship between sustainability performance and firms' profitability. One study investigated Korean and Indian firms on this topic; the result showed that Korean firms with higher sustainability disclosure levels had higher financial performance, while the opposite was observed in other countries, including India (Laskar, 2019). Specifically, high sustainability disclosure levels increase the growth rate of firms' total assets by reinforcing corporate soundness and social contribution, which ultimately results in higher firm value (Cho et al., 2019). Nevertheless, this is not the case for large conglomerate

firms called chaebol⁵ firms in Korea. Profitability was not associated positively with SR in the case of Chaebol firms (Griffin & Youm, 2018).

Studies on chaebol firms' behavior in SR found that Chaebol firms are more devoted to voluntary SR than non-chaebol firms to maintain their reputation by showing prosocial behaviors (Griffin & Youm, 2018; Lee et al., 2019). Nonetheless, investors question Chaebol firms' intentions for voluntary SR due to founder families' dominating power over the entire company group in chaebol firms. Stakeholders doubt that voluntary SR is nothing but a tool to uphold their credibility and divert attention from concerns related to the governance structure. Investors, therefore, often discount corporate value even though chaebol firms put significant efforts into SR (Lee et al., 2019). In the Korean context, legitimacy-seeking is the primary driver for SR (Griffin & Youm, 2018). According to legitimacy theory, firms must prove that they meet society's environmental and social expectations. Applying this to SR, poor reporting practices threaten the company's legitimacy. Thus, firms publish the quality of SR to convince society of their contribution to social value as well as to avoid the cost of regulatory actions (Alsayegh et al., 2020; Balogh et al., 2022; Damert et al., 2017; Nishitani et al., 2021).

While the academic community has explored voluntary SR in Korea, the necessity for a regulatory system was underlined to encourage firms to engage further in SR. Since new regulations of mandatory SR will be enforced from 2025 in Korea (Choi, 2022), the narrative surrounding Korean firms' SR is changing; firms' motivation for SR may converge into compliance. Another narrative in previous studies is classifying Korea as an emerging economy, implicitly indicating low expectations toward Korean firms' SR. However, the status of the Korean economy has been promoted from developing to developed by United Nations Conference on Trade and Development (UNCTAD) in 2021 (UNCTAD, 2022), meaning that Korean firms now have higher expectations for sustainable practice and reporting as required in other developed countries. Hence, academia should shift the research focus from voluntary SR (i.e., why do firms engage in SR?) to mandatory SR (i.e., how do firms embrace mandatory SR? What can it be improved from voluntary SR?) in Korean context.

2.2.2 Sustainability Reporting in Scandinavia

Hedberg and von Malmborg (2003) investigated Swedish companies' voluntary SR practices. Swedish companies' main driver for publishing SR is organizational legitimacy. Although the main driver is directed towards external communication, Swedish companies recognized SR's positive effect on internal communication, such as enabling employees to learn about their companies' practices and facilitating dialogues and engagement. Most Swedish companies followed GRI guidelines to increase credibility; however, the authors pointed out the need for further development in GRI guidelines in terms of visibility and controllability of TBL on a corporate level (Hedberg & von Malmborg, 2003)⁶.

Another study on SR in Scandinavia discusses the role of government in CSR, comparing four Nordic countries (Gjølberg, 2010). The author reviewed how governmental interpretations of CSR have shaped the sustainability policy in Scandinavia.

Denmark was the first country in the Nordic region to introduce CSR policies; the Danish government implemented an incentive program in 1993 to encourage companies to hire socially disadvantaged individuals such as immigrants and disabled people. However, while Denmark

⁵ According to the definition by The Korea Fair Trade Commission, Chaebol is "a business group of firms which are dominated by the group's controlling shareholder, who owns or controls more than 30% of the firms' shares" (Lee et al., 2019, p.1).

⁶ Although this study provides insights into SR practices in Sweden, one must note that the research was conducted two decades ago. The content analysis was performed with reports published in 2000 and interviews were conducted between 2001 and 2002.

encountered globalization around 2000, Danish authorities changed their viewpoints on CSR, reflecting it into law. Mandatory CSR reporting (i.e., SR) for large firms emerged since CSR was regarded as a significant competitive advantage for companies in competition with emerging economies (i.e., competing on environmental and social parameters instead of price) (Gjølberg, 2010). This view was explicit as captured in the press release from the Ministry of Economy, “*Corporate Social Responsibility Pays Off (Danish Ministry of Economy 2008)*” (Gjølberg, 2010, p. 212).

Norway was the second country to jump on the bandwagon of CSR policy. Social issues were the main topic, similar to Denmark, yet human rights were highlighted due to Norwegian companies’ operations in high human rights risk regions. These concerns were raised by the public and addressed by a consultation body comprising NGOs, academia, and corporatists. In contrast to Denmark, the Norwegian government viewed CSR as one of the goals in foreign policy, emphasizing humanitarianism. Accordingly, business is a “*necessary and natural partner*” (Gjølberg, 2010, p. 213) in the Norwegian context, not a beneficiary of CSR policy as in Denmark (Gjølberg, 2010).

In **Sweden**, the prime minister launched the Swedish Partnership for Global Responsibility initiative in 2002. CSR drew the attention of public authorities in relation to political matters, such as international trade, assistance in developing the economy, and foreign policy. Sweden’s approach was integrating CSR into a wide range of policies rather than having a standalone CSR policy. However, CSR reporting was an exception. The Swedish Ministry of Economic Affairs mandated CSR reporting in accordance with the GRI guidelines to all state-owned companies in 2007. However, the private sector was unaffected as the government viewed it as unnecessary because many multinational Swedish companies were already voluntarily disclosing their comprehensive CSR activities to the public (Gjølberg, 2010).

Overall, the literature review confirms that Scandinavia has a more extended history in SR than Korea, as the government introduced mandatory reporting between the late-1990s and mid-2000s. Most Swedish companies already actively engaged in voluntary SR in the early 2000s, adopting GRI guidelines. Considering that the discussion of mandatory SR has brought up in the early 2020s in Korea, there is a large societal gap in sustainability awareness levels and its significance, both in business communities and public authorities.

Furthermore, Gjølberg (2010) notes that each country’s political, economic status, and cultural norms highly affect the governmental interpretation of CSR, leading to different policies. This suggests that policymakers’ interpretation of sustainability shapes the regulations. In that regard, the upcoming mandatory SR signals the Korean government’s transformation in view.

2.2.3 Best Practices Approach

As this research adopts a best practice approach, prior studies employing a similar approach on SR were explored. While the following three pieces of literature were identified during the last decade, none addressed Scandinavian cases. The studied countries are Italy, Indonesia, Malaysia, and India.

Romolini et al. (2014) examine best reporting practices by Italian-listed companies between 2008 and 2010 by exploring indicators disclosed in SR. By analyzing SR with scoring and assessing the maturity levels of reports, the authors concluded that Italian firms have a good level of disclosure overall in all three TBL dimensions, and both the quality and quantity of the report had matured over time. For instance, increasing the use of GRI indicators in SR was a trend. While Romolini et al. (2014) viewed growing interest in SR and its development positively for the most part, they cast doubt on the probability of that trend being a temporary fashion for

companies. This research was conducted before NFRD was introduced in the EU, yet authors advocated mandatory rules for SR to further spread the best reporting practices across industries.

Joseph et al. (2016) investigate CSR best practice companies in Indonesia and Malaysia with a focus on anti-corruption information disclosure. With content analysis of SR, authors determined two countries' disclosure levels on seven themes related to anti-corruption. Findings indicate that many firms do not disclose information on anti-corruption overall, while Indonesian firms have higher disclosure levels than Malaysian firms. Authors link this to Indonesia's more substantial coercive pressure of anti-corruption information reporting, stressing the importance of the government's role in providing guidelines for improved disclosure through regulations.

Jain and Winner (2016) explore top Indian firms' SR practices through content analysis of CSR and sustainability information disclosed on companies' websites by comparing with the bottom 100 firms' practices in The Economic Times 500 list. The study evaluated the presentation of reporting based on levels of conformity to GRI standards through content analysis. The result shows that disclosure in India leaned into economic impacts and performance, describing fewer environmental and social impact indicators. Nevertheless, the authors highlight that a majority of top Indian firms are actively embracing GRI standards in the reports, and a positive shift towards further efforts for sustainability communication is emerging in India. Authors associate this trend with the Indian government's move to make mandatory expenditures for CSR/sustainability activities. Indian firms must spend two percent of their annual net profit from the last three years under the new regulation. The conclusion exposes the positive influence of regulatory measures and the significance of the government's role, which is aligned with the two other studies above.

These three studies are valuable for performing a content analysis of sustainability reports with best practices approach. First, it is essential to set out criteria for sample selection. Firms with best practices can be defined in two ways: 1) firms with higher economic, environmental, and social performance, labeled as sustainability leaders, and 2) largest firms by market cap or revenue, assuming that their sustainability practices are the best based on abundant resources. Secondly, all three studies used a theme or indicators based on reporting standards such as GRI to determine what to analyze in the reports. At the same time, specific methods for scoring and assessment vary among studies.

2.3 Summary of Literature

The literature review first shed light on the various concepts of sustainability and SR, followed by existing reporting frameworks, key elements of SR, and sustainability in the manufacturing industry context. In addition, since this research ultimately aspires to heed producing a good SR, reporting quality principles and challenges in SR were also reviewed. It is important to note that standardization and comparability are central issues in SR. Specifically, although many scholars have proposed several ways to assess SR quality, it still needs uniform assessment criteria to define good reporting. Further, various SR guidelines/frameworks and multiple assessment methodologies hinder the comparability of reporting quality. Nevertheless, a broader understanding of the SR-related concepts facilitates the reader's background knowledge building, as well as serves as a conceptual basis for developing a research methodology that will be discussed in the subsequent Section 3.

Secondly, regional studies in Korea and Scandinavia were scrutinized to understand the state of the art in SR. As for Korea, literature has focused on why Korean firms engage in SR and how SR affects firms' financial performance. This suggests that previous studies hinge on the context of voluntary reporting; recent Korea's discussion of change toward mandatory SR is yet to be

explored in academia. Conversely, the literature addresses both voluntary and mandatory SR in Scandinavia, reflecting regulatory changes over the past two decades. However, investigated Scandinavian reporting practices are deemed out-of-date from their publication date (2003 and 2010), especially given the rapidly changing SR trend and the emergence of NFRD in 2014. Moreover, the two regions' overall reporting practices regarding trends and quality are undiscovered. Finally, since this research premises on benchmarking, literature employing the best practices approach on SR was reviewed. Despite irrelevance to the geographical scope of this thesis, earlier research provided insights into how to define best practices, confirming the paucity of comparative studies between Korea and Scandinavia on SR.

In brief, despite growing attention to SR implementation and quality improvement in Korea and globally (Brusca et al., 2018; Dumay et al., 2017), SR remains an under-investigated topic. Thus, more research is needed to mirror the current social and political context. Furthermore, as the literature mainly has sought theoretical explanations on the phenomenon (i.e., voluntary SR) in the Korean context, little research has examined how to produce high-quality SR. Recognizing that, this thesis aims to provide plausible solutions that Korean companies can pursue under regulatory changes by narrowing the research gap. Identified literature gap includes a lack of research on 1) the comparison of voluntary vs. mandatory context, 2) changing regulatory landscape, 3) reporting quality and trends in Korea and Scandinavia, 4) SR in the manufacturing industry, 5) the best practices approach exemplifying Scandinavian cases, and 6) solution-focused research.

3 Research Design, Material and Methods

3.1 Research Approach and Design

The research aims and RQs are grounded in the institutional isomorphism of organizational theory. The concept of institutional isomorphism arose to describe the tendency for organizations to resemble one another in terms of similar rules or routines. The logic behind institutional isomorphism involves competition for market position and gaining legitimacy by society. Among three types of institutional isomorphism – coercive, normative, and mimetic – (DiMaggio & Powell, 1983), this thesis is in line with **mimetic isomorphism**, which occurs when an organization imitates others who are considered successful due to the uncertainty of the situation (Mizruchi & Fein, 1999) in two aspects.

Firstly, there has been uncertainty about the situation in terms of mandatory SR in Korea. Even though pressure from stakeholders for sustainability disclosure increases and regulators are discussing SR regulation, Korean companies have varying awareness levels towards SR. This shows that the significance of SR remains uncertain compared to other countries where SR is legally obligated. Further, requirements of mandatory SR in Korea still need to be completed by policymakers, implying that what to report remains uncertain as well. Thus, Korean firms have followed SR trends in the Western (EU, North America) worlds to overcome uncertainty. Secondly, the research questions are based on the assumption with mimetic isomorphism, “Benchmarking the best practices will improve Korean firms’ SR”. This stance is also rooted in the **pragmatic worldview**. Pragmatism views that research is constantly occurring at hand in a specific context. In the case of this research, the findings focus on the current Korean social and political context: from voluntary to mandatory SR. The study aims to make suggestions for improving Korean companies’ SR, which aligns with a pragmatic worldview in pursuing real-life problem-solving applications (Creswell & Creswell, 2018).

As research with a pragmatic worldview can opt for the methodology that best suits the study’s aim (Creswell & Creswell, 2018), this thesis adopts an **exploratory qualitative research design**. As mentioned in the literature review section, there is limited research on Korean companies’ SR. Thus, the nature of this research is exploratory yet context-specific, aiming at developing a deeper understanding of SR in Korea and comparison with Scandinavia. Qualitative research allows an inductive process, enabling the identification of patterns from the data set when the topic is less known (Creswell & Creswell, 2018). This research uses two qualitative data sources: 1) public documents (sustainability reports) and 2) semi-structured interviews. Figure 2 shows the overview of the research design.

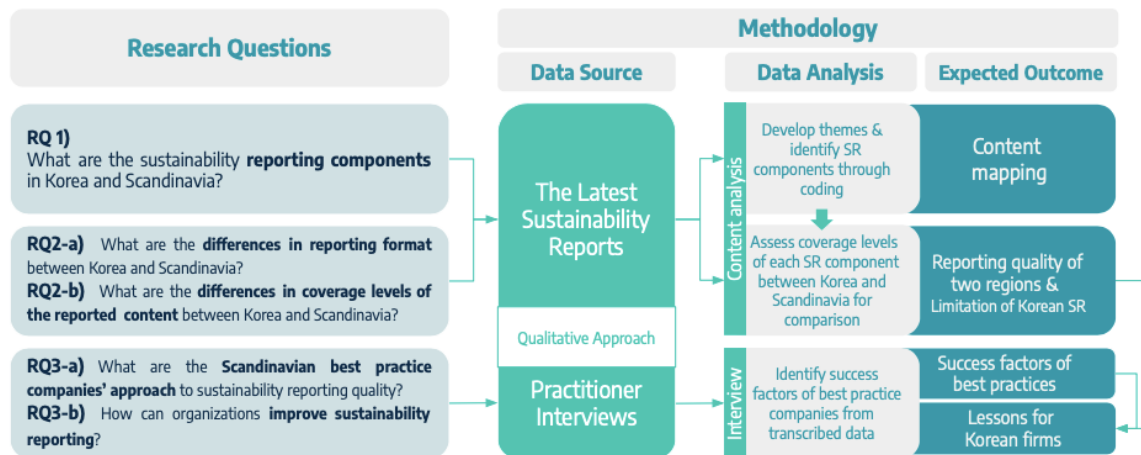


Figure 2. Research design overview

Source: Own illustration

The research at the outset carries out a content analysis of the latest sustainability reports for RQ1 and RQ2. Content mapping of SR components is a steppingstone for the coverage level analysis, providing a general picture of reporting contents and what is to be analyzed. Next, SR components will be listed through the coding process. Since many organizations follow existing reporting frameworks, such as the GRI, SR components are not new fields to discover. Thus, the initial coding framework was created based on a literature review (See Appendix A) to increase coding process efficiency. While deductively generated codes are prepared, detailed categories (i.e., sub-codes) will be developed throughout the analysis.

The next step is to investigate the disclosure levels of each SR component in Korea and Scandinavia. First, the coverage level is scored with four indices (0: no meaningful information, 1: patchy information, 2: overall extensive information yet lacking certain areas, and 3: full information) to facilitate comparison. Then, components that Korean firms have lower coverage levels than Scandinavian firms will be highlighted to identify Korean firms' limitations in reporting practice.

Finally, practitioner interviews for RQ3 are carried out to gain deeper insight into SR, such as strategies and measures taken in the past for having the best reporting practices. The interview complements the content analysis, serving the role of validity strategy by uncovering information not disclosed in the sustainability reports. Triangulating multiple data sources (i.e., sustainability reports and interview data) can strengthen validity by examining evidence from different data types (Creswell & Creswell, 2018).

3.2 Sample Selection

3.2.1 Content Analysis

For the sample selection, two different sampling methods were employed for Korea and Scandinavia for content analysis. First, Korea's local stock exchange indexes of the top 100 firms by capitalization size (KOSPI 100 index⁷) were selected as the initial sample population. It then classified listed companies in the index by industry to filter manufacturing firms. As a result, 40 manufacturing companies were identified as the final sample population, determining 20% of the population as the sample size with systematic sampling.

Since the research seeks to explore SR practices and find patterns in large enterprises, having a wide range of samples is crucial to represent the entire population. Considering that large companies are often market leaders in the sustainability field due to high capacity and more resources (Kim et al., 2019), examining the top 10 largest firms does not epitomize RQ1. In other words, if the sample concentrates on the biggest companies, under-coverage bias – “*results only apply to the sub-population... results cannot be used to say something about the target population as a whole*” (Bethlehem, 2010, p. 162) – is inevitable. Thus, a systematic sampling approach was applied to mitigate sampling bias.

Even though random sampling is not a typical method in qualitative research (Creswell & Creswell, 2018), distributing samples to the total population deemed essential in this thesis. Hence, at first, 40 companies of the sample population were listed with numbers (No. 1-40), and the company of No.1 was chosen as the start of the index. Subsequently, 1 out of every fifth firm (i.e., No. 1, 6, 11, 16,...,36) was selected for data analysis, resulting in eight Korean companies corresponding to 20% of the sample population as the final sample.

⁷ Korean Composite Stock Price Index (KOSPI) 100 index was downloaded from the Korean domestic exchange-traded fund market (KODEX) website http://www.eng.kodex.com/product_view.do?fid=2ETF57 on January 26th, 2023.

In contrast, Scandinavian firms were selected with a purposeful sampling method – the common approach in qualitative research – to draw the best help to address the research problem and questions (Creswell & Creswell, 2018). Since the thesis aims to compare Korean companies with best reporting practices, Scandinavian companies perceived as sustainability leaders were chosen. This research defines sustainability leaders based on ratings by two renowned practitioners (Sustainalytics⁸ and Position Green⁹). Scandinavian firms that received a positive assessment from both organizations were deemed best practices. Final samples were selected by filtering company size (large) and industry (manufacturing) to align with the scope of this research. Moreover, the availability of English reports was marked. As a result, six Scandinavian companies (Denmark: 0, Norway: 4, Sweden: 2) were identified as final samples for the data analysis. Table 5 summarizes the sampling methods and criteria used for sample selection.

Table 5. Sample selection method and sample size of content analysis

Region	Korea	Scandinavia
Sampling method	Systematic sampling	Purposeful sampling
Sample selection criteria	<ul style="list-style-type: none"> - Top 100 firms by market cap listed in local stock exchange (KOSPI 100 index) - Filter manufacturing firms - Every 5 numbered firms on the list - Firms publishing sustainability report on websites - Firms publishing reports in English (for the comparability) 	<ul style="list-style-type: none"> - Firms placed A+ and A in ESG disclosure by Position green’s 2022 ESG 100 report - Filter manufacturing firms - Scandinavian firms ranked in 2023 Top-rated ESG companies by Sustainalytics - Firms publishing sustainability report on websites - Firms publishing reports in English (as researcher does not speak Scandinavian languages)
Sample size	Total: 8	Total: 6 (Denmark: 0, Norway: 4, Sweden: 2)

Source: Own description

3.2.2 Interview

Interviews serve as a complement to document analysis to capture practitioner perspective as well as in-depth information not revealed in the publicly available documents. Specifically, interviews with Scandinavian firms allow for exploring success factors of best practices, including SR strategy-building and measures taken to overcome challenges in the past. Furthermore, interviews with SR experts from sustainability rating companies and consulting firms are expected to bring valuable insights into their observations on SR quality, including best and second-class reporting practices.

The target interviewees are ideally personnel in charge of SR in the sample companies listed for the content analysis, but not limited to them. Potential interviewees are twofold: Type 1) sustainability experts of large Scandinavian/Nordic firms’ sustainability departments and Type 2) sustainability experts of consulting firms and ESG rating companies. While interview questions for type 1 interviewees focus on internal perspectives related to success factors and

⁸ Sustainalytics is a leading company that evaluates sustainability performance of world’s listed firms, headquartering in the Netherlands. More than 10,000 firms across 42 industries are reviewed on corporate approach to ESG concerns by Sustainalytics, and top 50 companies are identified (Sustainalytics, 2023).

⁹ Position Green group, a sustainability software and consulting company based in Sweden, published ESG 100 report in 2022 to examine ESG reporting of the 100 largest listed companies in Sweden, Denmark, and Norway. The ESG 100 report provides a ranking of each company’s ESG disclosure with grades A+, A, A-, B+, B, C, D, E (Position Green, 2022).

barriers in the internal process for SR, type 2 interviewees can provide external views on the determinants of high-quality reports from evaluator perspectives. By triangulating different data sources (i.e., several perspectives from various participants), the study aims to enhance the accuracy of findings and overall validity of the research.

As voluntary participation is a key prerequisite for the research, the number of SR experts who agreed to participate became the final sample size (13 interviews).

3.3 Data Collection

3.3.1 Content Analysis

Sample companies' sustainability reports were collected on each company's websites (see Appendix D for an overview of the sample companies). Since not all companies issue a report under the name of "sustainability report", other similar documents, such as CSR reports or annual reports, were collected in the case that sample companies communicate their sustainability approaches through other materials. For instance, press releases and articles on their websites deemed valid empirical evidence to understand the current reporting practices. SR content analysis is an essential foundation for practitioner interviews in this research.

3.3.2 Interview

After the content analysis of sustainability reports, a brief research description and consent form was sent out to potential interview participants (see Appendix F for the consent form). Participants who agreed to participate in the interview signed the consent form, and mutually signed forms were collected before the interview to assure voluntary participation. In total, 13 online interviews were conducted between 10th March and 17th April 2023 (see Appendix E for the type of interviewees). The duration of interviews varied from 30 minutes to one hour, depending on the participant's availability.

This research adopted semi-structured interviews to guide the conversation with respondents while having some flexibility. Interview questions were developed during the document analysis, but certain questions were adjusted based on the interviewees' position in the organization and the interview time. The questions were formulated based on the non-leading approach to avoid prompting a particular response that would possibly influence participants' accounts. For instance, open-ended questions phrased as "What?", "How?" and "Why?" were used to encourage extended responses from participants to elicit more information than a simple one-word answer like "Yes" or "No". The questions were discussed with the thesis supervisor prior to the interviews to confirm the relevance to the research questions and comprehensiveness for the interviewees (see Appendix G for the list of interview questions). Additional questions arising from the interviewees' responses were improvised and asked when necessary to gain in-depth insights, taking allocated interview time into account. All interviews were audio-recorded upon permission, and recorded audio files were converted into text files with the transcription software Notta. The transcribed texts were analyzed and synthesized in the Excel matrix.

3.4 Data Analysis

This research, to begin with, conducted the qualitative content analysis of sustainability reports through coding. Content analysis is "*a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use*" (Krippendorff, 2013, p. 24), and it is widely used in environmental and social reporting studies (Berniak-Woźny & Kwasek, 2020; Guthrie et al., 2006; Şahin et al., 2017). The data analysis process consists of three steps: 1) preparation, 2) organizing, and 3) reporting, adapted based on Elo and Kyngäs (2008). Figure 3 illustrates the overall data analysis process of this research.

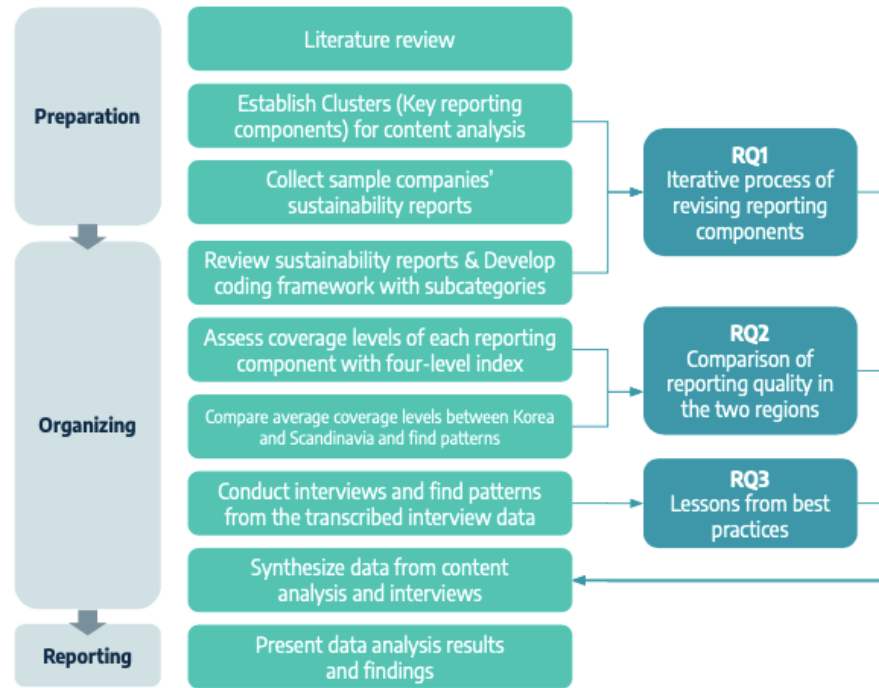


Figure 3. Data analysis process

Source: Own illustration, adapted to this research based on Berniak-Woźny & Kwasek (2020); Elo & Kyngäs (2008)

The first stage, **preparation**, requires collecting all sample companies’ reports and deciding on major categories of analysis. Based on key elements of SR identified from the literature review – primarily built on GRI standards – as outlined in Section 2.1.3, four clusters were reshaped into 1) content: sustainability strategy & profile, 2) content: management approach, 3) content: performance indicator, and 4) format: reporting strategy. This formed the backbone of the initial coding framework (see Appendix A).

The next step, **organizing**, is an open coding process to generate subcategories, parent and child codes. Certain parent and child codes were deductively created under four clusters based on the literature review; however, those were reviewed and modified throughout the organizing step (see Appendix B for the revised coding framework). In addition, this research follows the index approach used by Daub (2007) and Berniak-Woźny and Kwasek (2020), who investigated SR practices in Switzerland and healthcare product sectors in Europe and North America, respectively. The index approach is useful to examine whether specific information is present or absent (Beattie et al., 2004); thus, it is suitable for this research to understand the coverage levels of disclosed information in SR and identify missing elements in Korean firms’ reports. In order to define SR components and information type, 14 sample companies’ sustainability reports were screened, utilizing the qualitative data analysis software NVivo. Identified codes were classified under each cluster outlined at the preparation stage. This process was iterative due to continual code updates over the document review.

After the coding framework was established, each code (i.e., reporting component) was assessed by a multi-level index to analyze reporting quality (Berniak-Woźny & Kwasek, 2020). A four-level index was created for this thesis, anchoring from two indexes by Daub (2007) and Berniak-Woźny and Kwasek (2020)¹⁰, as shown in Table 6. Sample companies’ each reporting component (code) was evaluated based on the assessment criteria based on Section 2.1.4 (see Appendix C), and the score was given following the four-level index. This index approach with

¹⁰ Berniak-Woźny and Kwasek (2020) employed the four-level index based on Wiseman (1982).

scores enables visualization of coverage levels between two regions by converting qualitative data into quantitative data. Integrating quantitative and qualitative data facilitates comprehensive data interpretation (Creswell & Creswell, 2018).

Table 6. Four-level index

Score	Coverage level
0	No meaningful information is provided. (e.g., no information is provided, or information provided is unclear)
1	Patchy information is provided. (e.g., only general term/information is disclosed without company-specific information)
2	The reporting provides overall good information. However, the information does not address certain relevant area/indicator, consequently it does not fully meet assessment criteria. (e.g., extensive information is provided but lacking supporting indicators, such as quantitative terms)
3	The reporting includes full information that fulfills all assessment criteria. (e.g., disclosed information is clear, company-specific and supported by tangible indicators)

Source: Berniak-Woźny & Kwase (2020); Daub (2007); Wiseman (1982)

Subsequently, Korean and Scandinavian firms' average scores were calculated for each reporting component (i.e., child code) to elicit the "Difference value" between Korean and Scandinavian firms. The difference value refers to the number with one decimal digit, a subtraction from Korean firms' average score to Scandinavian firms' average score of each code. Reporting components were classified into five groups (a, b, c, d, e) by the range of difference values. Table 7 outlines the implication of each difference value group. This method is not a conventional approach seen in the previous studies, yet the author devised it to facilitate the comparison of two regions for this research.

Table 7. Five difference value groups and its implication

Group	The Range of Difference value	Implication
a	$-3 \leq \text{Difference value} < -2$	Korean firms have poor disclosure levels compared to Scandinavian firms. The gap between two region is large.
b	$-2 \leq \text{Difference value} < -1$	Korean firms have lower disclosure levels compared to Scandinavian firms. The gap between two region is moderate.
c	$-1 \leq \text{Difference value} < 0$	Korean firms have slightly lower disclosure levels compared to Scandinavian firms. The gap between two region is small.
d	Difference value = 0	Korean firms and Scandinavian firms have same disclosure level and there is no difference.
e	$0 < \text{Difference value} \leq 3$	Korean firms have higher coverage levels than Scandinavian firms.

Source: Own description

The organizing process of interview data analysis refers to finding patterns from multiple interviewees' responses. The transcribed interview data was coded by the predetermined themes of interview questions (see Appendix G). Then, patterns under each theme were developed through analysis.

The last stage, **reporting**, is a presentation of analysis results and findings, which will be outlined in Section 4.

3.5 Limitation

3.5.1 Content Analysis

Following a programmatic worldview, the research focuses on current SR practices in two regions, analyzing the latest (i.e., single-year) sustainability report. Thus, this research does not capture historical reporting trends and growth curves (e.g., how has the SR evolved?) in Korea and Scandinavia.

Furthermore, while it is acknowledged that using a larger sample increases accuracy in the inferences in general (Creswell & Creswell, 2018), only eight (20% of the total population) large Korean manufacturing firms were selected for content analysis due to time constraints. Therefore, although systematic sampling was adopted to spread the sample to the total population, the inherent limitation remains that selected sample companies may not represent the whole group (i.e., large Korean manufacturing firms). In other words, the possibility exists that all sample companies have similar reporting quality.

Lastly, subjectivity is the other limitation. Even though the assessment follows the index description when assigning scores based on the qualitative data in the sustainability reports, the researcher's subjective judgment may still be embedded.

3.5.2 Interview

One practical challenge is finding sustainability experts willing to participate in the interviews. Especially considering that most Scandinavian firms publish annual sustainability reports between February and early April, SR experts may be unavailable for the interview due to a hectic schedule. Therefore, while the interviews for this research were planned for March, the availability of interviewees was prioritized by extending the interview period from March to mid-April.

In terms of limitation, the various extent of information shared by the participants should be noted. For example, although the researcher informed that interviewees' organization and name would be anonymized in the thesis, some may still be reluctant to share negative aspects of the company's practices. Instead, interviewees may share and highlight more positive performance of the companies, which could be driven by internal policy that interviewees need to comply with as an employee or by personal judgment. Furthermore, interview data may be filtered by the participant's worldview, which may alter the nuance of the information (Creswell & Creswell, 2018).

The other limitation is the scope of the interview. As RQ3 focuses on the best practices to identify success factors, the thesis targeted interviewees who work in the Scandinavia/Nordic regions. Interviews with Korean firms were excluded from this research, leaving it for future studies. Hence, Korean companies' challenges in SR from a practitioner perspective are not explored.

4 Analysis and Findings

This section presents the analysis results of qualitative content analysis and practitioner interviews. This section comprises three sub-sections corresponding to each RQ. First, Section 4.1 will outline SR components identified from 14 sustainability reports (RQ1). Then, Section 4.2 will review differences in reporting practices in Korea and Scandinavia, including format (RQ2-a) and coverage levels of reporting content (RQ2-b). Finally, Section 4.3 will present the findings from SR expertise interviews (see Appendix E for the interviewee list), best practice companies’ approach to SR (RQ3-a), and suggestions to improve SR (RQ3-b).

4.1 Components of Sustainability Reporting (RQ1)

As a result of analyzing 14 sample companies’ sustainability reports (eight Korean companies and six Scandinavian companies), 39 reporting elements were found (see Appendix B for revised coding framework). From a broader view, there are nine elements – labeled as parent codes¹¹ in this research – 1) reporting format, 2) organizational profile, 3) approach to sustainability, 4) sustainable management, 5) sustainability governance, 6) stakeholder, 7) sustainability practices, 8) environmental performance, and 9) social performance in SR. As shown in Figure 4, all 39 reporting components belong to three cluster groups, 1) format, 2) content: general disclosure, and 3) content: topic-specific disclosure. The following sections, 4.1.1, 4.1.2, and 4.1.3, will briefly describe each component under three clusters.

Format		Content			
Reporting Format		General Disclosure		Topic-specific Disclosure	
<ol style="list-style-type: none"> 1. Report Title 2. Report Type 3. Volume 4. Reporting History 5. Reporting Period & Frequency 6. Issue Date 7. Scope & Boundary 8. Methodology 9. Reporting Standard & Framework 10. External Assurance 	Organizational Profile		Sustainability Governance	Environmental performance	
	11. Company Profile	12. Sustainability/ESG Recognition	20. Governance Body & Procedure	29. Green Procurement	
	Approach to Sustainability		21. Code & Policy	22. Compliance & Ethics	30. Emissions
	13. Initiative & Commitment	14. Vision & Strategy	23. Reporting Process	31. Energy	32. Water
	15. Target & KPIs	Stakeholder		33. Waste	34. Biodiversity
	Sustainable Management		24. Stakeholder Analysis	Social performance	
	16. Materiality Assessment	17. Risk & Opportunity Analysis	25. Stakeholder Engagement	35. Human Rights	36. Safety & Health
	18. Value Chain Analysis	19. Supply Chain Management	Sustainability Practices		37. Diversity & Inclusion
			26. Sustainable Products & Services	27. Sustainable Operation	38. Product Responsibility
			28. Progress & Achievement	39. Corporate Philanthropy	

Figure 4. Components of sustainability reports

Source: Own illustration

4.1.1 Format

As SR is a tool to inform stakeholders of the company’s sustainability activities, it is critical to have an appropriate reporting form for effective communication. Therefore, the reporting format must have a clear structure with a moderate length to make readers easily navigate the report and digest the content (Moravcikova et al., 2015).

While Moravcikova et al. (2015) view the volume of the report and its structure as reporting format, the coding analysis identified a total of **10 components under the cluster “Format”**:

¹¹ In this thesis, code refers to reporting component. Child code is more detailed elements as a subset of parent code.

1) report title, 2) report type, 3) volume of the report, 4) history of reporting, 5) reporting period and frequency, 6) issue date of the report, 7) scope and boundary, 8) methodology, 9) reporting standard and framework, and 10) external assurance. Table 8 describes 10 reporting format components.

Table 8. Ten reporting components under the cluster “Format”

Parent code	Child code	Description	
Reporting format	1	Report title	The title of the report varies by company. Some have a simple title, such as a sustainability report or annual report, whereas others use distinctive titles (or subtitles) representing the company’s vision.
	2	Report type	There are two report types: 1) one is a standalone sustainability report that focuses on disclosure of the environmental, social, and economic impact of the company’s operations, which is published separately from financial reporting, 2) the other type is integrated reporting, which often is called the annual report that combines sustainability information and business strategy/financial performance in one report.
	3	Volume of the report	The total length of the report was analyzed. In the case of an integrated report, the volume of the sustainability reporting section was counted respectively.
	4	History of reporting	The history and development of sustainability reporting were tracked (i.e., since when did the company start SR? How has SR been developed?). While most companies introduce their reporting history with a phrase like “This year’s report is Xth sustainability report published by the company”, the company’s website was investigated for those that do not disclose such information in the report.
	5	Reporting period and frequency	Reporting period refers to the selected time frame where sustainability information is collected and presented in the report. The report covers the company’s activities during the reporting period. Reporting frequency indicates how often the report is published.
	6	Issue date of the report	The issue date refers to the date on which a company releases the report to the public (i.e., websites).
	7	Scope and boundary	Reporting scope and boundary refer to the range of sustainability performance and impacts of business operations covered in the report. Companies can opt for what to include in the report by region or ownership of entities. For instance, some limit the scope and boundary to direct operations, while others extend it to value chain activities and report their impacts.
	8	Methodology	Methodology refers to a set of principles/methods used for reporting, particularly the overarching data collection and analysis process. In addition, whether the limitation of the methodology is explicit or not was examined.
	9	Reporting standard and framework	Companies use reporting standards and frameworks to prepare sustainability reports as they provide a set of principles for systematic reporting (GRI, 2022a). Companies’ approaches to reporting standards/frameworks were analyzed.
	10	External assurance	External assurance can strengthen the credibility and accuracy of the information disclosed in the report (Andelin et al., 2013; Bramanti et al., 2021). First, this research checked whether the companies obtained the report’s external assurance. Then, the scope of third-party assurance was reviewed.

Source: Own elaboration based on findings from content analysis, in combination with Andelin et al., 2013; Bramanti et al., 2021; GRI, 2022a

4.1.2 Content: General Disclosure

General Disclosure in this paper refers to the company's overarching approach to sustainability and relevant activities, which is in line with “*information that gives insight into the profile and scale of organizations and provides a context for understanding the organization's impacts*” (GRI, 2022a, p.8) by GRI Universal Standards.

GRI Universal Standards¹² are applicable to any organization, regardless of organization type (public and private), size (large and small), and all sectors/industries from any location. The GRI Universal Standards require two types of disclosures: 1) GRI 2 General Disclosures, including organization to disclose information about their organization, reporting practices, strategy, policies, governance, activities and workers, and stakeholder engagement, and 2) GRI 3 Material Topics, which refers to the process of selecting material topics and management approach to handle each topic (GRI, 2022a). These requirements were utilized to create the initial coding framework (see Appendix A); however, reporting components were reorganized through the coding analysis. This is because companies often adapt it to the organization's context to present the reporting content in the most appealing way to the audience. Thus, coding analysis focused on how the sample companies structured and disclosed each piece of information in the reports.

As a result, **18 reporting components** (i.e., child codes) were developed under six pieces of information **under the cluster “Content: General Disclosure”**, 1) organizational profile, 2) approach to sustainability, 3) sustainable management, 4) sustainability governance, 5) stakeholder, and 6) sustainability practices. A description of 18 reporting components is provided in Table 9.

Table 9. Eighteen reporting components under the cluster “Content: General Disclosure”

Parent code	Child code		Description
Organizational profile	11	Company profile	The company profile in SR serves as an introduction to the business. Basic information about the organization should be included, such as the company's business (products and services), location of headquarters and operational sites, and company size in terms of assets, revenue, and the number of employees.
	12	Sustainability/ ESG recognition	Sustainability/ESG recognition refers to rating scores/rank measured by sustainability rating agencies. External organizations' ratings show the company's reputation of how the company's sustainability/ESG management is well performed, helping stakeholders' (i.e., investors) investment decision-making (Deloitte, 2021b).
Approach to sustainability	13	Initiative and commitment	The sustainability initiative is an approach to achieve the business's long-term success by considering ESG aspects (Özdemir & Ergun, 2021). Commitment to initiative requires companies to engage in sustainable practices. In particular, as the climate change effect intensifies, companies' investments in climate-related initiatives are increasing (Deloitte, 2023). This research investigates the type of initiatives participated by sample companies and their commitment status.
	14	Vision and strategy	The company's short, medium, and long-term vision and strategy should describe how they manage its negative social and environmental impacts by producing more positive impacts from

¹² There are three series of GRI Standards: 1) the GRI Universal Standards, 2) the GRI Sector Standards, and 3) the GRI Topic Standards (GRI, 2022a).

			business operations (GRI, 2022a). In this paper, vision refers to the company's statement of what sustainability means to them, and the strategy is a set of action plans for sustainable business development.
	15	Targets and KPIs	Target setting is a part of the sustainability strategy. Having time-bound targets and goals can help companies to focus on the priorities to execute action plans outlined in the strategy (UNGC, n.d.b). Further, measuring a comprehensive set of KPIs in alignment with the strategy enables evaluating a company's sustainability performance and improvement (Hristov & Chirico, 2019). This research examines whether sample companies have targets and measurable KPIs.
Sustainable management	16	Materiality assessment	Materiality assessment is a process of identifying critical environmental, social, and governance topics that could influence a company's business (KPMG, 2014). This research analyzes whether sample companies conducted a materiality assessment to determine material topics in addition to the list of material topics and the management approach to address them.
	17	Risk and opportunity analysis	Companies face growing sustainability risks, such as financial risks by volatile energy/raw material prices and reputational risks caused by operations with environmental damage (Deloitte, 2012). In this paper, sample companies' disclosure on risk and opportunity analysis and how they are aligned with the strategy and action plans for sustainable value creation.
	18	Value chain analysis	Value chain analysis refers to systematically analyzing actors and activities in producing, distributing, marketing, and selling the product or service, allowing companies to identify inefficiencies (Tukana et al., 2023). As the manufacturing industry involves multiple value chains in operations, it is essential to acknowledge its value chain and impact. Thus, this research focuses on whether the sample companies perform value chain analysis and how the result relates to sustainability strategy and action plan.
	19	Supply chain management	Supply chain management focuses on the manufacturing process, particularly activities of obtaining raw materials and sub-assembly operations, which differs from the value chain. The value chain is a broader concept that describes a set of linked activities to add value to the end product (Reddy et al., 2018). This research reviews sample companies' holistic management approach and activities to promote supply chain sustainability.
Sustainability governance	20	Governance body and procedure	The governance body in this research refers to the company's governance structure to execute sustainability strategy and action plans. This research examines sample companies' disclosure on sustainability governance composition, governance bodies' responsibility, and governance activities' procedure.
	21	Code and policy	Code and policy refer to a set of principles that employees or suppliers need to follow within the company. This research focuses on whether the sample companies have internal codes and policies and whether they cover all ESG aspects in a balanced manner.
	22	Compliance and ethics	Compliance in this research refers to the act of complying with legislation, including environmental regulation and business ethics laws such as anti-corruption and fair-trade standards. The research examines the sample companies' compliance management system, activities, and performance during the reporting year.
	23	Reporting process	The internal reporting process is a series of steps the organization takes to publish sustainability reports. Sample companies'

			overarching workflows of SR and internal approval systems are reviewed.
Stakeholder	24	Stakeholder analysis	Stakeholder analysis refers to a process of identifying people or groups who can impact or are influenced by the company's practices. Stakeholder analysis facilitates the company's understanding of the report's audience and their concerns, which is a preliminary way to determine a communication channel to secure support from important stakeholder groups (C4D, 2021). This research reviews whether the sample companies perform stakeholder analysis and disclosure of the key stakeholders.
	25	Stakeholder engagement	Based on stakeholder analysis, companies should communicate with stakeholder groups to address their concerns (GRI, 2022a). Stakeholder engagement enables co-participation in sustainability problem-solving, which can result in effective stakeholder expectations management (Ardiana, 2023). This research investigates the sample companies' reporting on the overarching approach to stakeholder engagement and relevant activities carried out during the reporting period.
Sustainability practices	26	Sustainable products and services	Products and services in this research refer to those providing environmental and social benefits. For instance, products designed to reduce environmental impact (e.g., renewable resource-based) are considered sustainable products (European Commission, 2022a). When a company provides services like technology that minimize environmental impact (e.g., green technology related to renewable energy), they are also considered sustainable. This research examines whether the sample companies' core business integrates the concept of sustainability into their products and services.
	27	Sustainable operation	Sustainable operation in this research refers to a manufacturing process that minimizes negative environmental and social impacts. For instance, when manufacturing involves using green (i.e., renewable) material or energy efficiency measures, it is an environmentally sustainable operation (Kaldas et al., 2021). An example of a socially sustainable operation is securing employees' working safety (Digalwar et al., 2020). This research reviews sample companies' practices related to sustainable operations.
	28	Progress and achievement	Progress and achievement are highlights of the company's sustainability performance during the reporting year. This study analyzes how the sample companies disclose their progress status against targets and achievements of the year, looking into whether they utilize appropriate qualitative/quantitative indicators.

Source: Own elaboration based on findings from content analysis, in combination with Ardiana, 2023; C4D, 2021; Deloitte, 2021b; Deloitte, 2023; Digalwar et al., 2020; European Commission, 2022a; GRI, 2022a; Hristov & Chirico, 2019; Kaldas et al., 2021; KPMG, 2014; Özdemir & Ergun, 2021; Reddy et al., 2018; Tukana et al., 2023; UNGC, n.d.b

4.1.3 Content: Topic-specific Disclosure

Lastly, the “Content: Topic-specific Disclosure” is linked to the GRI Topic Standards, which provide a reporting guideline for specific information on the organization's material topics (GRI, 2022a).

Coding analysis resulted in **11 reporting components under the “Topic-specific Disclosure”**, including six environmental and five social sustainability topics. In other words, the following 11 topics in Table 10 are key sustainability issues addressed in Korean and Scandinavian sample companies.

Table 10. Eleven reporting components under the cluster “Content: Topic-specific Disclosure”

Parent code	Child code	Description
Environmental performance	29	Green procurement Green procurement refers to purchasing products or services with a lower environmental footprint. There are various types of green procurement, from sourcing low-carbon raw materials to recyclable materials for product design and sustainable packaging. This study reviews sample companies’ approaches and activities related to green procurement.
	30	Emissions Emissions are the discharge of substances that contributes to climate change. In this research, emissions refer to significant air emissions designated by GRI 305, such as GHG, NOx, and SOx emissions (GRI, 2022a). The sample companies’ disclosure on emissions-related impacts is examined, including GHG emissions reporting and emissions reduction activities.
	31	Energy Organizations consume various types of energy, such as electricity, fuel, heat, and steam. This research reviews the disclosure of the sample companies’ energy consumption management approach and measures to reduce energy consumption. For instance, renewable energy use and energy efficiency measures can mitigate the adverse environmental impact of the operation (GRI, 2022a).
	32	Water The industry is one of the major water consumers worldwide; particularly, industrial facilities used in the manufacturing process often require a substantial amount of water. Hence, optimizing water efficiency is critical to realize more environmentally responsible manufacturing (Walsh et al., 2017). This study analyzes the disclosure of water resource management by the sample companies’ reports.
	33	Waste Waste can be generated throughout the company’s value chain, including product production and delivery. Since exposure to hazardous waste affects human health as well as the environment, adequate waste management is essential (GRI, 2022a). This research reviews whether the sample companies disclose their significant waste-related impacts from operations and how they manage it from waste generation to disposal.
	34	Biodiversity Manufacturing plant construction or operation can affect the biodiversity of natural ecosystems (GRI, 2022a). This research examines companies’ approaches to preventing biodiversity loss, including significant direct/indirect impact of activities and performance.
Social performance	35	Human rights Respect for human rights is crucial in socially sustainable operations, yet tracking and eliminating all human rights violations is challenging (GRI, 2022a). Serious human rights abuses, such as forced labor, child labor, unpaid work, and fraud, must be forbidden in the workplace and supply chain. This study reviews the disclosure of how sample companies address and manage human rights issues.
	36	Safety and health Safe and healthy work conditions involve workers’ physical and mental health. The company must prevent hazards such as work-related injuries, illness from exposure to toxic chemicals, or workplace violence (GRI, 2022a). This research examines whether the sample companies have occupational health and safety management system and what measures are taken to promote worker health.
	37	Diversity and inclusion Diversity and inclusion refer to involving all employees from different backgrounds (e.g., age, culture, ethnicity, gender, and disability) and supporting equal opportunity at work. By promoting diversity and

			equality, companies can access a larger group of potential workers by promoting diversity and equality, which lead to human capital development (GRI, 2022a). This research focuses on how companies' approaches and efforts to embrace diversity and inclusion are reported.
	38	Product responsibility	Product responsibility in this research refers to the safety and quality of the product/service and ethical marketing practices. Not only should the company make systematic efforts to manufacture products in adherence to customer safety and health regulations, but also they are obliged to abide by moral principles in marketing. The study examines sample companies' disclosure concerning product responsibility.
	39	Corporate philanthropy	Corporate philanthropy refers to a company's voluntary activities to promote the welfare of society. While the most common type of philanthropic activity is cash or goods donations to the local community (Formánková et al., 2015), other activities such as employee volunteerism in children's education, technical support, and knowledge sharing for small businesses are also included. This research reviews sample companies' approaches to corporate philanthropy and disclosure of their activities.

Source: Own elaboration based on findings from content analysis, in combination with Formánková et al., 2015; GRI, 2022a; Walsh et al., 2017

4.2 Differences between Korean and Scandinavian reporting (RQ2)

The differences between Korean and Scandinavian reports were analyzed after investigating the reporting structure and its components in RQ1. It should be noted that the four-level index analysis only applied to the reporting components under the cluster "Content", not "Format". Since format-related components are the basic profile of the reports rather than sustainability performances, it is unfitting to assign a quality score to the report title, type, volume, and reporting period. Hence, Section 4.2.1 compares "Format" reporting components in Korea and Scandinavia, yet no score was given. On the other hand, Section 4.2.2 analyzes the difference in coverage levels of "Content" reporting components based on the four-level index assessment.

The findings are presented with data anonymization in the quotation of reports used for content analysis. For example, the company's name in quotation texts is replaced with the company code assigned in this thesis (see Appendix D for the sample companies' in-text reference code) to prevent the organization's identification reveal.

4.2.1 Differences in Report Format (RQ2-a)

This section compares Korean and Scandinavian reports' 10 formatting components (code no.1-10) described in Table 8 of Section 4.1.1. The similarities and differences of each component are as follows.

Code 1. Report Title & Code 2. Report Type

The reporting form varies depending on how companies decide to disclose sustainability information. Some opt for a standalone sustainability report to highlight environmental and social aspects. The other option is incorporating sustainability information with financial statements in annual report. In the case of sample companies, **a standalone sustainability report was the more dominant reporting form in Korea** (K1, K2, K5, K7, K8) than in Scandinavia (S1, S5). On the other hand, annual reports are more common in Scandinavian samples (S2, S3, S4, S6) while explicitly stating the position of SR, such as "This is the 9th ESG

Report published by S2, which is included in our annual report for 2021” (S2, p.98), “S4’s Sustainability Report for 2021 is included as a separate section of our Annual Report” (S4, p.108).

Report titles are straightforward: “Annual Report” (S2, S3, S4, S6), “Integrated report” (K3, K4, K6), and “Sustainability report” (K1, K5, K7, K8, S1, S5). S2 labeled “Corporate citizenship report” instead of “Sustainability”. In addition to the main title, some reports (K1, K3, K6, S5) convey their vision and goal with subtitles, which was primarily observed in Korean reports. The examples include “A journey towards a sustainable future” (K1), “Sustainable seed for tomorrow” (K3), “Beyond steel” (K6), and “From ambition to action” (S5).

Code 3. Volume of the Report

The average length of the sustainability report was calculated based on the pages of sustainability disclosure. In detail, the pages of the sustainability reporting section were extracted in the annual report, excluding the financial performance and statements sections. In the case of the standalone sustainability report, the total pages were counted.

The result indicates that, on average, Korean reports (128 pages) have a larger volume than Scandinavian reports (96 pages). In short, **Scandinavian reports are relatively concise in average length and range** (40 to 122 pages), compared with Korean reports ranging from 54 to 211 pages. Looking closely at the two Korean reports having large volumes (K2: 153, K3: 211 pages), the appendices of ESG data and a set of internal policies account for approximately 36% (K2:55 and K3:79 pages) of the reports. This implies that page numbers differ from more disclosure of the reporting year’s activities and performance. Further, the longer or shorter length of the report does not represent the quality of the disclosed information. Reporting quality of the content will be examined in the following sections.

Code 4. History of Reporting

The first year of SR publication varies from the early 1990s to the late 2010s. **Scandinavian firms generally have a more extended history than Korean firms in SR**, developed from environmental reporting. For instance, S4 published an environmental report in 2003 for the first time, expanding its scope into an Environmental, Health, and Safety (EHS) report in 2008. Then since 2011, the sustainability section has been integrated into the annual report. Similarly, S5 launched a sustainability report in 2000, which evolved from environmental reporting in 1994.

Among Korean firms, K2 is comparable with Scandinavia since the environmental report from 1998 became the basis of “Corporate citizenship report”. On the other hand, three Korean companies (K1, K3, K5) started SR in the late 2000s, whereas SR is a contemporary trend for the rest four (K4, K6, K7, K8). Considering this, S2, which published the first SR in 2013, has a longer reporting history than half of the Korean companies, despite being the latecomer among Scandinavian firms.

Code 5. Reporting Period and Frequency

Content analysis data was collected in February 2022 on 14 sample companies’ websites. The latest reports as of February 2022 were for Fiscal Year (FY) 2021, from January 1, 2021, to December 31, 2021. K8, on the other hand, was the exception because the reporting period of K8 was between January 1, 2020, to December 31, 2021. K8 states that they publish a sustainability report every two years. Considering that 13 other companies publish the report annually, **K8’s biennial reporting may be inappropriate** in terms of **Timeliness**, hindering stakeholders’ effective use of information.

Code 6. Issue Date of the Report

Although the two regions have the same reporting period FY 2021 (FY 2020-21 for K8), a **significant gap in the report release date** was found. Scandinavian firms publish the report between mid-March and early April, whereas the earliest release date in Korea (K1) was the end of June. July was the most common month of report issue date for Korean firms. The latest release date was August 17 by K3. This suggests the need for **Timeliness** enhancement among Korean companies.

Code 7. Scope and Boundary

Scandinavian reports have a more expansive scope than Korea, covering activities of all owned businesses. In particular, S5 and S6 state that the reporting boundary includes indirect business participants, such as suppliers or distributors. The scope of Korean companies varies; however, only K1 discloses company-wide information – all activities from domestic and global business sites as well as partner companies – like Scandinavian companies.

On the flip side, five reports (K3, K4, K5, K7, K8) limit the scope to direct operations in domestic and key oversea business sites. Furthermore, the definition of “key oversea business sites” could be clarified as shown in S4 report. For instance, S4 explicitly states their boundary: “*Sustainability report cover all the businesses in which we owned more than a 50 percent ownership interest as of 31 December 2021*” (p.108). Lastly, K2 and K6 reports are based on domestic business sites while partially disclosing oversea data. In short, two types of **inconsistency were identified in Korean companies**: 1) the scope of data varies within one company’s report, and 2) the geographic boundary covered in the reports differs among companies, which makes it incomparable.

Code 8. Methodology

Methodology, a set of principles applied to reporting, can be regarded as a part of reporting standard/framework. However, this study segregates methodology from the reporting standard/framework due to discrete focal points of the analysis. To elaborate, Code 8. Methodology analysis focuses on the company’s overarching approach to data collection and analysis process for the reporting, whereas Code 9 examines the standard/framework employed by sample companies.

Code 8. Methodology shows the significant differences between the two regions. Most Scandinavian firms introduce the data collection system and process used for reporting as below.

Environment, energy, and resource data are reported through the corporate data reporting tool. Data reported should be based on specific environmental, energy, and resource data reporting processes that have been established for management purposes at site, business unit, business area, and corporate level within S3. (S3, p.198)

To measure and gather data from across S5, we rely on a global, online data reporting system. The system is used to file reports on hazards, incidents, sustainability observation tours and environmental performance at every production and service site, as well as a majority of our office locations. It is also used to collect annual social data from every country. This centralized reporting system simplifies data collection and facilitates greater transparency. (S5, p.17)

Reported facts and figures in the sustainability report have been verified in accordance with S6’s procedures for internal control. Data collection is integrated into the Group reporting consolidation systems and collected on a quarterly basis. Data is reported at local operating unit level, aggregated to division/ business area and Group level. Data verification is performed at each level before submitting to external auditors for verification. (S6, p.136)

However, **none of the Korean companies mention the comprehensive data collection or compilation process.** The disclosure of methodology is limited to specific sections, such as GHG emissions or water.

Individual business sites are required to enter their GHG data (electricity, fuel, manufacturing process gases, etc.) into the EHS System, and we review their changes on a monthly basis and analyze the causes of such changes. Respective organizational units control GHG emissions in an integrated manner accordingly, and annual third-party audits are conducted to ensure the credibility and alignment of emissions data. (K1, p.105)

K3 collects monthly water usage for each worksite by linking it with the company-wide energy cost settlement system. After the collected data is verified for error based on the evidence documents (charge bills), they are published on company bulletin boards. (K3, p.53)

Furthermore, **Scandinavian reports tend to make methodological limitations explicit.** For example, S6 outlines “*Operations divested during the year are excluded, acquired units are included. This may at times cause changes in reported performance*” (p.136). Even though Korean companies have limitations in data scope and validity (as noted in Code 7. Scope and Boundary), it is somewhat implicit rather than addressing it directly.

Code 9. Reporting Standard and Framework

GRI was identified as the most common standard in both Korea and Scandinavia. All Korean and most Scandinavian companies claim that their reports are prepared **in accordance with the core option of the GRI Standards.** S4’s approach to GRI Standards “*We are also continuing to report on various other metrics defined in the GRI Standards*” (p.108) is somewhat different since Oslo Stock Exchange’s guidance on corporate responsibility reporting is S4’s primary reporting standard. In addition to GRI Standards, reference to various initiatives such as SDGs, TCFD, SASB, and UNGC was noted in all sample companies. Regarding reporting framework, three Korean companies (K3, K4, K6) mentioned the application of the IR framework, whereas Scandinavian companies made no statements on IR.

Further, it is noteworthy that Code 9. Reporting Standard and Framework shows the distinct context in the two regions, **voluntary versus mandatory disclosure.** Scandinavian companies made a reference to relevant legislation, including the Norwegian Accounting Act Section 3-3 (S2), NFRD (S5), and EU taxonomy (S5, S6).

Code 10. External Assurance

Third-party assurance, often provided by traditional audit firms (i.e., the big four accounting firms), sustainability certification bodies, or NGOs, enhances the credibility of disclosed information in the report (Andelin et al., 2013; KPMG, 2022; WBCSD, 2016). All sample companies obtained limited external assurance of their report, yet the **assurance scope ranges** from sustainability data, GRI index (K1, K3, K4, K7, K8, S4, S5) to the entire sustainability section (K5, K6, S3, S6). On top of this, four Korean companies (K1, K2, K3, K7) further conducted external assurance on GHG emissions from other auditors.

Another observation on external assurance is **independent auditors’ recommendations to Korean firms.** For example, K3’s auditor provides several suggestions for future reporting.

K3 could include various stakeholders by considering the scope of the subsidiaries in future reporting. DNV recommends that the results of company’s performance and integrated value creation during the reporting period are in conjunction with their sustainability strategy and context in future reporting. Even though the intentional error or misstatement is not noted, DNV recommends that data owners demonstrate how to trace the origin of the data and interpret the

processed data in a reliable manner for ensuring the reliability and transparency of the data. The Company reports the sustainability performance of the last three years and can be compared over time. (K3, p.173)

K6, K7, and K8’s assurance bodies also commented similarly. This contrasts with Scandinavian firms’ external assurance, principally concluded like S6 “*Nothing has come to our attention that causes us to believe that the Sustainability Report is not prepared, in all material respects, in accordance with the criteria defined by the Board of Directors and Executive Management*” (p.143).

Summary

To summarize, the following Korean reports’ characteristics were identified as development areas in report format: large volume, late release date, narrow reporting scope, lacking disclosure of data collection and analysis process, and methodological limitations.

4.2.2 Differences in Coverage Levels of Content (RQ2-b)

Coverage level analysis was conducted for the rest of the 29 reporting components (code no. 11-39) to compare the reporting quality between Korea and Scandinavia. Figure 5 shows the analysis result, classifying the degree of difference value – average Korean score minus Scandinavian average score – into five groups (a, b, c, d, e). Appendix H enumerates detailed analysis results.



Figure 5. Coverage level analysis result

Source: Own illustration

While Korea’s reporting quality was exceptionally comparable to Scandinavia in five reporting components of groups (d) and (e), the majority of reporting components – 83% (24 out of 29) – were categorized into groups (a), (b), (c). This indicates that **Korean companies have overall lower reporting quality than Scandinavia**, confirming the underlying assumption of this research, “There is room for improvement in Korean firms’ reporting”.

This chapter highlights Korean reports’ limitations in comparison with Scandinavian reports. Thus, reporting elements in groups (a), (b), (c) – Korean companies have lower coverage levels than Scandinavia – will be introduced, reviewing assessment criteria used for analysis (see Appendix I for full analysis result).

Group (a) -3 ≤ Difference value < -2

When Korea and Scandinavia’s average scores have a gap exceeding 2, this indicates that Korean reports’ coverage levels are substantially poorer than Scandinavia’s. Therefore, reporting components in group (a) is key improvement area for Korean companies. The analysis result shows that only one component – value chain analysis – allocated to the group (a) -3 ≤ Difference value < -2.

Code 18. Value Chain Analysis

Assessment of “Value chain analysis” with three criteria (Clarity, Sustainability context, and Balance) resulted in 2.0 points of difference in Korea and Scandinavia’s average disclosure levels. Korean reports’ average score (0.8) was not only the lowest level among all other codes under the cluster “Content”, but also a tremendous gap was found compared with the Scandinavian average score (2.8), as shown in Table 11.

Table 11. Reporting components in group (a) -3 ≤ Difference value < -2

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
18	Value chain analysis	2	0	3	0	0	1	0	0	0.8	3	3	3	3	3	2	2.8	-2.0

Source: Own study

Notably, most Korean reports (K2, K4, K5, K7, K8) were marked with a score of 0 since no information on value chain analysis was found. On the other hand, all Scandinavian companies performed value chain analysis, emphasizing the significance of value chain management. Disclosure of value chain risks is clear in Scandinavian reports, meeting the **Clarity**, **Sustainability context**, and **Balance**. Examples include “S3’s integrated aluminium production chain poses risks related to value chain concentration, where disruptions in the bauxite and alumina production located in one region in Brazil could negatively impact metal production in other parts of the company” (S3, p.40) and “There is still a risk of production disruptions due to major local infection outbreaks, and this applies to the entire value chain as well as to S4’s suppliers” (S4, p.34). Further, sustainability strategy reflects the identified risks with action plans to mitigate value chain risks.

Among Korean companies, K1, K3, K6, and K8 have a section of the value chain, whereas K1 and K6’s coverage levels were lower than Scandinavian companies. K1’s analysis, for instance, is limited to environmental aspects, “eco-conscious activities along the value chain” (p.24). In the case of K6, the report provides only a figure of the “integrated steelworks processing” (p.11); negative impacts of value chain activities or the company’s approach to mitigating value chain risks were missing. In short, **uncertainty remains whether Korean companies conducted an in-depth value chain analysis or not**, deducing a lack of Clarity, Sustainability context, and Balance.

The other observation from Korean reports is **the interchangeable usage of “value chain” and “supply chain”**, even though the two are technically different. The supply chain – activities of obtaining raw materials and sub-assembly operations (i.e., manufacturing process) – is a narrower concept than the value chain, which includes all activities adding value to the end product (Reddy et al., 2018). Nevertheless, K8’s value chain sustainability section was about supply chain management while calling it a value chain. Although the awareness levels of the value chain seem low in Korea, several companies (K2, K4, K5, K8) acknowledge the significance of value chain management in the report. Perhaps, more companies may address and elaborate on value chain analysis in the upcoming reports.

Group (b) $-2 \leq \text{Difference value} < -1$

In the case of a group (b), the difference value of Korean and Scandinavian average scores ranges from -2 to -1. This indicates that Korean reporting quality is moderately lower than in Scandinavia. Thus, group (b) reporting components are also considered fields of development for Korean companies. Table 12 shows five reporting components (Code no. 15, 22, 23, 34, 37) fall under group (b).

Table 12. Reporting components in group (b) $-2 \leq \text{Difference value} < -1$

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
Child codes		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
15	Targets and KPIs	1	3	3	2	1	3	1	1	1.9	3	3	3	3	3	3	3.0	-1.1
22	Compliance and ethics	1	2	2	1	1	1	2	3	1.6	3	3	3	3	3	3	3.0	-1.4
23	Reporting process	3	1	1	0	0	1	1	0	0.9	3	0	3	3	3	3	2.5	-1.6
34	Biodiversity	2	1	2	1	N/A	1	N/A	N/A	1.4	2	N/A	3	3	N/A	N/A	2.7	-1.3
37	Diversity and inclusion	1	2	2	1	2	1	1	1	1.4	2	3	3	3	3	3	2.8	-1.4

Source: Own study

Code 15. Targets and KPIs

The targets and KPIs section identified a considerable gap between the two regions' reporting quality. All Scandinavian reports meet four criteria (Clarity, Significance, Completeness, and Balance) with an average disclosure score of 3.0. In contrast, the score of Korean reports ranges from 1 to 3, resulting in an average score of 1.9. Since half of them scored 1.0, the implication is that Korean companies need improvement in specific criteria to increase reporting quality.

First and foremost, Korean reports have low **Clarity** because **the goal and target were not explicitly stated** (K1, K4, K5). While Korean companies describe their broad aim and some action plans, quantitative targets still need to be included to fully meet **Significance**. This contrasts Scandinavian reports with solid future goals and measurable targets based on sustainability strategy. Instead, Korean companies tend to focus on the reporting year's target and achievement levels. In other words, **the forward-looking perspective is lacking** as it is unclear how reporting year's performance is connected to the company's vision or goals.

Given that Scandinavian companies established mid-long-term targets and revealed status quo, such as "*S4's sustainability targets for 2025*" (S4, p.99) and "*Progress against S5's 2030 targets*" (S5, p.19), Korean companies should straightforwardly present how the performance of the reporting year and previous years are proceeding toward the future target to achieve greater Clarity. Furthermore, K1's future target, "*continue to expand use of renewable energy, continue to reduce GHG emission*" (p.22), does not provide information about when the future is and how much the company aims. This target-setting also shows a deficiency in Clarity and Significance.

Another characteristic of Korean reports is the great emphasis on environmental sustainability. Looking into reports marked as score 1 (K1, K5, K7, K8), environmental targets are relatively advanced compared to social or governance aspects. For instance, some have quantitative targets such as 100% energy efficiency aiming at enhanced environmental performance; however, **social and governance targets and KPIs are absent**. Reports with high **Completeness** should have a good balance among all ESG aspects, addressing all of them.

Lastly, a difference in **Balance** between the two regions was found. Scandinavian reports share current progress transparently when their targets or baseline are yet to be set, such as “*Target for the reduction of upstream scope 3 is not yet defined, we will pinpoint a main suppliers selection for reduction in 2022*” (S5, p.19). However, **Korean reports do not mention their progress**, possibly due to incompleteness and concerns about leaving a bad impression. It should be noted that communicating both positive and negative aspects leads to better balance in reporting.

Code 22. Compliance and Ethics

The analysis shows a considerable difference in average coverage levels between Scandinavia (3.0) and Korea (1.6). Scandinavian companies report in accordance with all four criteria, Clarity, Significance, Comparability, and Balance. However, most Korean companies partially met the assessment criteria.

All reports outline the type of regulations applicable to the company, the operational process of the whistleblower channel, and training programs to promote business ethics. All companies have systematic, well-established compliance management systems, and the report delivers the information with high **Clarity**. Moreover, reporting year’s performance is presented with qualitative data and multiple years of quantitative data (KPIs), satisfying **Significance** and **Comparability** criteria. Nevertheless, **Balance** was identified as several Korean reports’ shortcomings.

Reporting non-compliance or unethical practices and addressing how the company copes with the incidents is crucial to reduce governance risk. However, although Korean companies disclose data on the number of whistleblowing and non-compliance incidents, most companies **do not explain the type of violation, the company’s response to violations, and plans for continual improvement**. For example, reports of K1, K2, and K3 reveal the increase in whistleblowing from the previous years, yet additional information on the data was not provided. Readers might cast doubt on the company’s performance, posing questions like “Does the increased whistleblowing mean increased non-compliance incidents?”, “What actions were taken to handle the incidents?”, “What are the plans to prevent unethical practices and strengthen governance?”.

Scandinavian reports are more transparent in that disclosing details of non-compliance incidents (i.e., negative aspects) and corrective actions. S3, for example, provides an overview of legal disputes caused by non-compliance and updating progress.

Korean reports, however, are **prone to highlight positive performance**. For example, looking to the K5 report, “*In 2021, measures were taken according to the internal regulations on 38 out of 40 reports investigated. None of the reports were subjected to legal or administrative dispositions*” (p.102), there was no information about the rest of the two reports. Suppose those two were legal violation cases; this report emphasizes only positive results, which could be considered unbalanced information. In short, Korean companies tend to be selective about what to disclose, especially about negative performance.

Code 23. Reporting Process

Reviewing workflows and internal approval systems related to SR, two regions showed a large gap in coverage level. The average disclosure level of Scandinavian companies was 2.5, whereas Korean companies’ average score (0.9) was significantly lower. This implies that most **Korean reports contain limited or no information about the reporting process**, particularly the internal audit system.

Scandinavian reports clearly state that an internal review committee, including board members or senior managers, audits the report before publication. The responsibility of the committee and each member's role are also transparently disclosed, which meets one of the assessment criteria, **Reliability**. Notably, the description of reporting process proclaims the commitment of top management in SR, confirming the report's **Credibility** as well. Examples are:

This report has been reviewed by an internal review committee consisting of senior managers for relevant disciplines and business units. It has also been reviewed by the Audit and Risk Committee (ARC) which assists and facilitates the Board of Directors responsibilities within integrity of financial reporting, the financial reporting process, internal controls, company risks, corporate governance, compliance and auditing, prior to approval by the Board of Directors. (S1, p.3)

The information has been reviewed by S3's Corporate Management Board and has been approved by the Board of Directors. The head of internal audit reports to the company's board of directors through the board audit committee. Every quarter, they inform the board audit committee and periodically the corporate management board about matters reported through the AlertLine. S3's internal audit has resources in Norway, Brazil and North America. (S3, p.51)

The S5 Group Sustainability and HSE & Security functions are responsible for the development and coordination of the Group's policies and programs that address matters related to health, safety, the environment and corporate responsibility. These functions report directly to the Chief Communications and Sustainability Officer, who is a member of the Executive Committee. (S5, p.8)

However, most **Korean reports have room for improvement in the disclosure of reporting process and the presence of an internal approval system**, except for one Korean company (K1). No relevant information was provided in the three reports (K4, K5, K8), and rest four companies (K2, K3, K6, K7) report limited information. For instance, K2, K3, and K7 mention that the company has a sustainability/ESG committee, yet it is uncertain whether they implemented an internal audit system for SR. Moreover, while K6 has an audit committee, sustainability workflows, and reporting processes are not disclosed.

Overall, there is a need to develop the reporting process disclosure to increase the Reliability and Credibility of the report.

Code 34. Biodiversity

Biodiversity is **Materiality** for three Scandinavian companies (S1, S3, S4) and one Korean company (K2). Notwithstanding, four Korean companies (K1, K3, K4, K6) have a "Biodiversity" section in the report. The coverage level analysis, therefore, included those companies.

The data reveals that the reporting quality is markedly different in the two regions. Korean firms' average coverage level (1.4) was 1.3 points lower than Scandinavia's (2.7). This is because more than half of Korean companies were marked as score 1 since the disclosure did not meet several assessment criteria, whereas Scandinavian companies' coverage levels ranged between 2 and 3.

The **Clarity** level was overall moderate since the information provided by Korean companies covers the overarching approach, goal, and biodiversity protection activities of the reporting year. However, the limitations in **Significance** and **Comparability** were identified in Korean reports. Although all five Korean companies (K1, K2, K3, K4, K6) competently combined quantitative data when reporting their biodiversity protection activities, **the quantitative targets and trackable historical data were absent**.

In addition, **the scope of data needed to be explicitly stated**. For instance, K4 outlines biodiversity survey results with KPI "*number of species managed*" (p.89) by each project; however,

basic information (e.g., When was the survey conducted? Is the data cumulative or non-cumulative?) was not provided. This determined low levels of Significance and Comparability in Korean reports.

A recommendation for Korean companies is to benchmark S3. Reviewing Scandinavian reporting, S3 is the best reporting practice on the biodiversity topic. KPIs were formulated in alignment with the company's goal and five years of the KPIs data were disclosed.

Goal: We have set new ambitions toward 2050 and aim to achieve net-zero greenhouse gas emissions, and no net loss of biodiversity in new projects (S3, p.74). Our environmental ambition emphasizes protecting biodiversity and reducing our environmental footprint, with a particular focus on eliminating landfilling of waste in the long term (S3, p.8). For biodiversity, S3 has set an ambition to achieve no net loss of biodiversity for all new projects, in addition to the existing 1:1 rehabilitation target for our mining operations. (S3, p.12)

KPIs: Biodiversity in mining - the total affected area within property (hectares), endangered species observed (hectares), total volume of over-burden moved in mine in Brazil (S3, p.196)

Balance is the other assessment criteria that Korean companies need enhancement. For example, although K2's report addresses the significance of biodiversity and its negative impact, it is **not company-specific** as seen below.

The 2020 Global Risk Report, from the World Economic Forum (WEF), picked loss of biodiversity and ecosystem collapse as one of the biggest crises that humanity will face over the next decade. Loss of biodiversity and ecosystem collapse means uncertainty and limitation in securing natural resources and will affect human life conservation and industrial activities. The report points out that more than half of the world's GDP depends on natural capital, which leads to financial risk to human society. It will cause a serious challenge to sustainability by weakening the profit base of most industries and companies, including the steel industry. (K2, p.106)

The report should reflect risks or negative impacts in the company's context. The Balance level of K4 and K6 was far lower than K2 since no reports were made about the significance of biodiversity (i.e., why is biodiversity significant to the company/industry? In what business activities are affecting biodiversity?), not even patch information.

Code 37. Diversity and Inclusion

Most companies view diversity and inclusion as **Materiality**, excluding K6 and S5. However, K6 and S5 disclose relevant information in the topic-specific section regardless of the omission in materiality. Thus, the coverage levels of the two companies were also analyzed. "Diversity and inclusion/inclusiveness" (K1, K2, K3, K5, S2, S3, S4) was the most common phrase of the material topic, followed by "Respecting/promoting diversity" (K7, K8) and combination with the keywords "Equal opportunities" (S1, S4), "Non-discrimination" (K4, S6).

The coverage level analysis led to 1.4 points gap in average score between Korean (1.4) and Scandinavian (2.8) firms. Since more than half of Korean companies received a score of 1, the Korean average coverage level was below 2. On the other hand, Scandinavian companies' reporting quality on diversity and inclusion is far higher as most companies except S1 were marked with a score of 3.

In terms of **Clarity**, missing information, such as tangible targets and action plans, resulted in low coverage levels of Korean companies. For example, five reports (K1, K4, K6, K7, K8) were marked with a score of 1 because they only outlined an overarching approach to

diversity and inclusion. The reports needed to clarify whether the company has specific targets and practical action plans.

Furthermore, if the company has targets and corresponding action plans, the reporting year's performance should be linked to the target for high Clarity. For example, Scandinavian reports (S3) disclose activities and outcomes that align with the clear target, whereas Korean company (K6)'s performance disclosure is close to listing activities during the reporting year (see Appendix J for examples of the difference in Clarity level between Korea and Scandinavia). In this case, readers may question the implication of the disclosed information, "Is the X% of women in total management positions considered successful performance?", "What percentage was the company aiming for?", "What are the target achievement levels?". Clarity will enhance when the performance is linked clearly with the target and action plan. In that sense, setting measurable targets is also helpful, contributing to higher Significance.

The other attribute of Korean reports is low **Significance** due to the **unbalanced presentation of qualitative and quantitative indicators**. All companies have three or four years of diversity KPIs data (e.g., the number/percentage of employees by region, gender, age, and position) that fulfills **Comparability** criteria; however, qualitative data is insufficient. Specifically, Korean reports rarely describe why selected KPIs are significant to the company and how the data is connected to the activities. Providing further data interpretation will reinforce the Significance and Balance.

Lastly, none of the Korean companies met the **Balance** criteria, resulting from **scant qualitative data related to KPIs**. On the other hand, Scandinavian reports have a good Balance by addressing challenges and improvement areas. The following reporting practices of S2, S4, and S6 could be a model for Korean companies.

Within the R&D department in Norway, the average salary in 2021 for females was 88% of the average salary for males. The global average salary for female employees was 78% of the average salary for males. This excludes the Executive Management Team, where the average salary for female employees was 76% compared to their male peers. The average salary gap between women and men is largely caused by a higher proportion of men in senior positions and with longer tenure. Gender differences in salary are also influenced by function and location. (S2, p.21)

However, the My Voice survey reveals that we have more to do to ensure that employees feel that everyone has the same opportunity for development in S4. We are therefore working strategically to promote relevant diversity, both at Group level and down through the organisation. (S4, p.194)

The biggest gap in the area of diversity is within gender balance, and we address this through our goal of 30% women in the Group by 2030. (S6, p.39)

Group (c) -1 ≤ Difference value < 0

The result shows that most reporting components (18 out of 29) were classified into group (c), where the difference between the two regions' average coverage levels ranges from -1 to 0. This indicates that Korean companies' reporting quality is slightly lower than Scandinavian companies.

However, some reporting components' difference values were close to zero (e.g., -0.1 or - 0.3), meaning that reporting quality between the two regions is negligible. Since RQ2 accentuates Korean companies' limitations, this section will highlight nine reporting components with difference values between -0.6 to 1.0, as shown in Table 13 (see Appendix I for full analysis result).

Table 13. Reporting components in group (c) $-1 \leq \text{Difference value} < 0$

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
Child codes		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
12	Sustainability/ESG recognition	2	2	3	1	3	2	2	2	2.1	3	3	3	3	3	3	3.0	-0.9
19	Supply chain management	2	3	3	2	2	3	2	1	2.3	3	3	3	3	3	3	3.0	-0.7
25	Stakeholder engagement	2	2	2	3	2	3	2	2	2.3	3	3	3	3	3	3	3.0	-0.7
30	Emissions	1	3	3	2	3	2	2	1	2.1	3	3	3	3	3	3	3.0	-0.9
32	Water	3	3	2	N/A	1	3	N/A	1	2.2	3	2	3	3	N/A	3	2.8	-0.6
33	Waste	2	N/A	2	2	2	N/A	N/A	2	2.0	2	2	N/A	3	3	3	2.6	-0.6
35	Human rights	2	2	3	2	2	2	1	1	1.9	2	3	3	3	2	3	2.7	-0.8
36	Health and safety	2	3	2	2	3	2	2	2	2.3	3	3	3	3	3	3	3.0	-0.7
38	Product responsibility	1	N/A	3	N/A	2	N/A	2	2	2.0	N/A	N/A	N/A	3	N/A	N/A	3.0	-1.0

Source: Own study

Code 12. Sustainability/ESG Recognition

Analyzing whether sample companies disclosed ESG ratings in the report, all Scandinavian reports contain several evaluation results by sustainability rating agencies, whereas only two Korean companies (K3, K5) disclose such information. This resulted in different average disclosure levels between Scandinavia (3.0) and Korea (2.1).

Firstly, most companies except K4 meet **Clarity** as the report included indicators related to sustainability/ ESG recognition by external stakeholders, such as rank, score, or awards. Scandinavian companies show high clarity levels by interpreting ratings, such as comparing with average industry ranking or phrasing as top X%. However, **Korean companies highlight awards received for their achievement rather than score/rank**. Since ratings are valuable indicators for stakeholders to compare various companies' ESG performance, disclosure of awards may not serve a role in comparability.

In addition, Korean companies call attention to domestic recognition (e.g., Korean research institute & ESG rating, SUSTINVEST: Korean ESG rating agency) than global standards (e.g., CDP, Morgan Stanley Capital International [MSCI], Sustainalytics, Dow Jones Sustainability Indices [DJSI], Ecovadis, S&P Global, The Nasdaq-100 ESG Index [NDXESG]). Given that all Korean sample companies are multinational corporations, disclosure of global evaluation would be helpful for international stakeholders to understand the company's position within the worldwide market.

Comparability is another criterion where Korea needs improvement. For instance, Scandinavian companies provide how their ratings have changed over time, such as “three years of CDP ratings” (S2, p.121) or “In 2021, S4 was again included in the Dow Jones Sustainability Index Europe”(S4, p.7). On the flip side, Korean reports highlight reporting year's award or rank without previous years' performance. This indicates **a lack of comparability**.

Code 19. Supply Chain Management

Korean companies' disclosure level on supply chain management varies from 1 to 3 (average score: 2.3), whereas all Scandinavian companies have high coverage levels of 3.0, fulfilling five assessment criteria: Clarity, Completeness, Sustainability context, Significance, Balance.

All companies comply with **Clarity** criteria as the reports provide extensive information on the overarching approach, action plan, reporting year's activities, and performance outcome. In terms of **Completeness** – whether all ESG aspects are reflected in supply chain management – K4 did not meet the criterion. K4 addresses social (e.g., human rights impact assessment) and governance (e.g., fair trade compliance), yet environmental management in the supply chain was lacking.

For the **Sustainability context**, the assessment focused on how a company's approach to supply chain management is incorporated into sustainability strategy. Scandinavian reports show a clear connection between supply chain management and integral sustainability strategy, elaborating on their specific action plans in alignment with the targets. Notably, all Scandinavian companies actively utilize quantitative indicators, such as “percentage of new major suppliers screened using environmental/social criteria” (S1, p.57), “the percentage of ISO 9001/14001/45001 certified suppliers” (S2, p.108), and “percentage of significant direct suppliers that have an approved environmental management system” (S6, p.45).

However, four Korean reports (K1, K5, K7, K8) rely on qualitative data to describe their goal and activities, even though their supply chain management is a part of the sustainability strategy. The **need for quantitative data** indicates low **Significance** levels of Korean reports. Setting quantitative targets and measuring indicators will enable to build of a more concrete action plan, strengthening the Sustainability context.

Lastly, most reports have a good **Balance** by addressing risks in the supply chain. The management approach is shaped based on the risks (i.e., negative impacts on/by the supply chain) identified by the company. However, K8 **needs more risk disclosure** to level up the balance.

Recognizing that violations of human rights may occur outside the company's control, we try to improve our management of human rights issues in the supply chain. We strive to address and advance the human rights movement through appropriate supply chain due diligence efforts. (K8, p.34)

As seen above, K8's risk identification is too general. The report should mention details in the company's context (e.g., where in the supply chain do the human rights issues matter the most?). In addition, K8's report **omits the contingency plan**, which is the company's systematic approach in cases suppliers violate the codes. In short, the report should address negative aspects to increase the Balance. Highlighting only the positive efforts or influence of the company is not enough.

Code 25. Stakeholder Engagement

Based on the stakeholder analysis, all companies report how they communicate and engage with each stakeholder group. However, Scandinavian reports (average score: 3.0) show higher **Clarity** levels than Korean reports (average score: 2.3). This is because Korean companies' disclosure is often limited to reporting the type of communication channel (e.g., meetings, workshops, social media, press releases) **without mentioning stakeholder engagement activities**. Scandinavian firms, in contrast, share activities carried on during the reporting year in detail (see Appendix I for further details).

Moreover, adding the highlights of stakeholder dialogue gives readers a clearer picture of topics discussed with stakeholders' interests as well as companies' efforts to integrate stakeholders' opinions into strategy and action plans. However, given that only one Korean company (K1) disclosed stakeholder engagement activities of the reporting year, other companies could make the report more tangible by including a brief overview of stakeholder communication. Moreover, disclosure of the communication cycle (i.e., frequency of stakeholder meetings, seminars, or surveys) could further enhance Clarity, which is absent in most Korean reports.

Code 30. Emissions

Emissions, including GHG emissions, NO_x, and SO_x, were ranked top **Materiality** among all sample companies. The keywords used in the material topic are "Climate", "Carbon", and "GHG emissions", which are phrased in "Response to climate change," "Carbon reduction," and "Carbon neutrality".

Even though all companies address emissions in the report, analysis of coverage levels reveals moderate differences between the two regions. The average score of Korean firms is 2.1, 0.9 points lower than Scandinavian firms' average score of 3.0. This is because Korean firms' score is distributed between 1 and 3, yet it should be noted that three Korean firms (K2, K3, K5) have comparable disclosure levels to Scandinavia.

To begin with, reporting quality of nine companies (K2, K3, K5, S1, S2, S3, S4, S5, S6) is top-notch. Disclosed information, including emissions reduction strategy, targets, action plans, and performance of the reporting year, is comprehensive and accessible, indicating complete accordance with the criteria **Clarity**. Not only are action plans and activities during the reporting year aligned with the underlying climate strategies, but quantitative data was also extensively used to describe performance (see Appendix I for good examples).

On top of quantitative data used in performance description, good practices companies stood out in target and KPIs setting, which shows excellent **Significance** (see Appendix I for further details). The targets were set based on the company's overarching strategy, and the coverage levels meet Clarity and Significance criteria. On the other hand, a few Korean companies need an improvement.

To illustrate, K1 does not meet the Clarity and Significance criteria due to the **absence of a quantitative target**. While K1 presents its future target as "*continue to reduce GHG emissions*" (p.22), the definition of future is undefined, as well as to what extent they aim to reduce emissions. Thus, K1's Clarity and Significance level is lower compared to the abovementioned other companies in target setting. K8 is another company that does not disclose quantitative targets. Instead, K8 identifies establishing mid-long-term climate strategy and roadmap as the next step. Considering that most sample companies already have a well-developed climate strategy, K8 appears to have lower maturity levels in emissions management.

Furthermore, a large discrepancy between Korea and Scandinavia has been observed in Scope 3 emissions, which are indirect GHG emissions from the companies' value chain activities (GRI, 2022a). All Scandinavian companies include Scope 3 emissions in GHG emissions; however, **only half of the Korean companies (K2, K3, K5, K7) calculate Scope 3 emissions**. K4 and K6 were given a score of 2 since Scope 3 emissions disclosure was missing. It is also critical to explicitly state the methodology (e.g., GHG protocol, calculation scope), which is recommended for K4 and K8 to achieve a high level of Clarity.

Nevertheless, all companies fulfilled **Comparability** criteria by releasing multiple years of GHG emissions and GHG intensity data.

Lastly, limited **Balance** was shown in Korean companies. For example, K8 highlights “-17% reduction in GHG emission per production unit at company in North America and Korea (2020-2021)” (p.24), whereas the total GHG emissions have increased over the past three years. K1 took a similar approach, **selective disclosure**. K1 put emphasis on their achievement, “In 2021, we reduced GHG emissions by a total of 6.41 million tonnes through 476 projects” (p.27). However, total GHG emissions increased from the previous year. It can be inferred that K1 **focus on positive performance** since the report did not explain what caused the total emissions increase. In contrast, Scandinavian companies deliver their performance more objectively by sharing both positive/negative outcomes and challenges experienced during the reporting year. S6’s reporting can be a benchmark for K1 and K8 to improve Balance (see Appendix I for further details).

Code 32. Water

Water resource management is **Materiality** to four Korean firms (K1, K5, K6, K8) and five Scandinavian firms except S5. Companies K4 and K7 exclude water from material topics, whereas the other companies (K2, K3) disclose relevant information in the report as they classify water as a general issue that needs to be managed. Thus, coverage levels analysis extended its scope to include K2 and K3.

Data shows that Scandinavian companies’ average value (2.8) is higher than Korean companies (2.2), resulting from the different score ranges between the two regions. None of the Scandinavian companies were given a score of 1, while Korean companies’ scores varied from 1 to 3. Most Korean companies (K1, K2, K3, K6) comply with the criteria **Clarity** as they provide comprehensive information about their water management approach, action plan, and performance of the reporting year as well as all Scandinavian companies. On the other hand, K5 and K8 were assigned low scores (i.e., 1) due to **insufficient disclosure of the activities during the year**. Interestingly, both companies had outstanding achievements, such as K5’s “CDP Korea Climate Change Response and Water Management Awards” (p.37) and K8’s “41% reduction in water use” (p.60). Nonetheless, the elaboration of efforts to reach such accomplishments was lacking. Scandinavian firms’ disclosure like S4 seems to be a benchmark for K5 and K8, as the information provided by S4 is supported by several series of activities in connection with the outcome (see Appendix I for examples of S4).

In terms of **Significance**, all companies disclose KPIs such as the total amount of water consumption, water recycling, and water intensity. As most companies but S2 present multiple years of data in the table, **Comparability** is also overall satisfied.

Companies with a score of 3 (K1, K2, K6, S1, S3, S4, S6) have good **Balance** in the report by addressing their operations’ negative impacts on water, whereas other companies (K3, K5, K8) did not disclose such information in the reports.

Further, looking closely into Korean companies scored 3, it is noteworthy that the **tendency to highlight potential negative impacts** on the water was identified. Examples include “our semiconductor sites, which typically require large amounts of water” (K1, p.38), “while the nature of the integrated steelworks means that it is essential to use a large quantity of water” (K2, p.52), and “The deterioration of the water quality of ... source of industrial water supply ... has been feared to reduce the efficiency of water supply and drainage facilities and disrupt industrial water production, which could negatively affect the operation of the steelworks.” (K6, p.40).

However, Scandinavian companies go beyond acknowledging the negative impact caused by the business. For instance, S3 disclose water permit breaches in the reporting year, including the overview of breaches and corrective measures received. S1 and S6 elaborate on the negative performance with their reasons (see Appendix I for examples of S1, S3, and S6).

Code 33. Waste

Waste handling is a material topic for five Korean and five Scandinavian firms. While three Korean firms (K2, K6, K7) and one Scandinavian firm (S3) did not select waste as **Materiality**, all firms disclosed information on their waste management approach and performance during the reporting period. Notably, Korean firms emphasized their efforts to comply with regulations such as Waste Management Act and Framework Act on Resource Circulation, which can explain why all companies addressed this topic in the report.

The average coverage level of the five Korean firms that chose waste as materiality is 2.0, lower than the five Scandinavian firms' average score of 2.6. Looking at the assessment criteria **Clarity** and **Significance**, all ten companies disclose their waste management approach and corresponding target action plan. However, two Korean firms did not fulfill the Clarity criteria due to a deficiency in target setting.

K8 only has a broad qualitative target “*to minimize waste generation*” (p.59) **without a specific quantitative target linked to the action plan**. In the case of K1, two quantitative future targets were disclosed; “*acquire zero waste to landfill certification for all manufacturing sites, 7.5 million tonnes of collected E-waste (cumulative from 2009)*” (p.22). These **targets are ambiguous** because the report does not clarify when the future refers to; thus, the target is not time-bound. In addition, the second target is based on the cumulative amount of E-waste. Since the company publishes an annual report to disclose sustainability performance measured yearly, the **purpose of selecting cumulative targets needs to be elaborated**. Similar to K8, Scandinavian firm S1 **does not disclose quantitative targets** for the following years. Nevertheless, the difference is that S1 has a qualitative target in alignment with specific action plans for the upcoming year. The other five Scandinavian firms have both qualitative and quantitative mid-long-term targets.

Concerning waste management activities during the reporting year, all Korean and Scandinavian firms utilize quantitative KPIs such as volume of waste generation by waste type, recycling and treatment rate to delineate the outcome of the activities. Although the KPIs vary among companies, all of them disclose multiple years (i.e., three to five years) of KPIs, enabling readers to track down the company's performance in the past years. This indicates the assessment criteria **Comparability** is met.

Balance is the criteria that most Korean firms fell short of compared with Scandinavian firms. In particular, **the tendency to feature positive performance** was found in Korean firms' reporting. For instance, K8 deliberately highlights their achievement of “*zero hazardous waste in North America (2020-2021)*” (p.24, p.91) several times in the report, even though their operation sites are not limited to North America. Given that the KPI (i.e., hazardous waste) scope contains countries where the company operates, such as Korea, the performance in other regions should also be disclosed. Even if there was underperformance, being transparent about the outcome and addressing the improvement area can strengthen the reporting balance, as seen in Scandinavian firms (see Appendix I for Scandinavian examples). Furthermore, all Scandinavian firms disclose how well they acknowledge of negative environmental impacts caused by their operations, whereas Korean firms exclude such information.

Code 35. Human Rights

Most companies selected human rights management as **Materiality**. Although K3 places “Human rights protection” as a general issue, the report presents relevant information in a topic-specific disclosure section, “Human rights management”. Thus, coverage levels of K3 on this topic were assessed along with other reports. The majority of companies phrase the Materiality as “Human rights” (K7, K8, S4, S6) or “Human rights management/protection” (K1, K2, K3,

K4, K5, K6). Several Scandinavian companies (S2, S3, S5) add on “Labor” or “Workers’ rights”. The material topic of S1 is more specific, “Forced labor and modern slavery”.

Reporting quality on human rights varies among Korean companies, ranging from 1 to 3. The score of 1 was unobserved in Scandinavian companies’ coverage levels to the contrary. Consequently, the average score of Korean reports (1.9) was below the Scandinavia’s (2.7).

Korean companies’ disclosure of human rights management system, the statement on aim, and action plans are overall comprehensible. However, there is room for improvement to achieve greater **Clarity** and **Significance** in target setting. As seven Korean companies besides K3 **omit quantitative targets**, it can be suggested to utilize existing KPIs. For example, K8 could modify their KPIs “*total hours/average hour of (human rights-inclusive) code of conduct training*” (p.94) into e.g., percentage of (human rights-inclusive) code of conduct training, in order to raise Clarity of their goal “*ensure our employees and third parties comply with our policies on human rights issues, including mutual respect, a safe and healthy workplace, freedom of association and collective bargaining, wage, and working hours?*” (p.34). Tangible targets not only appeal to readers about how they take this topic seriously, but they can also facilitate companies in developing action plans and managing performance (see Appendix I for Scandinavian examples).

Moving on to **Comparability**, K7 has single-year data of “*Total human rights training hours*”, which makes a **comparison with the previous years unavailable**. On another note, K7 could set other KPIs representing the outcome of management activities. For instance, K7’s KPI “*total human rights training hours*” (p.27) may show the company’s efforts, but it does not necessarily result in zero human rights violations. Thus, KPIs such as the number of breaches of human rights policy or confirmed cases of human rights violation could be employed, as shown in Scandinavian companies.

Finally, **Balance** is the other criterion where two regions have a gap in coverage levels. Scandinavian companies’ reporting addresses challenges such as how their operation is exposed to potential human rights risks and how their business could negatively affect human rights. In addition to challenges, Scandinavian reports include the companies’ response to human rights-related non-compliance incidents during the reporting year (see Appendix I for Scandinavian examples). In short, Scandinavian reports are well-balanced, sharing both positive and negative aspects of the company’s practices, whereas Korean reports are **prone to avoid mentioning downside performances**. More Balance is required for Korean companies to have a higher quality of disclosure.

Code 36. Health and Safety

Occupational health and safety, preventing work-related hazards or incidents that result in injury or ill health, are **Materiality** to all sample companies. Companies need sound safety management systems to minimize health and safety accidents by developing internal policies, procedures, and proper budget allocation (Berhan, 2020). Work-related hazards include both physical and psychosocial harms (Appendix I for further details on the type of harm).

Sample companies’ material topics converge to “Health and safety” and “Employee wellbeing”. In the case of K3, “Widespread safety and health culture” is classified into general issues; however, the report discloses relevant information in the topic-specific disclosure section. Thus, coverage level analysis included K3. Overall, the information provided by the sample companies is satisfactory. Not only is a safety management system consisting of internal safety policy, procedure, and measures in operational processes well developed but also the disclosure of such information appears advantageous and appropriate for stakeholder’s use.

The result, however, indicates that 0.7 points lower Korean companies' average score (2.3) compared with Scandinavia's (3.0). This arises from six Korean companies (K1, K3, K4, K6, K7, K8) that scored as 2 due to inadequacy in certain criteria.

To start with, **Clarity** and **Significance** were identified as the most extensive development areas for Korean companies. For instance, the **quantitative targets are missing** in Korean reports (K1, K7, K8), whereas Scandinavian reports disclose quantifiable targets that are more specific and tangible (see Appendix I for examples).

Another pattern seen in Korean companies is **scarce information about performance outcomes**. All companies provide three to five years of data on KPIs (e.g., number of work-related accidents, total recordable injury frequency/incident rate, safety and health training hours), which fulfills the criteria of **Comparability**. Nonetheless, those data are often disclosed separately in the Appendix; qualitative data interpretation is insufficient, lowering **Clarity** levels. To illustrate, five companies experienced underperformance (K1: increased incidents frequency rate and injury rate, K3: increased domestic industrial accident rates, K4, K6: increased LTIR, K7: increased number of incidents) in comparison with the previous year, and yet none of them give an explanation the outcome. On the other hand, Scandinavian reports transparently what happened and what they will do for prevention (see Appendix I for Scandinavian examples).

K3's reporting, however, is in opposition to Scandinavian reporting practices. For example, despite an increase in the domestic industrial accident rate and Lost Time Injury Frequency Rate (LTIFR), the K3 report **only highlights their positive outcomes** "*No domestic or overseas deaths between 2018-2021*" (p.137), indicating a lack of **Balance**. Considering that some stakeholders may regard safety-related underperformance as social sustainability risks, Korean companies should address negative aspects of corporate practices to alleviate stakeholder concerns and ultimately reinforce reporting quality in Clarity and Balance.

Code 38. Product Responsibility

Five Korean firms (K1, K3, K5, K7, K8) selected product responsibility as one of the material topics, whereas only one Scandinavian firm (S4) views this topic as **Materiality**. A closer look at terminologies of material topics suggests two types of product responsibility. One is high product safety and quality, as seen in reports of K1, K5, and K7 "Product safety and quality", K3 "Develop a modified risk product", K8 "Customer satisfaction" and S4 "Safe products". The other definition is ethical marketing, as K1 "Responsible marketing and customer relations management" and K3 "Implement responsible marketing policies" raise it as key agendas.

Although more Korean companies report on this topic than Scandinavian companies, the average coverage levels show a moderate gap between Korea (2.0) and Scandinavia (3.0). First, not all Korean companies fully meet the criteria of **Clarity**. For instance, K1 reveals its goals, "*reinforcement of quality and safety management systems*" (p.19) and "*promoting the healthy and safe use of digital devices*" (p.58), in several sections throughout the report. However, **no specific section outlines a holistic approach to product responsibility**. This indicates that K1 could enhance accessibility to navigate readers interested in product responsibility. S4's reporting that fulfilling the Clarity and Significance assessment criteria can be a benchmark for Korean companies (see Appendix I for examples of S4).

Four other Korean companies have overall high coverage levels in disclosure of detailed activities during the reporting year are easily understandable to readers. However, most Korean companies (K1, K7, K8) **need more quantitative targets**. For example, only K3 has quantitative and time-bound targets "*100% follow responsible marketing policies in Korea and exporting countries by 2025, zero non-compliance cases of responsible marketing by 2025*" (p.22). While K5 has a

quantitative target of “*deliver impressive quality to customers by following the principles and basics and keeping promises made to customers*” and the qualitative target of “*achieving zero defect, zero quality accident, and zero loss*” (p.31), it is **uncertain when the target year is and the KPIs’ status quo** (i.e., the number of defects, quality accidents, and losses in the reporting year). This explains why Korea has lower Clarity and **Significance** compared with Scandinavia.

Regarding **Comparability**, S4 discloses three years of KPIs such as “*the number of participants in food safety training, share of volume manufactured in compliance with the S4 Food Safety Standard*” (p.179). Likewise, three Korean companies (K3, K7, K8) released quantitative KPIs like number of recalls, number of safety defects, customer satisfaction survey score measured in the past three to four years, meeting the requirements of Comparability. However, **K1 does not have KPIs; K5 does not disclose the measured values despite having KPIs.**

Lastly, no significant differences were marked in the **Balance** criteria between the two regions. A brief description of the non-compliance incident related to product safety was provided by S4, transparently disclosing negative performance. Similarly, K3 shares litigation related to marketing while updating the status (see Appendix I for further details). Other Korean companies clearly state that there were no significant incidents related to product responsibility.

Summary

Much-discussed limitations in Korean reporting content are as follows: a lack of quantitative targets (KPIs) and goals, ambiguous/non-timebound target setting, unbalance between quantitative and qualitative data, a greater focus on environmental dimension than social and governance, the tendency to highlight positive performance, lack of disclosure on negative performances, and lack of company-specific information regarding sustainability risks.

4.3 Best Practice Approaches in Sustainability Reporting (RQ3)

This section outlines the findings from 13 interviews (seven SR specialists in Scandinavia/Nordic best practice companies and six SR external experts from ESG rating agencies and consulting firms). Interview information is referenced with participant code in square brackets [] (see Appendix E for the list of interviewees).

4.3.1 Attributes of High-quality Sustainability Reporting (RQ3-a)

This section presents what makes a high-quality sustainability report based on participants’ responses. Questions were phrased differently by interviewee types: for best practices companies (Type1) interviewees, their SR approaches were mainly asked, such as “What reporting strategy/principles does your organization follow to produce a high-quality report?”. To the other interviewees with external perspectives (Type2), questions were formulated as “How do you evaluate reporting quality?” and “What are the requirements of a high-quality report?”.

Accessability

A good report should be well-structured and accessible to readers [B2, B6]. An easy format can navigate readers to sections where their interests place. For instance, since stakeholder groups such as investors and ESG rating agencies collect certain data types for assessment, the report’s straightforward format can guide them. However, suppose analysts fail to obtain specific data due to segregated report structure. Then, even if the report contains the information needed, it may underestimate the company’s sustainability performance, resulting in a lower rating score. In order to prevent this eventuality that causes a negative reputation, it is critical to have an appropriate form of the report for effective communication [B2].

Another aspect of accessibility is **readability**, meaning that a good report is comprehensible to the audience. Any stakeholder group should be able to easily understand disclosed information [B6], which also connects to other attributes of a high-quality report, “Clarity” and “Relevance”.

Clarity

One of the key requirements to produce a high-quality report is **clarity**. Interviewees threw light on how clarity can be embedded in SR. First, a good report discloses the **methodology**, including the data collection, calculation, and analysis process. An explanation is necessary to questions such as “To what extent does the report cover in terms of data scope?”, “How is the result calculated?”, “How is the data collected for estimations?”, “What proxies are used for calculation?” [B1, B2, E3, E5]. Otherwise, it could be deemed a false claim [B1].

In addition to transparency in the methodology, the company’s goal has to be presented with high clarity to avoid greenwashing. When companies disclose their sustainability goals in the mid-long-term roadmap, their ambitions should be backed up by tangible targets and detailed action plans [B4, E2, E6]. For example, a **clear roadmap provides a well-defined goal** (e.g., minimizing environmental footprint) with a measurable target (e.g., X% of carbon emissions reduction by 2030), ongoing activities, and action plans (e.g., energy efficiency increase in factories, carbon offset) [E6]. Moreover, it is fundamental to **set achievable targets** and action plans [B4, B6, E2, E5, E6].

One interviewee introduced a case highlighting the significance of clarity in SR; the Netherlands’ authority accused one Scandinavian company of greenwashing because the company did not disclose a course of action to achieve goals [E6]. Other red flags mentioned are: 1) listing numerous initiatives that are irrelevant to the goal/target, 2) no specific action plans, and 3) vague (e.g., non-time-bound, fluffy words) targets [B4, B6, E2].

Furthermore, a good report outlines **target achievement with KPIs**. KPIs show the progress of the reporting period against mid-long-term goals, enabling companies to identify significant gaps between the status quo and goal. If the report only highlights achievement without the reporting year’s target, this makes it readers hard to assess whether or not the outcome was successful. For example, even though the achievement of “30 % GHG emissions reduction in 2021” sounds positive, the company’s target would have been a 40% of reduction [B4].

Lastly, it is essential to integrate the company’s business model into sustainability reporting. While most companies’ SR often overlaps with the core business model and strategy, sustainability disclosure is not always 100% connected to them. However, a high-quality SR has an **evident connection between the company’s overall business strategy and sustainability performances**, reflecting the risks and opportunities of the business model [B6, E5].

Relevance

The other requirement to produce a high-quality report is relevance. The information should be **relevant to broad stakeholder groups** [B1, B6], and the report needs to reflect the **company’s context** [B4, E1, E2, E5]. For instance, when companies mention their commitments to SDGs, the report should elucidate “how the company’s commitment and corresponding activities/action plans are relevant to SDG elements” to increase reporting quality. In particular, the positive impacts of company’s SDG-related activities/operations should be highlighted rather than announcing the general terms of each SDG [B4].

In a similar vein, it is crucial to **set appropriate indicators (KPIs)** relevant to the company or industry [E1, E2, E5]. For example, an energy-intensive industry’s energy consumption (e.g.,

MWh) per year is a suitable indicator to assess the company's environmental performance. Likewise, employee turnover rates or incident rates would better fit in the company's context for labor-intensive industries such as textiles [E2]. For another example, companies often disclose the percentage of females in managerial positions from the diversity and pay equity angle. Yet, intrinsically, the numbers of indicators should be apprehensible to readers, providing answers to questions such as "What does 20% of females in top management mean?", "How does it represent the company's social sustainability approach?" [E1]. Listing plenty of irrelevant indicators does not advance reporting quality [E2].

Representativeness

High-quality reports **cover more than 80% of business activities**. Suppose the disclosure information is limited to operations that account for 50-60% or less of the company's revenue/sales. In that case, the reporting quality is considered low due to a lack of transparency and accuracy. The report should show the impacts of the company's overall business activities [E4].

Balance

Balance is the most stressed quality of good reporting by multiple interviewees. First of all, the **balance in report volume** was brought up. A good report focuses on the material topics and should be concise. Since not every ESG dimension is material to the company in terms of impact on/by environment and society, it is unnecessary to discuss every ESG topics that may be irrelevant to the company. Although long sustainability reports are prevalent these days since the company uses them as both a marketing tool and statutory reporting, the prerequisite of a good report is to have **a moderate length**, highlighting material topics. At the same time, the report should contain sufficient qualitative information [B1, B4, B6, B7, E1, E5, E6].

Another definition of balance is to **address the business's positive and negative impacts**, which aligns with GRI reporting quality principle. A good report provides the company's management approach and action plans to mitigate identified negative impacts or operational risks. Most importantly, highlighting only positive performance is a major red flag of unbalance in the report. A good report is based on what is actually going on; thus, selective disclosure to hide negative aspects violates the principle of balance [B1, B2, E2, E4, E6], posing greenwashing risk [E6]. In practice, some companies – particularly the communication/IR department – are reluctant to disclose unpleasant news [E2, E4, E6]. Nonetheless, the company should capitalize on the negative information to prove how well they manage risk/negative impacts, which can lead to high-quality reporting.

Furthermore, the **balance of ESG topics** should be taken into consideration as well. Governance is broadly discussed in relation to compliance with regulations, and environmental topics like climate change and biodiversity are relatively easy to address since there are numerous disclosure frameworks or standards to utilize, such as TCFD and EU taxonomy. However, standards related to social sustainability topics are not as advanced as environmental topics. Companies tend to focus on health, safety, or anti-discrimination and harassment when it comes to social issues; other pivotal topics are often unaddressed, such as human capital management. For example, despite a master plan for carbon neutrality, companies cannot execute the strategy if they are incapable of attracting, retaining, and developing talent. Investors, as a matter of fact, view talent management as a big sustainability issue affecting a company's long-term durability; thus, companies should disclose relevant information, balancing ESG topics in the report [E1].

Lastly, a balance between **quantitative and qualitative data** was mentioned. Some reports are too data-driven, listing a large amount of ESG performance data. However, a good report

elucidates quantitative data, providing sufficient qualitative information on the company's overarching sustainability strategy and explaining its connection with data [E4].

Forward-looking Perspective

Lastly, interviewees mentioned a forward-looking perspective. A good report gives a glimpse into the **company's future plans** for sustainable development. This implies that sustainability strategy disclosure plays a significant role in the report, envisioning the company's future in the short-mid-long term [B1, B4, B6, E4, E6]. Moreover, the reporting year's performance should be alignment with concrete future targets. Backward-looking information should be used to build credibility for forward-looking statements [B4, B6], and the balance is the key [B1].

4.3.2 Suggestions to Improve Sustainability Reporting (RQ3-b)

In the interviews, participants provided practical advice for SR specialists (individuals) and the sustainability department (organizations). This section outlines lessons from the best practice companies and external expertise, complementing Section 4.3.1 with specific courses of action and mindset for SR improvement. The following lessons are applicable at the **individual level**.

Keep abreast of trends!

Since sustainability is an ever-changing field, it is vital to follow big trends, including regulatory changes and stakeholders' interests in material topics. Firstly, the country/region where the company has markets should be examined, yet trends at global levels are also essential to grasp the big picture [B1].

Another advantage to staying on track, and monitoring what is happening at the global level, is **preparedness enhancement**. The following trend begins with gathering and digesting huge amounts of data to gain an in-depth understanding of essential topics and what is expected from society, which is an intensive process. A good report responds to those trends, addressing them in the organization's context. Hence, sustainability personnel must assess whether the company has a system to cope with the trends. Mostly this is linked to data such as 1) What data is needed for reporting a certain topic?, 2) Is the data measurable or already measured?, and 3) Who is in charge of providing data?. If the company has no answers to these questions, it is crucial to initiate action earlier. Appropriate preparation enables ensuring high-quality data, ultimately leading to higher report quality. This can be accelerated by keeping abreast of trends [B1, B2].

One practical suggestion from interviewees is to **start with regulatory requirements**. Although regulation is a bare minimum, it can be a good starting point for companies to develop reporting practices [B1, B5], such as Korean companies that have yet to engage in SR yet expected under the new regulation. Once "*getting the basics (goals and targets) right*", companies can see what to follow up on and build plans. Following GRI guidelines is one way to start with [B4, B5]. Then, companies can further expand the scope of the disclosure. Voluntary disclosure beyond compliance is a great opportunity to showcase the company's efforts for sustainable development [B1].

Be open to learn!

Although Scandinavia and the EU generally have a long history of reporting than Korea, sustainability is broad and still a new field. In that sense, everyone stands at the same starting line for upcoming regulations, including CSRD. Hence, it is crucial to be open-minded and keep studying to adapt to regulatory/market changes, regardless of many years of experience in the field [B1]. This applies to all employees, not limited to sustainability personnel [B2], since sustainability is integral to the core business; sustainability is relevant to everyone's tasks [B1, B2, B3, B4, B5, B6, B7].

Engage colleagues from other departments!

The size of the sustainability department in best practice companies varies, ranging from three to 40 employees. The main task of the SR specialist and the sustainability department is to produce a quality report. Nonetheless, all interviewees pointed out that employees across different departments (e.g., HR, Finance, Legal, IR, and Business units) contribute to SR. In other words, as reporting involves many departments and people, it is critical for the sustainability team to **effectively communicate with others** for a smooth internal process [B1, B2, B3, B4, B5, B6, B7]. Furthermore, another sustainability team's responsibility is to bring more sustainability awareness among employees. By engaging everyone, the company can build capabilities for advanced corporate sustainability development, helping them understand how their work contributes to its sustainable practices [B5].

Followingly, interviewees proposed several measures that the sustainability department (or top management) could consider at the **organizational level**.

Build a solid reporting strategy!

Develop internal reporting guideline – Best practice companies employ a top-down approach in sustainability strategy building and reporting. However, interviewees highlighted the flexibility given to each business unit. For instance, each division sets its specific target and corresponding action plans, managed and executed by the division leader. To do so, the sustainability department should provide the company's overarching goals/targets and reporting guidelines [B1, B2, B4, B7]. In addition, communicating an established internal policy is essential to ensure the consistency of the report. For instance, the data collection scope and underlying data analysis assumptions should align with reporting guidelines, which is also crucial for reporting audit process [B3].

Focus on the target audience – A basic reporting strategy is identifying the target audience. Companies should determine the way of communication, key messages to each target reader, and how much effort they should put into reporting [B7, E2]. For instance, a consumer is one of the primary audiences for SR in B7's organization as a food production company; thus, two different reports are published, 1) an exhaustive full report for investors and ESG rating agencies and 2) a summary report for consumers and community [B7].

Avoid over-reporting – A lengthy report that overwhelms readers is not a good report. While providing sufficient information, the disclosure should focus on material topics relevant to stakeholders [B1, B4, B6, B7, E1, E5, E6]. It takes bravery to overleap unsubstantial information that is just nice to have. That information could be communicated through other channels, such as the website, not in the report [B4, B7].

Avoid selective reporting – Cherry-picking disclosure – only highlighting positive performance – must be avoided. High-quality SR is based on facts (warts at all), including the company's negative impacts on the environment or society (i.e., damage point [E6]). Similarly, negative performance, such as safety accidents and corruption, must be addressed [B1, B2, E1, E2, E4, E6]. Moreover, a cautious approach is required when stating “no violation”. Considering that multinational corporations often have broad and complex value chains, it is unfeasible to track all activities; there may be uncovered forced-labor cases. Thus, one way to mitigate this risk is to have contingency measures. Disclosure of how the company plans to handle it in case of violation occurs would be top-notch [E2, E4].

Avoid the phrase “We are sustainable” – As sustainability is a broad concept, the definition of sustainability varies in each industry and company. Hence, it is fundamental to clarify what “being sustainable” means to the company, and reporting should be specific about “how”

sustainable they are. Companies should refrain from overusing the general term “sustainability” [B6].

Learn from the past failure – Performance review, one of the main objectives of reporting, allows the company to look back on whether the sustainability strategies are functioning to achieve the goals. If the goal is achieved, that is a green light to continue executing current strategies. Contrarily, when the target is not met as planned, the credibility of strategic statements and targets should be re-examined. Above all, viewing failure as a springboard to improve reporting quality is vital [B6].

Invest in data management system!

Multiple interviewees emphasized the significance of data management, which takes up a large part of SR. Even best practice companies face various challenges under CSRD due to its more stringent requirements, such as broader scope, higher transparency in the data collection process, and higher data quality in terms of accuracy and validity. While preparation for CSRD varies from gap analysis to internal data collection process optimization, interviewees pointed out the need for a robust and unified data management system [B1, B2, B3, B4, B5, B6, B7].

One of the current challenges raised by the interviewee was human errors. Unfortunately, as hundreds of employees across different departments manually fill out the data in one Excel sheet, data inputs are sometimes incorrect [B3]. While monitoring requires a workforce, **building one central data collection system** is convenient for sustainability personnel by optimizing the process and effectively managing massive data sets [B3, B7]. This can also save time in the external assurance process [B3]. Therefore, companies should **invest in tools/solutions for data management** if their current system cannot accommodate increasing regulatory requirements [B6]. In addition, developing similar procedures and management systems of financial data is likely desired [B7].

Leverage internal human resources!

In the interviews, the internal employee was named as a key factor in human resource management. Best practice companies leverage their existing resources rather than hiring external experts, based on the view that “*anyone interested can learn* [B2]”. The companies expect to build employee competency in sustainability.

However, this approach might not apply to all organizations [B2, B6]. For example, some large companies with abundant financial resources prefer hiring experts for specific tasks (e.g., carbon accounting specialists) since having sustainability experts can be beneficial [B2]. The other case is that companies may have to choose this option when employees do not have time to take on additional sustainability-related tasks [B2, B6] or when companies need more skilled human resources [E3].

5 Discussion

This section firstly reviews each RQ's findings from the analysis and discusses them in comparison with the literature. Secondly, the methodological choices and limitations in research design will be discussed in Section 5.2. Finally, Section 5.3 will conclude with significance and implications for academia and practitioners.

5.1 Key Findings, Significance and Relevance

This section summarizes the key findings of three RQs addressed in this thesis, highlighting the similarity and divergence between academic literature and empirical data. The discussion focuses on Korean companies' limitations in SR and lessons learned from best practices to give direction to practitioners in Korea.

[RQ1] Sustainability reporting components in Korea and Scandinavia

After analyzing eight Korean and six Scandinavian sustainability reports, 39 reporting components were identified under nine themes (reporting format, organizational profile, approach to sustainability, sustainable management, sustainability governance, stakeholder, sustainability practices, environmental performance, and social performance). The most significant difference in terms of the regional context – voluntary vs. mandatory reporting – was shown in reference to reporting standards. Korean companies are committed to sustainability initiatives such as SDGs, TCFD, and SASB, whereas Scandinavian firms stressed their compliance with legislation, including NFRD, EU taxonomy, and Norwegian Accounting Act.

Nevertheless, all companies in both regions noted GRI standards as their core reporting principle. This confirms GRI's significant presence as a worldwide SR framework, as outlined in the literature review (Andelin et al., 2013; Barkemeyer et al., 2015; Daub, 2007). Further, most importantly, no geographical difference was found in the report structure in general; despite varying order, reporting components stemming from three series of GRI standards (universal, sector, and topic) were indistinguishable. This validates the flexibility given to companies to adapt GRI guidelines in their business context, as Barkemeyer et al. (2015) mentioned.

The similarity in reporting components implies that GRI guidelines function well in standardizing SR. Especially considering the gap in reporting history between the two regions, Korean companies are on the right track to close the gap by disclosing the analogous information that best practices companies report. This suggests that following GRI standards could be a good place to start for Korean companies preparing for mandatory SR, as advised by several interviewees [B4, B5].

[RQ2] Differences in reporting practices between Korea and Scandinavia

Even though reporting components between the two regions are not significantly different (RQ1), it does not signify that reporting quality is also comparable. Thus, this thesis investigated the coverage level of 29 reporting components – content related to general and topic-specific disclosure – to answer RQ2. The analysis showed that Korean companies have lower coverage levels in most reporting components (24 out of 29) than Scandinavian companies. Taking SR as a communication tool, the result aligns with Hetze and Winistörfer (2016)'s claim that Asian firms generally fall behind EU firms in sustainability communication. Moreover, the findings go along with practitioners' SR assessment results of Korea's lower ratings than the EU and Nordic (EcoVadis, 2022). This verifies the thesis's underlying assumption that Korean companies has limitations in SR.

One might argue that higher Scandinavian companies' coverage levels come as no surprise since the analyzed Scandinavian reports are the best practices. However, looking into the range of

differences in reporting quality (i.e., “how much” are Scandinavian reports better?) between the two regions, it is interesting that Korea’s reporting quality is comparable to Scandinavia’s in five reporting components. Furthermore, one must point out that although Korea’s coverage level is overall lower than in Scandinavia, there were few (6 out of 29) reporting components with significant gaps between the two regions. To rephrase, the difference in reporting quality is subtle in most reporting components (18 out of 29). This indicates that Korean firms may have endeavored to produce good-quality reports in recent times despite short reporting history. Interviewees’ comments on Korean companies, such as “*usually eager to be innovative and move really fast on things rather than waiting for trends*” [B4], “*usually big conglomerates are very progressive when it comes to what they do with sustainability and how they report*” [E1], “*every year, the reporting quality is overall increasing*” [E4], could explain why there was a slight difference in reporting quality between the two regions than anticipated. Given that sample companies in this research included big conglomerates, SR practices in Korea may have notably changed, as interviewees observed.

On a related note, all Korean companies conducted external assurance of the report. While the assurance scope varies among companies, independent auditors confirmed that the report was adequately prepared. Since third-party assurance enhances the credibility and accuracy of the report (Andelin et al., 2013; Bramanti et al., 2021), Korean companies may have secured the reporting quality through external assurance. However, independent auditors’ limited assurance implies fulfilling minimum requirements, not necessarily denoting top-notch SR. Some Korean companies indeed received recommendations for future reports from the auditors. This suggests that Korean companies still have limitations in their reporting practices, and there are opportunities to enhance reporting quality by learning from Scandinavian best practices.

In that regard, coverage level analysis unfolded shortcomings of Korean reports, such as selective disclosure of positive performance, sharp focus on environmental dimension, and lack of measurable targets and goals. These three patterns were identified as major deficiencies in Korean reports as well as substantial differences from Scandinavian reports (RQ2-b). Moreover, in terms of format, Korean reports had a larger volume, relatively late release date, and narrower reporting scope compared to Scandinavia. The disclosure of data collection, analysis process, and methodological limitations also needed to be improved (RQ2-a). The limitations will be further discussed below in connection with RQ3.

Reporting quality and actual sustainability performance

Before moving on to RQ3, another discussion arises from the content analysis: “Does reporting quality represent actual sustainability performance levels?”. Daub (2007) emphasized that the disclosure level of the report does not necessarily show how companies truly perform, introducing Switzerland companies’ cases; many Swiss companies intentionally unrevealed CSR information because they did not desire to convey the impression of being a “too social” company. This narrative, interestingly, was rebutted by interviewees.

According to external experts, many companies are willing to disclose their efforts and positive performance as much as possible. Thus, when the report does not cover certain information, it implies that companies have nothing to share on numerous occasions. For instance, there is a high probability of absence in strategy or goal when the report lacks a sustainability strategy section [E4, E6]. In other words, companies rarely deliberately conceal “positive” performances, which suggests that the coverage level of the report is somewhat associated with actual performance levels these days; the trends Daub (2007) observed in the mid-2000s may have changed over time.

On the other hand, one could argue whether companies deliver “negative” performance as much as possible as they do for “positive” performance. As shown in the coverage level analysis,

Korean companies take a conservative approach in sharing negative aspects of the business or performance. One interviewee mentioned the imposing presence of ESG ratings in Korea behind this phenomenon. Seemingly, nomination in corporate sustainability awards and listing on Dow Jones Sustainability Korea Index (DJSI Korea) are nowadays primary motivations for many Korean companies to produce SR [E4]. This is consistent with the primary driver – legitimacy seeking – of SR in Korea noted by Griffin and Youm (2018). Legitimacy seeking itself is not fallacious; best practice companies, in fact, also mentioned that aiming for higher ESG ratings is one of the missions [B7]. However, as some Korean companies focus too much on scoring a win in ratings, criticism has arisen, such as “*ESG ratings are supposed to be an assessment of sustainable performance, not how the report sounds good*”. Considering this “putting the cart before the horse” situation in Korean companies’ SR, the reporting quality and disclosure levels may have limitations in measuring actual sustainable performance levels.

Furthermore, reporting quality is not necessarily associated with how sustainable the organization’s business model is. For example, one of the Korean sample companies, K3, showed overall high coverage levels, nearly comparable to Scandinavian best practices. However, looking closely into K3’s business, tobacco products (e.g., cigarettes) are the company’s largest revenue stream. Similarly, K4’s main businesses involve nuclear power plants. Interestingly, this aligns with previous studies – firms that face tremendous societal pressure need to earn recognition for legitimacy – (Brammer & Pavelin, 2006; da Silva Monteiro & Aibar-Guzmán, 2010; Radhouane et al., 2020). Companies with socially unethical businesses or environmentally unsustainable put more effort into communicating how their activities are socially acceptable, resulting in good-quality reports. In short, the robustness of (sustainable) business models and SR disclosure levels are different issues to tackle.

RQ 3: Lessons from Scandinavian firms’ approach to sustainability reporting

Interviewing 13 sustainability professionals, including SR specialists responsible for producing reports in Scandinavia/Nordic region and external experts assisting them with various services such as consulting, ESG rating, and GHG accounting, GRI reporting content and quality principles were addressed in response to “What makes a high-quality report?”. Although they did not directly mention “GRI”, three principles (balance, clarity, and reliability) were emphasized as a prerequisite to making good reports. This indicates that following GRI principles is a valid mechanism to improve reporting quality, proved by best practices. Further, three principles mentioned by interviewees overlap with Daub (2007) – materiality, clarity, and balance.

However, definitions of principles appeared to be diverse. For instance, Daub (2007) defined *clarity* as the clearness of disclosed information for the stakeholder’s use. In contrast, interviewees’ interpretations varied from a clear explanation of methodology and target-setting to the evident connection between the business model and sustainability strategy. Likewise, *balance* in GRI principles and Daub (2007) refers to the disclosure of both positive and negative aspects, whereas some interviewees noted the balance in report length and amount of qualitative and quantitative information. This suggests that the terminology proposed by GRI guidelines may be too broad, allowing multiple interpretations.

Revision of reporting quality principles

Even though the coverage level analysis was conducted against reporting quality criteria identified in the literature review (Section 2.1.4 and Appendix C), interviews provided a more explicit definition of each criterion. This implies that the assessment criteria used for the coverage level analysis can be phrased more comprehensively. Therefore, this research attempts to further break down the existing GRI principles for clarification, reflecting the findings from interviews in Section 4.3. Table 14 outlines the revised reporting quality principles in the form

of a checklist to offer practicality for SR specialists. They could use this to check whether their reports fulfill the requirements. It can also be helpful for future researchers who conduct an empirical analysis on SR quality assessment, applying it as an analytical framework.

Table 14. Revised reporting quality principles

Reporting Quality Checklist			GRI principle
<input type="checkbox"/>	Accessibility	Does the report have a straightforward and accessible format? Can readers easily find and access sections where they are interested?	Clarity
<input type="checkbox"/>	Readability	Is the report comprehensible? Can any stakeholder group easily understand the report?	Clarity
<input type="checkbox"/>	Representativeness	Does the report show the impacts from the company's overall business activities? Does disclosed information cover more than 80% of operations?	Accuracy
<input type="checkbox"/>	Relevance to stakeholders	Is the disclosed information relevant to broad stakeholder groups? Does the report provide information in the company's context?	Stakeholder inclusiveness Materiality Accuracy
<input type="checkbox"/>	Appropriate KPIs setting	Are the indicators (KPIs) in the report set in the company or industry context? Are the disclosed KPIs relevant to the company?	Accuracy Significance
<input type="checkbox"/>	Transparency in methodology	Does the report disclose the methodology used for reporting, including the data collection, calculation, and analysis process?	Reliability Credibility
<input type="checkbox"/>	Forward-looking perspective	Does the report disclose company's future plans for sustainable development (e.g., sustainability roadmap or strategy in the short-mid-long term)?	Clarity Sustainability context
<input type="checkbox"/>	Clarity in roadmap and target setting	Does the roadmap contain a well-defined goal and a time-bound measurable target? Is the target achievable based on ongoing activities and action plans?	Clarity
<input type="checkbox"/>		Is the commitment to sustainability initiatives aligned with the overarching goal and targets in the roadmap?	Clarity
<input type="checkbox"/>	Clarity in target achievement	Are the performances of the reporting period presented in comparison with the predetermined reporting year's target? Do KPIs show the progress of the reporting period against mid-long-term goals?	Clarity Significance
<input type="checkbox"/>	Clear connection with business model	Is the sustainability disclosure connected with the company's business model and strategy? Is the connection between the two evident?	Sustainability context
<input type="checkbox"/>	Moderate length	Does the report have a moderate length (i.e., not too long & not too short)? Does the report address material topics with sufficient information while being concise?	Clarity Materiality
<input type="checkbox"/>	Balance between ESG topics	Does the report address all material ESG topics in a balanced manner? For example, does not the report highlight one of the ESG topics?	Completeness
<input type="checkbox"/>	Balance between positive and negative information	Does the report address both the positive and negative impacts of the business? Does the report disclose the company's management approach and action plans to mitigate identified negative impacts or operational risks?	Balance
<input type="checkbox"/>	Balance between quantitative and qualitative information	Does the report utilize both quantitative and qualitative data in a balanced manner? Does the report provide sufficient qualitative information concerning quantitative data (i.e., adequate data interpretation)?	Significance

Source: Own elaboration based on findings from interviews

Reevaluating Korean sample reports in view of the revised quality principles checklist above, none of the Korean companies tick all boxes. Noticeably, three limitations identified through the content analysis in RQ2 – sharp focus on environmental topics, positive performance, and lack of quantitative targets – correspond to checklists’ “Balance between ESG topics”, “Balance between positive and negative information”, and “Clarity in the roadmap and target setting”, respectively. This suggests that Korean companies have three key development areas, confirmed by data triangulation from content analysis and interviews.

Challenges in sustainability reporting

While this research scope does not include challenges arising from the internal SR-producing process, one of the interviewees [E4] offered a glimpse of Korea’s SR trends. Although the shared information is based on the interviewee’s observation as external experts, it provides a deeper understanding of the regional, social context in Korea. Interestingly, challenges in SR by Korean companies were congruent with De Micco et al. (2020).

Firstly, the interviewee mentioned that Korean companies **struggle to disclose unfavorable information** in SR, such as negative impacts from business operations and underperformance. As institutional investors are the most important stakeholder to many Korean companies, their biggest fear is losing investors. Thus, companies tend to highlight their achievement and positive performance in the report. In other words, disclosing negative information has been deemed a huge risk that could cause investment withdrawals with a bad reputation [E4]. This is consistent with the key driver of Korean companies’ reporting – avoid boycotts from investors – noted by Kim et al. (2019). Moreover, it explains one of the limitations found in empirical analysis (i.e., coverage level analysis), the lack of balance between positive and negative disclosure. Further, this is also in line with the literature. SR is supposed to act as an instrument to mitigate information asymmetry among stakeholders, yet it is challenging for many companies (De Micco et al., 2020), which also applies to Korea since they withhold certain facts. This suggests that selective disclosure needs to be overcome to reduce information asymmetry among stakeholders as well as between the company (i.e., SR owner) and stakeholders.

Furthermore, **data management** was brought up as a mountain to climb for Korean companies. The sustainability department faces difficulties in data collection because data is often missing. Inconsistency of the data scope and calculation method are the other data-related issue [E4]. Considering that these challenges stem from the heterogeneous and complex nature of sustainability topics, Korean companies’ struggles are in the same vein as the literature. Data management, particularly ensuring data reliability, was also addressed as one of the great challenges in SR by De Micco et al. (2020).

Other than data management, the interviewee pointed out **human resources capacity** in Korean companies. For example, some companies – even large enterprises – have one employee to handle the whole process of SR. Moreover, only a few companies have sustainability experts with academic backgrounds or hands-on experience; hence it is commonplace to collaborate with consulting firms. However, skeptical views still exist, especially from top management, saying, “*Why do we have to spend money on SR?*” [E4]. This links to the challenges of mindset change De Micco et al. (2020) mentioned.

While sustainability awareness levels have been growing in Korea recently, the significance has yet to be fully embedded. For instance, the interviewee still observes the company’s misunderstanding of sustainability – “*Do we have to give up profit for the environment?*” – or lack of knowledge – “*Is the low-carbon emission good thing for the company?*”. In other words, sustainability or sustainable development has not yet been deeply rooted in the Korean business community, afflicting sustainability departments in producing SR. In particular, the data collection process

requires employee engagement across the company, yet SR personnel often face difficulties getting cooperation from other departments. Enhancing **internal communication and awareness levels** is the other remaining challenge in Korea [E4]. This aligns with the need for long-term endeavors for a mindset shift, which De Micco et al. (2020) emphasized.

While most challenges experienced by Korean companies are consistent with the literature, one challenge posed by De Micco et al. (2020) appears irrelevant to Korea. De Micco et al. (2020) maintained that companies encounter complications when deciding what sustainability topics to include in the report and what stakeholders to view as the target audience due to its heterogeneity. Empirical data, on the contrary, shows that Korean companies not only identify their stakeholders and clearly state to whom they report but also disclose sustainability topics based on the materiality analysis. These may have been past challenges in Korea, but it seems manageable at present.

The shift from voluntary to mandatory reporting

One thing to note here is that the abovementioned Korean companies' challenges and limitations emerged in the context of voluntary reporting. In all likelihood, challenges in SR alter over time, mainly deriving from regulatory landscape changes (Bebbington & Larrinaga, 2014; De Micco et al., 2020).

Mandatory reporting may add further challenges in SR, especially for companies with a long way to go to fulfill the criteria. For example, as regulatory requirements increase, more data has to be collected and processed within the stricter deadline, resulting in a large volume of work for companies (De Micco et al., 2020). Interviewees confirmed this in respect of challenges in preparation for the new regulation, CSRD. Even though best practice companies are in a good place for the CSRD, there is still much work to do, such as securing all data required by CSRD and ensuring data quality [B1, B2, B3, B4, B5, B6, B7]. Further, more transparency under the regulation challenges companies in balancing the report length [B1, B4, B6, B7], which aligns with what De Micco et al. (2020) mentioned about dealing with irreducible qualitative information.

At the same time, certain challenges – low sustainability awareness levels – under voluntary reporting could be resolved by the regulation. As was outlined in the literature, regulation can accelerate SR improvement; the first EU directive NFRD enabled the optimization of the data collection process, resulting in enhanced data quality (De Micco et al., 2020). Interviewees also expressed positive views of CSRD, highlighting expected beneficial effects, such as increased transparency and comparability through standardization and further heightened awareness of sustainability topics [B2, B5, B6, B7]. This suggests that Korean companies could also take advantage of the upcoming SR regulation (Schaltegger et al., 2017). For instance, regulation could drive public mindset changes, as SR will no longer be discretionary activities. Employees will have to perceive SR as a matter of compliance, which may raise awareness of sustainability and SR, leading to more proactive attitudes of employees and smoother communication in the process of SR. Then, as De Micco et al. (2020) noted, the institutionalization of SR in daily tasks and management systems may be achieved.

Further, mandatory SR has another implication in a broader perspective. Despite the widespread usage of GRI guidelines, the need for regional reporting standards was pointed out. Korean companies are often confused as to what extent their business operations should be included in the reporting scope or whether their disclosure is acceptable from greenwashing or false claim perspectives [E4], which is in line with a lack of SR guidance in the Korean context (Kane et al., 2017; Lee & Lee, 2021). The domestic (Korean) SR regulation could solve some current challenges in that regard.

Nevertheless, regulation is not a magic bullet to all SR challenges, nor does it mean that firms should wait until the regulation is ready. Instead, firms must proactively take action to overcome challenges to produce higher quality reports, ultimately to gain competitive advantages from SR. This thesis, therefore, provides recommendations for Korean firms in Section 6.1.

5.2 Methodology Reflections

This section discusses the methodological limitations of the thesis's research design. Firstly, this research adopted qualitative research to explore SR in Korea and Scandinavia. While SR's content analysis utilized a deductively created coding framework, the data analysis essentially involved an inductive process in identifying patterns of each region's SR. As a result, data interpretation took a large part of the analysis. In terms of limitation, it should be acknowledged that the **researcher's bias** could have been pervaded throughout the process. This also applies to interviews and interview data analysis. Even though the questions were framed non-leading way and confirmed by the supervisor prior to interviews, the risk exists that the researcher's personal opinion or bias might have arisen in some additional questions and during dialogue with interviewees. Similarly, the researcher's own worldview may have influenced the data interpretation.

Secondly, this research has limitations in **data validity**. The content analysis was conducted based on 14 sustainability reports in the two regions, which was a realistic sample size in the scope of the master's thesis considering the massive volume of reports analyzed (2,173 pages in total from 14 reports) and time constraints. Nevertheless, analyzing a larger sample would have enhanced data accuracy and validity of the inferences in general (Creswell & Creswell, 2018). For instance, this research's outcome, SR practices and reporting quality in Korea, was deduced from eight Korean samples, which is 20% of the entire population (i.e., 40 large Korean manufacturing firms). Since the risk exists that the selected companies do not represent all large manufacturing companies in Korea, increasing the sample size may have altered the findings.

This is applicable to the number of interviews as well. For example, although interviews with seven SR specialists of the best reporting practices and six external sustainability experts provided precious insights into guidance for high-quality SR, a larger sample would have further amplified the findings. Moreover, given that the target audience of the SR varies from the consumers, suppliers, and employees to the local communities and NGOs, broader scope of interviewees, including different reader groups, could potentially add valuable perspectives to "What defines quality SR?".

Thirdly, **data reliability** needs to be discussed. While this research ensures the triangulation of data sources with sustainability reports and interviews, the triangulation of researchers was not taken into account. Since this thesis is individual work, member checking – monitoring by other researchers and ongoing dialogue concerning the data analysis and interpretation throughout the research (Creswell & Creswell, 2018) – was not feasible. However, the triangulation of researchers could have strengthened the reliability and internal validity of content analysis result to a great extent. In particular, the coverage level analysis is, in a sense, practically indistinguishable from evaluation by ESG/SR rating agencies. According to interviewees from sustainability rating firms, SR assessment involves at least three analysts with different roles and levels (e.g., data analyst, scorer, reviewer) to finalize the evaluation score [E2, E4]. Even though the researcher went through data multiple times to assign a score for coverage level analysis, the reliability of findings would have been more robust if multiple researchers had double-checked the data in the assessment process.

In terms of the interview, this research adopted semi-structured interviews to ensure reliability, and the same information sheet was provided to participants prior to interviews. However,

several limitations remain. For example, though the list of questions was prepared, additional unlisted questions were asked for some interviewees to gain deeper insights into specific topics. Inversely, some questions were left out on certain occasions, mainly due to various interview times. The fully structured interview might have reduced the disparity in interview questions, resulting in higher reliability. Moreover, the information from interviewees could have been influenced by the participant's willingness to share or permissibility of information by an internal policy of their organizations. This implies that although all interviewees had extensive work experiences in the field with the capacity to provide invaluable practitioners' perspectives on the research topic and anonymity was proffered, participants might have felt restricted in the interviews. Further, as all interviews were online, thus the non-verbal clues or nuances may not have been fully captured compared to face-to-face interviews. Another barrier to online interviews was technical difficulties, such as unstable internet connections.

Fourthly, the research findings are short of **generalizability** due to this study's country-specific nature. By comparing Scandinavian reports, content analysis was performed to understand current Korean companies' reporting practices better. Although lessons from Scandinavian companies and some advice may be useful to any organization regardless of region, industry, and company size since SR has become a universal topic, limitations are inherent because the results substantively intend to offer recommendations to Korean firms. Thus, the organization's context should be taken into consideration when implementing these research findings in practice.

Lastly, it is important to note the limitation of **transferability**. While content analysis identified Korean companies' limitations in SR quality to some extent, those limitations are bounded to the outcome (i.e., reported content). In other words, this thesis did not investigate challenges in the reporting process or what caused the identified limitations. This could have been explored through interviews with Korean companies, yet it was beyond the scope of this research. Luckily, one of the external expert interviewees had vast experience with Korean companies; the interview provided a glimpse of Korea's current SR trends and struggles in Korean companies. However, it should be noted that the provided information is second-hand data (i.e., interviewee's observation) from one interview. Thus, root-cause analysis of the current Korean SR limitation may be needed to raise the transferability of lessons from Scandinavia.

5.3 Implications for Academia and Practitioners

By synthesizing empirical data from content analysis and interviews, this research has provided guidance on how firms can assess the quality of SR (Table 14) and how they can enhance SR (Section 4.3.2). This chapter discusses this study's implications for academia and practitioners.

Academia – This research extensively reviewed the concepts related to SR and relevant existing literature from various angles, including the definition of SR, SR key elements, reporting quality principles, SR in the manufacturing industry, challenges in SR, and previous research on Korean and Scandinavian SR. In addition to the comprehensive literature review, empirical analysis with the latest sustainability reports and practitioner interviews brought new insights into the recent transition in SR from voluntary to mandatory context, in addition to current SR trends (e.g., reporting components, features of disclosure per each component) in the two regions. The findings of this study also confirmed the gap in SR quality between Korea and Scandinavia.

Above all, this research contributes to academia by proposing the reporting quality assessment criteria. As mentioned in Section 2.1.4, the reporting quality assessment has been argued due to a lack of a uniform assessment framework; thus, most studies have used GRI reporting quality principles as an analytical framework. However, this research further developed the reporting quality principles by incorporating lessons from the best practices companies, primarily

reflecting practitioner perspectives on what attributes should be included to define a high-quality report. As a result, the proposed reporting quality assessment criteria in Table 14 are more detailed and straightforward than the ones in previous literature, which can be helpful for future researchers to analyze reporting quality. Furthermore, this research also offers an alternative, unconventional approach in terms of methodology. For instance, a revised four-level index in Table 6 enables the quantification of reporting quality. In addition, the difference value analysis method developed in Table 7 would facilitate researchers to systematically perform comparative analysis.

Practitioners – From a practical point of view, this research presents recommendations on how to enhance reporting quality. Even though many Korean companies already engage in voluntary SR, the analysis result showed that reporting quality – in terms of providing useful information to readers (Daub, 2007; Wolniak & Hąbek, 2016) – has room for improvement to achieve comparable quality levels as Scandinavian best practices.

Specifically, research findings have managerial implications for Korean firms' sustainability departments and personnel. For instance, Korean companies could compare their reports with best practice companies' examples in Section 4.2 and Appendix I for each reporting component and benchmark them to develop reporting quality.

Considering that multiple interviewees mentioned the growing importance of ESG rating and its influence on a company's reputation, it is essential to produce quality SR. The reporting quality principles revised in the thesis (Table 14) can serve as a practical instrument for Korean companies to scrutinize whether their reports meet the quality criteria. Self-evaluation would allow them to identify their shortcomings in reporting and reflect on what lessons from Scandinavia could apply to their organization. This also can be utilized by sustainability consultants who offer advice related to SR in diagnosing clients' SR quality. Additionally, the revised reporting quality principles may assist GRI or other SR frameworks/standards bodies to update their guidance for more users to produce first-class reports.

Furthermore, this research can benefit Korean companies planning SR upon regulatory changes. They can learn possible challenges in SR and limitations of peer companies' reporting, to say nothing of Scandinavian best practices. Recognizing that, they can prepare mandatory SR by establishing a rigorous reporting strategy and implementing measures that lower barriers to producing high-quality reports. For example, reporting quality assessment criteria could be incorporated into the reporting principle; thoroughly addressing reporting components where peer companies showed negligence could help build competency.

Finally, the findings may be of interest to policymakers in Korea. Looking closely current progress of new regulations, while the Korean government released ESG guidelines in late 2021, there is no apparent connection between guidelines and requirements of mandatory SR (Kwack, 2023). Policymakers are still discussing the details of SR regulation, such as which standards to benchmark and what to include in requirements. Since the regulation targets large firms, the sample companies' reporting practices provide snapshots of Korean companies' contemporary SR in the voluntary context. This enables policymakers to set pragmatic expectations and minimum requirements of the regulation. Simultaneously, Scandinavian best practices can envisage where Korean companies should move forward through statutory regulation, which plays a significant role as a social support system (Kolk, 2003).

6 Conclusion

Acknowledging the ongoing discussion of SR regulations in Korea and increasing stakeholder demand for high-quality SR, this research investigated large Korean manufacturing firms' current SR practices in comparison with Scandinavian firms, known as best practices. Specifically, this thesis explored SR components and the coverage level of each component to measure reporting quality of Korean and Scandinavian firms. From content analysis, no significant difference was found in report structure and components between the two regions. Given that all companies referenced GRI as reporting principles, it can be deduced that GRI guidelines play a pivotal role in standardizing SR across the globe, including in the voluntary reporting context (RQ1).

However, despite similar reporting structures and components, the reporting quality of Korea was different from Scandinavia. Surprisingly, coverage level analysis results indicate that Korean companies have good report quality in some reporting components as best practice companies. Furthermore, the gap in coverage levels between the two regions was not enormous, as the author assumed, because there were only a few reporting components where Korean companies have considerably lower disclosure levels than Scandinavia. Nevertheless, despite the extensive information provided in the reports, Korean companies still need to meet the assessment criteria in all respects. For instance, several patterns were uncovered in Korean reports, such as a tendency to focus on environmental issues among ESG topics (Completeness), highlighting positive performance while omitting negative impacts (Balance), and lack of quantitative targets or sufficient qualitative information for numerical data (Clarity, Significance). These limitations culminated in assigning lower scores to Korean reports, resulting in overall lower reporting quality than Scandinavia (RQ2).

Interestingly, according to SR experts in Scandinavia, Korean companies' development areas identified in the content analysis fall in with what they should refrain from to produce a high-quality report. Best practice companies, sustainability consultants, and ESG rating analysts broached GRI report quality principles by implication in the interviews, particularly emphasizing the significance of measurable targets, transparency in negative performance, and balance between ESG topics. This suggests that the practitioner interviews reaffirmed the need for SR improvement in Korea (RQ3).

By addressing three research questions, the thesis achieved its aims in 1) content mapping of SR components, 2) comparison of reporting practices between the two regions, and 3) investigation of Scandinavian best practice companies' approach to SR. In addition, this study revised reporting quality principles by breaking down current GRI principles for clarification of terminology and to avoid multiple interpretations. Not only can this serve as an analytical framework in SR quality evaluation for future research, but it can also be beneficial for practitioners to self-assess their reports. Moreover, this research offers recommendations for Korean companies on benchmarking best practice companies. The following Section 6.1 brings together Korean companies' shortcomings pinpointed in the analysis, with the key findings from interviews.

6.1 Recommendations for Korean firms

The end of Section 5.1 discussed that upcoming regulations might ameliorate current SR challenges in Korea. On the one hand, it also highlighted the significance of proactive actions for SR enhancement. The proactive actions will be explicated in this section, addressing "How can Korean companies be prudent?" and "What lessons from Scandinavia are conducive for Korean companies?".

Table 15 collates the main findings of this research, including Korea's SR challenges, limitations, and lessons from the Scandinavian best practice companies and SR experts. Simply put, these are suggestions for Korean companies, aiming to explicitly show what measures/lessons are applicable to each type of Korean company's development areas.

Table 15. Korean firms' limitation, challenges and recommendations

Limitations		Recommendations
Format	Lengthy report	<ul style="list-style-type: none"> ○ Focus on material topic and avoid discussing every ESG topic that may be irrelevant to the company or target audience. ○ Utilize other communication channels for unsubstantial information that is just nice to have.
	Biennial reporting	<ul style="list-style-type: none"> ○ Biennial reporting may not be considered timely for stakeholders' use. Some Scandinavian companies even move towards quarterly reporting from annual reporting.
	Belated SR release date	<ul style="list-style-type: none"> ○ Consider publishing the report earlier than July-August. Best practice companies release SR between February and March. Timely reporting can be a competitive advantage.
	Limited reporting scope and boundary	<ul style="list-style-type: none"> ○ Set a scope as company-wide information. ○ Cover impacts of more than 80% of the company's overall business activities.
	Limited disclosure of methodology	<ul style="list-style-type: none"> ○ Disclose overarching data collection, calculation, and analysis process. ○ Make methodological limitations explicit.
	Inconsistency of data scope and calculation method	<ul style="list-style-type: none"> ○ Develop internal reporting guidelines and communicate them with other departments involved in the reporting process. ○ Invest in a unified central data management system to optimize the data collection process and raise data reliability.
Content	Approach to sustainability	
	Lack of Strategy disclosure	<ul style="list-style-type: none"> ○ Show a clear connection between the company's business model and sustainability strategy. ○ Disclose mid-long-term sustainability strategy (forward-looking perspective) with achievable targets and detailed action plans. ○ Conduct performance reviews regularly. If the sustainability strategies do not cut the mustard in performance, reconsider the credibility of strategic statements and targets while learning from failure.
	Unclear target setting and KPIs selection	<ul style="list-style-type: none"> ○ Set a time-bound measurable target with indicators (KPIs) relevant to the company's context. ○ Avoid using fluffy words to set goals and targets. ○ Disclose reporting year's ongoing activities and the progress of target achievement toward mid-long-term goals.
	Sustainable management	
	Lack of targets setting in supply chain management	<ul style="list-style-type: none"> ○ Set measurable targets (KPIs) for supply chain management to establish a more concrete action plan.
	Absence of value chain analysis	<ul style="list-style-type: none"> ○ Conduct value chain analysis. ○ Avoid using "value chain" and "supply chain" interchangeably.
Limited disclosure of sustainability risks	<ul style="list-style-type: none"> ○ Identify ESG risks in the company's context rather than mentioning general risks applicable to all businesses. 	

Sustainability governance	
Lack of explanation on non-compliance incidents	<ul style="list-style-type: none"> ○ Disclose non-compliance/unethical incidents in the reporting year and address how the company copes with the incidents rather than not mentioning them.
Limited information on reporting process	<ul style="list-style-type: none"> ○ Disclose the internal reporting process and the presence of an internal approval system.
Stakeholder	
Lack of disclosure on stakeholders' interest	<ul style="list-style-type: none"> ○ Elaborate on stakeholder concerns and reflect them in materiality analysis.
Limited disclosure on stakeholder engagement activities	<ul style="list-style-type: none"> ○ Report on stakeholder engagement activities during the reporting period.
Sustainability practices	
Lack of highlights on reporting year's performance	<ul style="list-style-type: none"> ○ Summarize the reporting year's performance outcome in a separate section for readers' accessibility and readability.
Lack of quantitative data	<ul style="list-style-type: none"> ○ Provide quantitative data in describing achievement and progress to raise credibility.
Strong focus on environmental topics	<ul style="list-style-type: none"> ○ Balance all ESG topics rather than focusing on environmental achievement.
Environmental and social performance	
Limited disclosure on negative performance	<ul style="list-style-type: none"> ○ Avoid selective reporting and transparently disclose negative performance as well as positive impacts. ○ Disclose contingency measures of how the company plans to handle the compliance violation.
Challenges	Recommendations
Lacking human resource capacity	<ul style="list-style-type: none"> ○ Provide training for employees who are interested in learning to leverage internal human resource. ○ Utilize external assurance processes and actively adopt recommendations by independent auditors. ○ Hiring external experts is the other way.
Low sustainability awareness levels	<ul style="list-style-type: none"> ○ Communicate effectively with other departments and support them to have more sustainability awareness. ○ Help employees to understand how their work contributes to the company's sustainable practices.
Preparation for regulation	<ul style="list-style-type: none"> ○ Be open-minded and keep studying to adapt to regulatory/market changes. ○ Check significant trends from local, national, regional, and international levels. ○ If the company has not engaged in SR, follow GRI guidelines or start with regulatory requirements. Afterward, consider expanding the scope of the disclosure.

Source: Own elaboration based on findings from content analysis and interviews

The recommendations target Korean companies' sustainability departments and SR personnel, given their significant role in fostering SR practices. As emphasized in the literature, "communication, collaboration, and the daily adoption of SR practices" (De Micco et al., 2020, p.441) promote internal learning, leading to employee competency development in SR.

6.2 Recommendations for Future Research

The academic contribution of this study is two-fold. Firstly, the thesis revamped reporting quality principles reflecting up-to-date practitioners' perspectives, which serves as an analytical framework for assessing the disclosure level of the report. Secondly, a methodology to compare reporting quality was developed. Two indexes used in the thesis – disclosure level score in Table 6 and difference value in Table 7 – enables quantifying reporting quality and facilitate comparative analysis in SR assessment. In essence, this research has major implications for the methodology of SR quality assessment.

Nevertheless, the limitations of this study outlined in the earlier section offer a future research opportunity. For instance, future research could extend the scope of this thesis by examining multiple years of SR to trace how reporting quality has evolved in Korea and Scandinavia. A longitudinal approach is fundamental in the field of sustainability study, considering that integration into organizational practices and culture usually takes time (Caputo et al., 2017; De Micco et al., 2020). Especially since ESG and SR boom began in the late 2010s in Korea, exploring the learning curve in SR could give insights into Korean companies' organizational capability to change. Further, analyzing Scandinavian SR in the past 3-5 years would shed light on how best practice companies have evolved their reporting year by year. As Scandinavian companies have actively adapted SR for changing trends, including regulations (i.e., NFRD) and stakeholders' interests, their reporting history and transitions would be valuable lessons for Korean firms to prepare for policy change.

Moreover, Korea's SR practices can be explored to a greater extent by interviewing SR specialists in Korean companies. Identifying internal challenges would deepen understanding of limitations in Korean SR and the status quo in general, potentially producing more transferable and suitable solutions in the Korean context.

The other recommendation is replication in other contexts to investigate reporting practices besides Korea and Scandinavia. Other essential criteria may be uncovered by testing reporting quality principles in other countries or industries, leading to the continuous development of the SR quality analytical framework.

Lastly, while this thesis focused on the business perspective of how firms can improve reporting quality, future research could explore SR from different actors' angles, such as industry associations (“What should be included in certain industry's SR?”, “What are the status quo of current SR rates in a certain industry in Korea?”, “What are the roles of industry associations in SR enhancement?”) and policymaker (“What should SR regulation aim for?”, “How can Korean government implement SR regulation successfully?”).

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Appendix A – Initial Coding Framework

Prior to content analysis, an initial coding framework was created based on the literature review.

Cluster	Sub-code 1	Sub-code 2
Format	Reporting strategy	Reporting framework Reporting principles External assurance
Content	Sustainability strategy & Profile	Business model Sustainability strategy and policies
	Management approach	KPIs and targets Sustainability governance Materiality assessment Due diligence Risk and opportunity management
	Performance indicator	Environmental protection <ul style="list-style-type: none"> - Material - Energy - Water - Emission - Waste Social responsibility <ul style="list-style-type: none"> - Health and safety - Diversity - Employee well-being - Stakeholder development and engagement

Appendix B – Revised Coding Framework

The initial coding framework (Appendix A) was updated in the process of coding analysis. The revised codes are highlighted in green.

Cluster	Sub-code 1 (Parent code)	Sub-code 2 (Child code)
Format	Reporting Format	Report Title Report Type Volume Reporting History Reporting Period & Frequency Issue Date Scope & Boundary Methodology Reporting Standard/Framework External Assurance
Content: General Disclosure	Organizational Profile	Company Profile Sustainability/ESG recognition Initiative & Commitment
	Approach to Sustainability	Vision & Strategy Targets & KPIs Materiality Assessment Risk and Opportunity Analysis
	Sustainable Management	Value Chain Analysis Supply Chain Management
	Sustainability Governance	Governance Body & Procedure Codes & Policy Compliance & Ethics Reporting Process
	Stakeholder	Stakeholder Analysis Stakeholder Engagement
	Sustainability practices	Sustainable Products & Services Sustainable Operation Progress & Achievement
Content: Topic-specific Disclosure	Environmental Performance	Green Procurement Emissions Energy Water Waste Biodiversity
	Social Performance	Human Rights Health & Safety Diversity & Inclusion Product Responsibility Corporate Philanthropy

Appendix C – Coverage Level Assessment Criteria

Coverage level assessment criteria outlined in Section 2.1.4 were rephrased for content analysis in the thesis context.

Coverage Level Analysis - Assessment Criteria	
Balance	Does the report contain both positive and negative aspects of sustainability performance?
Clarity	Is sufficient information disclosed, such as overarching approach to the topic, target, action plan, and performance of the reporting year? Is the disclosed information understandable to readers?
Comparability	Are performance indicators consistently measured over time? Is the disclosed information comparable to the report of the previous year?
Credibility	Does the disclosed information show the implication of top management's commitment?
Materiality	Is the topic a material issue for the company?
Reliability	Does the report contain information of reporting process (i.e., internal workflow)?
Timeliness	Is the report published in a timely manner? Is the disclosed information updated timely for stakeholders' decision-making?
Significance	Does the report utilize both quantitative and qualitative indicators?
Sustainability Context	Does the disclosed information reflect the environmental and social aspects of the company's activities? Does the reported content is integrated into the company's sustainability strategy/action plans?

Source: Author's description, adapted from Moravikova et al., 2015; Permatasari et al., 2020, p. 250-251

Appendix D – List of Sample Companies Selected for Content Analysis

The 14 (eight Korean and six Scandinavian companies) sample companies are anonymized in this thesis to prevent any potential harm the analysis result can cause. Instead, the company code was assigned to samples for in-text reference. “K” refers to “Korean companies”, and “S” refers to “Scandinavian companies”.

Company Code for In-text Reference	Industry	Headquarters Country	Company Size ¹³	Data Access Date ¹⁴
			Number of Employees (Range ¹⁵)	
K1	Electronics & Semiconductor Manufacturing	South Korea	10,000+	February 22, 2023
K2	Steel Production & Manufacturing	South Korea	10,000+	February 23, 2023
K3	Consumer Goods Manufacturing	South Korea	5001-10,000	February 23, 2023
K4	Power Plant Equipment Manufacturing	South Korea	5001-10,000	February 24, 2023
K5	Electronic Components Manufacturing	South Korea	10,000+	February 22, 2023
K6	Steel Production & Manufacturing	South Korea	10,000+	February 22, 2023
K7	Automotive Parts Manufacturing	South Korea	1001-5000	February 24, 2023
K8	Industrial Equipment Manufacturing	South Korea	5001-10,000	February 24, 2023
S1	Oil and Gas Production	Norway	1001-5000	February 15, 2023
S2	ICT & Semiconductor	Norway	1001-5000	February 15, 2023
S3	Aluminum Production & Manufacturing	Norway	10,000+	February 15, 2023
S4	Consumer Goods Manufacturing	Norway	10,000+	February 15, 2023
S5	Electrical Equipment Manufacturing	Switzerland ¹⁶	10,000+	February 15, 2023
S6	Industry Machinery Manufacturing	Sweden	10,000+	February 15, 2023

¹³ Company size data (the number of employees) is based on the reports used for analysis. Most companies’ reporting period is 2021 January to December, except K8 2020 January to 2021 December.

¹⁴ The date of downloading sustainability report.

¹⁵ Since the specific number of employees is critical information to identify a company, the range was employee numbers selected to maintain anonymity.

¹⁶ While the headquarter of S5 is in Switzerlandis, S5 is Swedish-swiss multinational corporation.

Appendix E – List of Interviewees

The list is ordered by the date of interviews (i.e., No.1 is the earliest interview). All interviews were conducted online via Microsoft Team/Zoom. Participant code by organization type in the thesis context was given to each interviewee for in-text reference. “B” refers to “Best practice companies” and “E” refers to “External expertise”.

No.	Participant Code for In-text Reference	Position of Interviewee	Industry of the Organization (HQ Country)	Organization Type (In thesis context)	Date of Interview (Duration)
1	B1	Sustainability Specialist	Manufacturing (Sweden)	Type 1) Best practice	March 10, 2023 (58 mins)
2	E1	Engagement Services Manager	Financial Services, incl. ESG Rating (Netherlands)	Type 2) External expertise	March 16, 2023 (31 mins)
3	E2	Former CSR Analyst	Sustainability Rating (France)	Type 2) External expertise	March 16, 2023 (33 mins)
4	B2	Sustainability Communications Senior Manager	Manufacturing (Finland)	Type 1) Best practice	March 22, 2023 (29 mins)
5	B3	ESG Manager	Transportation & Logistics (Denmark)	Type 1) Best practice	March 23, 2023 (34 mins)
6	B4	ESG Reporting Specialist	Technology (Norway)	Type 1) Best practice	March 23, 2023 (35 mins)
7	E3	Sustainability Data Analyst	Environmental Services (Sweden)	Type 2) External expertise	March 25, 2023 (35 mins)
8	E4	ESG Client Engagement Senior Specialist	Financial Services, incl. ESG Rating (United States)	Type 2) External expertise	March 31, 2023 (55 mins)
9	B5	Sustainability Manager	Manufacturing (Finland)	Type 1) Best practice	March 31, 2023 (30 mins)
10	B6	ESG Reporting Director	ICT (Sweden)	Type 1) Best practice	April 5, 2023 (30 mins)
11	E5	Former Sustainability Manager	Food & Beverage (United States)	Type 2) External expertise	April 5, 2023 (35 mins)
12	B7	Sustainability Analyst	Food Production (Scandinavia ¹⁷)	Type 1) Best practice	April 12, 2023 (31 mins)
13	E6	Sustainability Consultant	Consulting Services (Sweden)	Type 2) External expertise	April 17, 2023 (33 mins)

¹⁷ Instead of the country, the region of the HQ was written upon the interviewee’s request.

Appendix F – Information Sheet and Consent Form

The following information sheet and consent form was shared with interviewees to provide a better context of the thesis topic and aim of the interview. Participants were asked to confirm the documents and sign the consent form before the interview sessions. The mutually signed consent forms were stored securely in the author's USB flash drive with a password lock.

INFORMATION SHEET

1. Description of the Master thesis project

1.1 Topic and Thesis Title

Corporate Sustainability Reporting: A comparative study of Scandinavia and South Korea
What are the lessons from the best reporting practices in Scandinavia?

1.2 Background

Sustainability Reporting (SR) has hitherto been considered discretionary and voluntary in most Asian countries; however, a new paradigm is emerging in South Korea, mandatory corporate SR by policymakers. In particular, EU's two directives have accelerated the discussion concerning mandatory SR in Korea: The Corporate Sustainability Reporting Directive (CSRD) and the Non-Financial Reporting Directive (NFRD), as large EU firms have been reporting how they manage social and environmental challenges in annual reports since 2017 under the NFRD.

Although Korean firms nowadays voluntarily issue sustainability reports, practitioners and academia have been pointing out that their sustainability performance, management, and reporting practices are still lagging behind Western (European and US) firms. Korean firms must brace for upcoming mandatory SR regulation requirements; especially Korean firms with global operation (i.e., multinational companies) must step up their reporting practices to the next level to provide quality sustainability information for international stakeholders whose standards are set high as the best practices.

1.3 Research Aim

The research aims to investigate the best practices in SR (i.e., Scandinavian firms' reporting) to learn lessons by 1) comparing the latest sustainability report between Korea and Scandinavian firms through content analysis and 2) identifying success factors and lessons from Scandinavian firms' reporting practices with interviews.

2. Usage of Interview Data

The data collected from interview will be used for MSc Student Thesis. The thesis will result in an academic publication accessible online (Lund University Student Papers). The interview data will be utilized to find patterns among multiple interviewees, rather than directly quoting one interviewee's response in-depth. However, if the direct quotation is needed, the name of the interview participants and their companies will be anonymous for the quotation.

3. Data Management

All the data for this thesis project is collected and stored in accordance with the General Data Protection Regulation (GDPR) 2016/679 of the European Union. More information about GDPR implementation at Lund University can be found at lunduniversity.lu.se/gdpr. All the research materials, including the participants' data will be securely stored during the thesis

project (from interview date to 30/06/2023) in a researcher's USB flash drive, which is protected with password lock. At any stage of the research project, the participants in interview have a right to gain access to their own personal data, and request its correction, deletion or limitation to processing of data as well as they can file a complaint about how their personal data is used.

CONSENT FORM

This consent form is to ensure that participants in interviews are given information about the research project and to confirm that participants are voluntarily willing to take part in the research. Please kindly provide your consent to activities below:

- I have read the information sheet above.
- I have been given adequate time to consider my decision and I am voluntarily taking part in the interview.
- I am aware of my right to withdraw participation at any time.
- I understand that the interview can be audio-recorded for the purpose of data analysis.
- I understand that my words may be transcribed and quoted in academic paper for the thesis project.
- I understand that my name and company will be presented anonymously in the research result so that no information can be traced to me personally.
- I give my consent that a record of my interview can be safely stored for data analysis until 30/06/2023.

Note: Your participation is **voluntary**. As an interviewee, you can choose what to answer and you do not have to answer all the questions that are asked; you reserve the right to refuse or cease participation in the interview process without stating your reason and may request to keep certain materials confidential.

Please, sign below to confirm your consent:

Participant Name

Silvia Kim
Researcher Name

Participant Signature

Silvia Kim

Date: XX / XX / 2023

Date: XX / XX / 2023

Contact Information

For any questions regarding this research, please contact: *Silvia Kim* (so3677ki-s@student.lu.se)

Appendix G – List of Interview Questions

The following interview questions were prepared to ensure a smooth process. The list of questions was formulated in three versions by interviewee type and time duration: 1) best reporting practices companies (60 minutes), 2) best reporting practices companies (30 minutes), and 3) external expertise in sustainability reporting (30 minutes). As this research adopts semi-structured interviews for flexibility, the order of questions was adjusted in consideration of conversation flow, and certain questions were adapted to interviewees' backgrounds, positions, and experiences. Additional questions from previous interviews were added to the list for subsequent interviews.

Version 1) Questions for Best Practices Companies (60 mins)

Part 1) Organization and participant

- Could you briefly describe your role and sustainability department/team in the company?
 - How many people are working on the sustainability team?
 - How many people are engaged in sustainability reporting?
 - What is the main task, and how are the roles delegated in the team?
 - How has the sustainability team evolved over time?

Part 2) Reporting process (from strategy building to publication of the report)

- Routine for annual reporting
 - For example, can you share the schedule of one year for the reporting (from strategy building to report publication)?
- Strategy building and decision making
 - How is the strategy established, and who is the decision maker?
 - Is the decision-making process top-down or bottom-up?
 - How is the sustainability team engaging top management and other departments?
- Reporting strategy
 - Do you have any goals or policies for reporting? What is the biggest driving force for reporting? (e.g., what information to highlight or take considerations of specific stakeholder group)
 - Who are the main target readers of the sustainability report? (i.e., who do you think is the most significant stakeholder in terms of sustainability disclosure?)
- Publication and external stakeholder
 - What opinions/feedback do you receive from stakeholders upon sustainability report publication?
 - How do you reflect/respond to stakeholders' demands and feedback on sustainability issues in the report? (e.g., put it in the agenda and discuss it in the internal meeting?)

Part 3) Challenges

- Mandatory reporting
 - How did NFRD (the first mandatory reporting directive) affect firms or reporting?
 - How will regulatory changes (i.e., new directive -CSRD) affect reporting strategy or process?
- Challenges

- What challenges/barriers have you experienced in the past in terms of internal stakeholder engagement, and how did you overcome them?
- How are employees' (or suppliers') awareness levels on sustainability issues and reporting?
- What activities are you working on for employees' engagement in sustainability?
- What were the effective measures from the past activities/experience?
- What are the challenges that the company is facing now?

Part 4) Lessons for companies that are still developing sustainability performance/reporting practices

- What are needed to produce a good quality sustainability report?
In terms of capacity building,
 1. Financial capital: What investments are needed for reporting (e.g., for the tool)?
 2. Human capital: What quality is needed for the sustainability team or the person who engages in reporting?
 3. Social and relationship capital: How to engage internal/external stakeholders?
- Some companies (e.g., Korean firms) just started taking SR seriously, and they just established policy and governance committees and implemented measures (or still implementing action plans). In this phase, what is the essential thing to keep in mind to successfully execute those action plans? Could you provide pieces of advice?

Version 2) Questions for Best Practices Companies (30 mins)

Part 1) Organization and participant

- Could you briefly describe your role and ESG/sustainability department in the company?
 - How many people are working on the ESG/sustainability team?
 - How many people are engaged in ESG/sustainability reporting?

Part 2) Reporting process (from strategy building to publication of the report)

- Strategy building and decision making
 - How is the strategy established, and who is the decision maker?
 - Is the decision-making process top-down or bottom-up?
- Reporting strategy
 - Do you have any goals or policies for reporting? What is the biggest driving force for reporting? (e.g., what information to highlight or take considerations of specific stakeholder group)
 - Who are the main target readers of the sustainability report? (i.e., who do you think is the most significant stakeholder in terms of sustainability disclosure?)

Part 3) Challenges

- Mandatory reporting
 - How did NFRD (the first mandatory reporting directive) affect firms or reporting?
 - How will regulatory changes (i.e., new directive -CSRD) affect reporting strategy or process?
- Challenges in general

- What challenges/barriers have you experienced in the past while working in sustainability team? How did you overcome them?

Part 4) Lessons for companies that are still developing sustainability performance/reporting practices

- What are needed to produce a good quality sustainability report?
In terms of capacity building,
 - Financial capital: What investments are needed for reporting (e.g., for the tool)?
 - Human capital: What quality is needed for the sustainability team or the person who engages in reporting?
 - Social and relationship capital: How to engage internal/external stakeholders?
- Some companies (e.g., Korean firms) just started taking sustainability reporting seriously, and they just established policy and governance committees and implemented measures (or still implementing action plans). In this phase, what is the essential thing to keep in mind to successfully execute those action plans? Could you provide pieces of advice?

Version 3) Questions for Consulting/ ESG Rating Firms (30 mins)

Part 1) Organization and participant

- Could you briefly describe your role in the organization and how your work is related to corporate sustainability (reporting)?
- What projects/tasks have you worked on, and how do you coordinate and work together with your clients?

Part 2) Challenges

- From your observation and experience with clients, what are the common sustainability-related challenges/obstacles that companies face?
 - In what phase (e.g., strategy building, implementation of the action plan, monitoring, and reporting) are those challenges prevalent?
 - Why? What causes the challenges?
 - How do you help your clients to overcome those challenges?

Part 3) Lessons for companies that are still developing sustainability performance/reporting practices from an external perspective

- What are the common characteristics among companies with high sustainability performance (so-called best practices)?
- What are required for companies to achieve best practices in sustainability performance and reporting?

Appendix H – Coverage Level Analysis Result Overview

The following table shows the result of the coverage level analysis. Sample companies' each reporting component under the cluster "Content" was analyzed with assessment criteria, anchoring from GRI reporting content and quality principles. The disclosure level is presented with a score of 0 (low) to 3 (high). Each reporting component's average score in the two regions was calculated for comparison. The difference in average scores between Korea and Scandinavia was used as an indicator to determine regional reporting quality gap.

Reporting components				Korea								Scandinavia						Average Coverage Level		
Cluster	Prent codes	No.	Child codes	K1	K2	K3	K4	K5	K6	K7	K8	S1	S2	S3	S4	S5	S6	Korea	Scandi- navia	Difference (Korea- Scandinavia)
Content: General Disclosure	Organizational Profile	11	Company Profile	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3.0	0.0
		12	Sustainability/ESG Recognition	2	2	3	1	3	2	2	2	3	3	3	3	3	3	2.1	3.0	-0.9
	Approach to Sustainability	13	Initiative & Commitment	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3.0	0.0
		14	Vision & Strategy	0	3	3	3	3	3	3	3	3	3	3	3	3	3	2.6	3.0	-0.4
		15	Target & KPIs	1	3	3	2	1	3	1	1	3	3	3	3	3	3	1.9	3.0	-1.1
	Sustainable Management	16	Materiality Assessment	3	3	3	3	3	3	3	2	3	3	3	3	2	3	2.9	2.8	0.1
		17	Risk & Opportunity Analysis	2	2	3	3	3	2	2	3	3	3	3	3	2	3	2.5	2.8	-0.3
		18	Value Chain Analysis	2	0	3	0	0	1	0	0	3	3	3	3	3	2	0.8	2.8	-2.0
	Sustainability Governance	19	Supply Chain Management	2	3	3	2	2	3	2	1	3	3	3	3	3	3	2.3	3.0	-0.7
		20	Governance Body & Procedure	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3.0	0.0
		21	Codes & Policy	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3.0	0.0
		22	Compliance & Ethics	1	2	2	1	1	1	2	3	3	3	3	3	3	3	1.6	3.0	-1.4
	Stakeholder	23	Reporting Process	3	1	1	0	0	1	1	0	3	0	3	3	3	3	0.9	2.5	-1.6
24		Stakeholder Analysis	3	3	3	1	3	3	3	3	3	3	3	3	3	3	2.8	3.0	-0.2	
25		Stakeholder Engagement	2	2	2	3	2	3	2	2	3	3	3	3	3	3	2.3	3.0	-0.7	
Sustainability Practices	26	Sustainable Products & Services	3	3	2	3	3	3	3	3	3	3	3	3	3	3	2.9	3.0	-0.1	
	27	Sustainable Operation	3	3	3	2	2	2	3	2	3	3	3	3	2	3	2.5	2.8	-0.3	
	28	Progress & Achievement	2	3	3	2	3	3	1	3	3	3	3	3	3	3	2.5	3.0	-0.5	

Reporting components				Korea								Scandinavia						Average coverage level		
Cluster	Prent codes	No.	Child codes	K1	K2	K3	K4	K5	K6	K7	K8	S1	S2	S3	S4	S5	S6	Korea	Scandi- navia	Difference (Korea- Scandinavia)
Content: Topic- specific Disclosure	Environmental Performance	29	Green Procurement	2	3	3	2	3	3	2	1	N/A	3	2	3	3	3	2.4	2.8	-0.4
		30	Emissions	1	3	3	2	3	2	2	1	3	3	3	3	3	3	2.1	3.0	-0.9
		31	Energy	3	3	3	3	3	N/A	2	2	3	3	3	3	3	3	2.7	3.0	-0.3
		32	Water	3	3	2	N/A	1	3	N/A	1	3	2	3	3	N/A	3	2.2	2.8	-0.6
		33	Waste	2	N/A	2	2	2	N/A	N/A	2	2	2	N/A	3	3	3	2.0	2.6	-0.6
		34	Biodiversity	2	1	2	1	N/A	1	N/A	N/A	2	N/A	3	3	N/A	N/A	1.4	2.7	-1.3
	Social Performance	35	Human rights	2	2	3	2	2	2	1	1	2	3	3	3	2	3	1.9	2.7	-0.8
		36	Health & Safety	2	3	2	2	3	2	2	2	3	3	3	3	3	3	2.3	3.0	-0.7
		37	Diversity & Inclusion	1	2	2	1	2	1	1	1	2	3	3	3	3	3	1.4	2.8	-1.4
		38	Product Responsibility	1	N/A	3	N/A	2	N/A	2	2	N/A	N/A	N/A	3	N/A	N/A	2.0	3.0	-1.0
39	Corporate Philanthropy	2	N/A	N/A	N/A	3	N/A	N/A	3	3	N/A	3	3	3	N/A	2.7	3.0	-0.3		

Appendix I – Coverage Level Analysis Result Full Details

The full version of the coverage level analysis result is provided below for each reporting component in groups (c)-(e). The analysis result of groups (a) and (b) is outlined in Section 4.2.2.

Group (c) $-1 \leq \text{Difference value} < 0$

Group (c) indicates that Korean companies’ reporting quality is slightly lower than Scandinavian companies. More than half (18 out of 29, 62%) of codes were classified into group (c).

Table 16. Reporting components in group (c) $-1 \leq \text{Difference value} < 0$: “Organizational Profile”, “Approach to Sustainability”, “Sustainable Management”

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
12	Sustainability/ESG recognition	2	2	3	1	3	2	2	2	2.1	3	3	3	3	3	3	3.0	-0.9
14	Vision and strategy	1	3	3	3	3	3	3	3	2.8	3	3	3	3	3	3	3.0	-0.2
17	Risk and opportunity analysis	2	2	3	3	3	2	2	3	2.5	3	3	3	3	2	3	2.8	-0.3
19	Supply chain management	2	3	3	2	2	3	2	1	2.3	3	3	3	3	3	3	3.0	-0.7

Source: Own study

Code 12. Sustainability/ESG Recognition

Analyzing whether sample companies disclosed ESG ratings in the report, all Scandinavian reports contain several evaluation results by sustainability rating agencies, whereas only two Korean companies (K3, K5) disclose such information. This resulted in different average disclosure levels between Scandinavia (3.0) and Korea (2.1).

Firstly, most companies except K4 meet **Clarity** because the report includes indicators related to sustainability/ ESG recognition by external stakeholders, such as rank, score, or awards. Scandinavian companies show high clarity levels by interpreting ratings, such as comparing with average industry ranking or phrasing as top X%. However, **Korean companies mention awards received for their achievement rather than score/rank**. Since ratings are valuable indicators for stakeholders to compare various companies’ ESG performance, disclosure of awards may not serve a role in comparability.

In addition, Korean companies call attention to domestic recognition (Korean research institute & ESG rating, SUSTINVEST: Korean ESG rating agency) than global standards (e.g., CDP, MSCI, Sustainalytics, DJSI, Ecovadis, S&P Global, NASDAQ). Given that all Korean sample companies are multinational corporations, disclosure of global evaluation would be helpful for international stakeholders to understand the company’s position within the worldwide market.

Comparability in terms of time is another criterion where Korea needs improvement. For instance, Scandinavian companies provide how their ratings have changed over time, such as “three years of CDP ratings”(S2, p.121) or “In 2021, S4 was again included in the Dow Jones Sustainability Index Europe” (S4, p.7). On the other hand, Korean reports highlight reporting year’s award or rank, indicating a **lack of comparability**.

Code 14. Vision and Strategy

The sustainability vision and strategy in the reports were assessed against Clarity, Sustainability context, and Completeness criteria. Most companies had separate chapters clearly stating their strategic direction and vision toward a sustainable future, fulfilling all three criteria. The Scandinavian average disclosure level was 3.0, and the average Korean score (2.8) was not significantly different. However, one Korean company (K1) was marked with a score of 1 due to a need for higher Clarity and Completeness levels.

To scrutinize, K1’s “Approach to sustainability” section describes their business model of sustainability management, indicating high **Sustainability context** as “Sustainability is a core value and key driver of our operations, and we strive to embed it in every product and service that we offer” (p.11). On the contrary, the disclosed information details their activities (e.g., eco-packaging, eco-conscious manufacturing process, and energy consumption reduction) rather than the company’s planning for the future or vision. Given that other companies report their short-mid-long-term strategy based on the big picture they draw, K1 lacks such information. Thus, **a forward-looking perspective is required** to enhance **Clarity** levels.

Furthermore, the sole sentence related to the future outlook, “We will remain committed to activities that minimize our environmental impact, including the use of recycled materials in all stages of mobile device and home appliance manufacturing processes by 2025.”, **primarily underlines environmental aspects**. To step up **Completeness** levels, other sustainability pillars, including social, economic, and governance, should be incorporated into the approach/vision.

Code 17. Risk and Opportunity Analysis

All companies conducted thorough risk and opportunity analyses, disclosing the result in the report. Although the Scandinavian average disclosure level (2.8) is slightly higher than Korea’s (2.5), there is no considerable difference between the two regions.

All reports have a separate section for risk and opportunity analysis results, which meets **Clarity** as it is accessible to readers. In addition, identified risks and activities to mitigate risks are reflected in the sustainability strategy, indicating high levels of **Sustainability context**. However, companies with a score of 2 could advance reporting quality by further developing Completeness and Balance.

While most companies address all ESG aspects in risk and opportunity analysis, two companies (K1, K2) show a strong focus on climate-related risks. This indicates that **social (e.g., safety, labor-relation) and governance risks (e.g., supply chain management, tax, cyber security) could be more elaborated**. S5, on the other hand, lacks environmental risk and opportunity analysis, yet states the plan of “From 2022, S5’s report will also incorporate the framework developed by TCFD” (S5, p.16). In short, the **Completeness** of the report will enhance when the analysis covers all ESG dimensions in a balanced manner.

In the case of K6 and K7, the **Balance** is a development area. Even though ESG risks are disclosed, higher Balance levels require an in-depth analysis that reflects the company’s context, including both positive and negative aspects. For example, K6 states their

environmental risks as “*Abnormal weather variations and climate agreement failures were ranked as the top two risks according to the Global Risks Report released by the World Economic Forum (WEF)*” (p.81). K7 also similarly reports “*Increased severity and frequency of extreme weather events such as cyclones and floods*” (p.21). These risks are **too general, not presenting how the company’s operation negatively affects or is impacted by climate change**. In contrast, reports with high balance are more outspoken about the company’s negative impact concerning risk, such as S6:

Production facilities could also have a risk of damaging the environment through their operations, e.g., through hazardous waste and emissions (S6, p.50). S6 operates in countries/areas with high risk of human rights abuse, including child labor, forced or compulsory labor, poor working conditions (S6, p.49).

Code 19. Supply Chain Management

Korean companies’ disclosure level on supply chain management varies from 1 to 3 (average score: 2.3), whereas all Scandinavian companies have high coverage levels of 3.0, fulfilling five assessment criteria (Clarity, Completeness, Sustainability context, Significance, Balance).

All companies comply with **Clarity** criteria as the reports provide extensive information on the overarching approach, action plan, reporting year’s activities, and performance outcome. In terms of **Completeness**, whether all ESG aspects are reflected in supply chain management, K4 did not meet the criterion. K4 addresses social (e.g., human rights impact assessment) and governance (e.g., fair trade compliance), yet **environmental management in the supply chain was lacking**.

For the **Sustainability context**, the assessment focused on how a company’s approach to supply chain management is incorporated into sustainability strategy. Scandinavian reports show a clear connection between supply chain management and integral sustainability strategy, elaborating on their specific action plans in alignment with the targets. Notably, all Scandinavian companies actively utilize quantitative indicators, such as “*percentage of new major suppliers screened using environmental/social criteria*” (S1, p.57), “*the percentage of ISO 9001/14001/45001 certified suppliers*” (S2, p.108), and “*percentage of significant direct suppliers that have an approved environmental management system*” (S6, p.45).

However, four Korean reports (K1, K5, K7, K8) rely on qualitative data to describe their goal and activities, even though their supply chain management is a part of the sustainability strategy. The **need for quantitative data** indicates low **Significance** levels of Korean reports. Therefore, setting quantitative targets and measuring indicators will enable to build of a more concrete action plan, strengthening the Sustainability context.

Lastly, most reports have a good **Balance** by addressing risks in the supply chain. The management approach is shaped based on the risks (i.e., negative impacts on/by the supply chain) identified by the company. However, K8 **needs more risk disclosure** to level up the balance.

Recognizing that violations of human rights may occur outside the company’s control, we try to improve our management of human rights issues in the supply chain. We strive to address and advance the human rights movement through appropriate supply chain due diligence efforts. (K8, p.34)

As this risk identification is too general, the report should mention details in the company’s context (e.g., where in the supply chain do the human rights issues matter the most?).

In addition, K8’s report **omits the contingency plan**, which is the company’s systematic approach in cases suppliers violate the codes. In short, reporting should address negative aspects to increase the balance of the report. Highlighting only the positive efforts or influence of the company is not enough.

Table 17. Reporting components in group (c) $-1 \leq \text{Difference value} < 0$: “Stakeholder”

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
Child codes		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
24	Stakeholder analysis	3	3	3	1	3	3	3	3	2.8	3	3	3	3	3	3	3.0	-0.2
25	Stakeholder engagement	2	2	2	3	2	3	2	2	2.3	3	3	3	3	3	3	3.0	-0.7

Source: Own study

Code 24. Stakeholder Analysis

Overall coverage levels of this section are high in both Scandinavia (3.0) and Korea (2.8). Firstly, the **Clarity** of reporting was assessed by whether the stakeholder identification was understandable to readers. Specifically, the disclosure of the following elements was examined: the relevance of stakeholders to the company, major interests or concerns arising from each stakeholder group, and rationales behind selecting a primary stakeholder group.

Looking into K4, which received a score of 1, the report defines their major stakeholder groups as “Shareholders, customers, employees, partner companies, the local community, government, and competitor companies” (p.114) and even mentions that “K4 conducts an annual materiality assessment to identify issues of significant concern to stakeholders” (p.113). However, the Clarity level was low due to **no elaboration on stakeholder concerns and how they were reflected in chosen material topics**. On the other hand, Scandinavian companies provide their overarching approach, the process of stakeholder analysis, and own definition of stakeholders in the company’s context. For example:

We conducted an internal and external stakeholder review of S5’s participation in environmental, social, and governance (ESG) rating schemes. In October 2021, the S5 Sustainability Board decided to re-evaluate S5’s engagement with ESG rating agencies to focus on requests for information from those agencies that are deemed the most important. As a result, we scheduled a series of interviews for late 2021 and early 2022 to obtain input from our main stakeholders on which ESG rating agencies they value most and which ESG criteria they expect us to report on. (S5, p.12)

This also indicates that S5 takes all ESG aspects into account in stakeholder analysis, fulfilling another assessment criteria **Sustainability context**. The sustainability context assessment focused on whether each stakeholder group’s main areas of interest reflect all environmental, social, and governance aspects. Other companies except K4 show good levels of Sustainability context. Although K4’s material topics address all ESG dimensions, **ambiguities remained regarding how each stakeholder is relevant to chosen material topics**, resulting in low coverage levels.

Code 25. Stakeholder Engagement

A Based on the stakeholder analysis, all companies report how they communicate and engage with each stakeholder group. However, Scandinavian reports (average score: 3.0) show

higher **Clarity** levels than Korean reports (average score: 2.3). This is because **Korean companies’ disclosure is often limited to reporting the type of communication channel** (e.g., meetings, workshops, social media, press releases) **without mentioning other stakeholder engagement activities**. Scandinavian firms, in contrast, share activities carried on during the reporting year in detail. A few examples are:

In 2021, we engaged in an active stakeholder dialogue on a broad range of topics. The most important of these include issues related to the pandemic, sustainable food production, circular business models, farming of the future, climate impact labelling, nutrition and health and recycling of plastic packaging. (S4, p.106)

In 2021, we began to engage our suppliers on the topic of their own GHG emissions. In 2021, we engaged with investors and analysts on the subject of S5’s 2030 sustainability strategy and how our market-leading portfolio benefits from the fact that ESG concerns are driving demand for energy efficiency and automation. (S5, p.13)

Adding the highlights of stakeholder dialogue gives readers a clearer picture of topics discussed with stakeholders’ interests as well as companies’ efforts to integrate stakeholders’ opinions into strategy and action plans. Given that only one Korean company (K1) disclosed stakeholder engagement activities of the reporting year, other companies could make the report more tangible by including a brief overview of stakeholder communication. Moreover, disclosure of the communication cycle (i.e., frequency of stakeholder meetings, seminars, or surveys) could further enhance Clarity, which is absent in most Korean reports.

Table 18. Reporting components in group (c) $-1 \leq \text{Difference value} < 0$: “Sustainability Practices”

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
26	Sustainable products and services	3	3	2	3	3	3	3	3	2.9	3	3	3	3	3	3	3.0	-0.1
27	Sustainable operation	3	3	3	2	2	2	3	2	2.5	3	3	3	3	2	3	2.8	-0.3
28	Progress and achievement	2	3	3	4	3	3	1	3	2.5	3	3	3	3	3	3	3.0	-0.5

Source: Own study

Code 26. Sustainable Products and Services

Sample companies show high coverage levels of Code 26. Sustainable Products and Services in both regions. Only K3 was assessed with a score of 2; others cleared all assessment criteria (Clarity, Sustainability context, and Significance) with a score of 3.

The analysis results suggest that all companies have high levels of **Sustainability context** as their core business deeply embraces the concept of sustainability. The following examples show how well environmental protection and social contribution are integrated into product design and technology/service development.

As a key means of achieving carbon neutrality, K2 is developing its own innovative hydrogen-based steelmaking technologies. The successful hosting of the HyIS Forum 2021 provided an opportunity for K2 to lead international cooperation. (K2, p.)

K4 has succeeded in developing an eco-friendly technology to recover lithium from waste batteries by developing a new lithium extraction method that does not use any chemicals. (K4, p.35)

K5 successfully developed the “Eco-friendly Magnet” producing the highest magnetic force in the world. For this product, the use of heavy rare earth element, a core material for a magnet, was drastically reduced by approximately 60%. (K5, p.63)

Since the launch of our low-carbon products, the market has embraced low-carbon aluminium, as it enables our customers to meet their CO2 abatement goals. S3 CIRCAL is a range of products made with a minimum of 75 percent recycled, post-consumer scrap aluminium. (S3, p.10)

To be considered one of S4’s most sustainable products, the product must satisfy the criteria in at least two of the following three categories: sustainable raw materials, sustainable packaging and products that promote a healthy lifestyle. (S4, p.91)

S5’s Motion Business Area enables its customers to reduce their carbon emissions with a complete range of high-efficiency motors and drives. (S5, p.26)

In addition, the reports provide the positive impact of sustainable products and services with quantitative data, which satisfies the **Significance** criterion. For instance, K6 estimates their product’s expected emissions reduction effect and S5 outlines their products’ energy consumption reduction effect as follows:

The ultra-high-strength, seismic-resistant rebar is expected to save construction materials, shorten construction period, and reduce CO2 emission. In fact, by using the ultra-high-strength rebar, one can save about 0.2 ton of rebar per house. Assuming the construction of 400,000 houses per year, total CO2 reduction amounts to 32,000 tons per year based on 0.4 ton of CO2 emission per ton of rebar production. (K6, p.72)

In Switzerland in 2021, Model Group, a manufacturer of paper packaging, deployed energy-efficient motors and drives from S5 to upgrade its paper machines. Papermaking is an energy-intensive process, and by replacing 36 motors and drives in its factory with new, IE4 super-premium-efficiency models and multidrives, Model Group has reduced its energy consumption by nearly 900,000 kWh/year – equivalent to the power consumption of about 200 single-family homes. (S5, p.27)

This detailed description was also seen in other reports, confirming high **Clarity** levels. In the case of K3, comprehensive information on their “eco-friendly products” and “Sustainable Product Policy” was disclosed, meeting the criteria of Clarity and Sustainability context. Nonetheless, compared with other reports, K3 **did not utilize quantitative data** to describe product effects. In other words, K3 will reach the highest coverage levels in Significance once quantitative indicators are appropriately combined.

Code 27. Sustainable Operation

While the earlier section Code 26. Sustainable Product and Service highlights the environmental and social value the company creates for the external stakeholder, typically customers or society, this section Code 27. Sustainable Operation focuses on the internal process (i.e., manufacturing operation). Although Korean companies’ average coverage level (2.5) is 0.3 points lower than Scandinavia (2.8), half of the Korean companies (K1, K2, K3, K7) were given a score of 3 since their reports met all assessment criteria of Clarity, Sustainability context, and Significance.

All reports provide an overview of activities and plan towards sustainable operations, including the distribution of environmental and safety manual, energy efficiency measures

implementation (e.g., S6: carbon-neutral manufacturing system), conversion to renewable energy, and eco-friendly packaging. The majority of sample companies stressed two keywords, “low-carbon” and “safe”, which confirms that both environmental and social aspects of operational processes were taken into account. This represents that all companies fulfill the criteria of **Clarity** and **Sustainability context**. However, analyzing five reports (K4, K5, K6, K8, S5) with a score of 2, **Significance** was identified as a development area.

Taking a glance at good reporting practices (S4, S6), quantitative data are combined to explain their performance: “*We have set science-based climate targets and in the period 2014-2021 achieved a 65 % reduction in GHG emissions from our own operations relative to revenue. Measured in absolute figures, the change was 56%*” (S4, p.91) and “*3% reduced CO2 emissions from energy in operations and transport of goods, 58% renewable energy of total Mwh energy used in operations*” (S6, p.44).

In contrast, **disclosure relying on qualitative data may appear less transparent** as seen in K4, K5, K8’s report below.

In the water business sector, we have developed optimization solutions, such as Energy Management Solution, to minimize power consumption at seawater desalination plants and the DAF Chemical Dosing Optimizer to optimize chemical injection optimization solutions and are pursuing commercialization of the solutions. (K4, p.37)

K5 is promoting eco-friendly packaging to reduce the cost of using disposable packaging materials at the same time as minimizing environmental impact caused by the use of plastic, vinyl, and paper box-type packaging materials when receiving components. In 2021, we organized a task force for eco-friendly packaging material use and automation. (K5, p.62)

To improve the environmental impact of our manufacturing process, we replaced existing equipment to highly-efficient and durable alternatives. (K8, p.56)

To put it succinctly, utilizing numeric metrics to support the statement/performance will further strengthen Significance, ultimately increasing the report’s credibility.

Code 28. Progress and Achievement

Analyzing disclosure of progress and achievement against five assessment criteria, the Korean reports’ average score (2.5) was 0.5 points lower than Scandinavia’s (3.0). Most companies clear all criteria (Clarity, Completeness, Comparability, Significance, and Balance), whereas three Korean companies (K1, K4, K7) show deficiency in specific criteria.

Firstly, K4 has lower **Clarity** levels compared with others. While other reports have a section on “sustainability achievement” or “key performance in 2021” that summarizes the reporting year’s performance outcome, K4 does not have one. Instead, each topic-specific disclosure section describes progress against targets, which may not be accessible to readers without reviewing the full report. **Completeness** is another development area of K4’s report because the disclosure **focuses on environmental achievement**, while other reports address all ESG aspects of progress.

Most reports provide multiple years of quantitative KPIs and describe the reporting year’s achievement compared to the previous year, which meets **Comparability** and **Significance** criteria. However, K1 shows **a lack of comparability in certain KPIs by highlighting data of cumulative sums**, such as hours of employees’ volunteer work (2012-2021) and number of companies adopting smart factories (2015-2021). Since the “Sustainability achievement”

section is supposed to disclose reporting year’s performance, the cumulative sum is inadequate for comparability.

In the case of K7, significance can be further improved. Even though qualitative and quantitative data are combined overall, **some indicators rely on quantitative data without interpretation**. For example, K7 discloses safety indicators – the number of industrial accidents, Lost Time Injury Frequency Rate (LTIFR) – in the “ESG highlight” section. However, there was no explanation of what data means. Notably, LTIFR increased from the previous year, yet the report did not address it, which was deemed a low **Balance**.

Table 19. Reporting components in group (c) $-1 \leq \text{Difference value} < 0$: “Environmental Performance”

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value
Child codes		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		(Average [K] - Average [S])
29	Green procurement	2	3	3	2	3	3	2	1	2.4	N/A	3	2	3	3	3	2.8	-0.4
30	Emissions	1	3	3	2	3	2	2	1	2.1	3	3	3	3	3	3	3.0	-0.9
31	Energy	3	3	3	3	3	N/A	2	2	2.7	3	3	3	3	3	3	3.0	-0.3
32	Water	3	3	2	N/A	1	3	N/A	1	2.2	3	2	3	3	N/A	3	2.8	-0.6
33	Waste	2	N/A	2	2	2	N/A	N/A	2	2.0	2	2	N/A	3	3	3	2.6	-0.6

Source: Own study

Code 29. Green Procurement

A majority of sample companies excluding S1 classify green procurement as **Materiality**. Four keywords “Circularity” (K1, S4, S6), “Eco-friendliness” (K2, K3, K5, K7), “Product stewardship” (K6, K8, S4, S6) and “Resource” (K1, K2, K3, S2, S5) represent the material issues. Green procurement activities identified in this research are low-carbon raw material sourcing and recyclable material use in product design, including packaging.

Coverage levels analysis indicates that the Scandinavian firms’ average score (2.8) is 0.4 points higher than Korean firms (2.4). Four Korean (K2, K3, K5, K6) and Scandinavian companies (S2, S4, S5, S6) tick all the boxes in four criteria: Clarity, Significance, Comparability, and Balance, marked with a score of 3. Four companies (K1, K4, K7, S3) with a score of 2 disclosed good quality information in general; however, opportunities for further enhancement were identified in certain areas.

K4, for example, can level up the **Significance** by **employing quantitative data in performance** reporting. K4 reported on the positive outcome of their activities as follows:

We have implemented processes to separate and reuse waste refractory materials in the steelmaking process, sort and recycle waste paint and organic solvent iron containers, and select and reuse incineration target waste materials with high calorific values as solid fuel to increase the recycling rate (K4, p.52). K4 has succeeded in developing an eco-friendly technology to recover lithium from waste batteries by developing a new lithium extraction method that does not use any chemicals. (K4, p.35)

If the achievements were supported by numerical evidence (e.g., changes in recycling rate, emission reduction effect), the report's credibility would have been higher.

Clarity is a development area for K7. Although K7 has a clear vision, target, and action plans, activities can go beyond current bullet points-disclosure of “*Low carbon sourcing* (K7, p.23), *Supplier engagement: Engaged partners to establish current day feasible material options to reduce carbon content*” (K7, p.19). Moreover, K7’s two **quantitative indicators were obscure**: “*30-50% carbon footprint reduction from eco-friendly design for electric vehicles, 15-20% carbon footprint reduction by eco-friendly aluminum sourcing*” (K7, p.19). The clarity can be further improved by explaining whether the indicators are future targets or performance outcomes of the year.

The inadequacy of **Comparability** was seen in S3’s reporting on this topic. Green procurement in S3 refers to “*source less carbon-intensive electricity and aluminium metal with a lower carbon footprint*” (p.78), which is part of Scope 3 emissions. Analyzing the S3 report below, the **previous years’ data was insufficient**.

As S3 regards the carbon footprint of process scrap as equal to its metal origin, S3’s Scope 3 emissions are significant when including externally sourced metal. In total, S3’s Scope 3 emissions were 17 million tonnes of CO₂e in 2021, a reduction of 18 % since 2018. The reduction was due to conscious sourcing of metal with a lower carbon footprint. (S3, p.199)

If S3 discloses three to five years of historical KPIs like other companies, the report can have better Comparability.

Lastly, K8 was assessed with a score of 1. While K8 discloses their approach for product stewardship, “*Adhering to the K8 eco-friendly product principles, improving product innovation and sustainability based on electrification, autonomy, and digitalization*” (p.31), an action plan is limited to “*replace 30 diesel forklifts to hydrogen-fueled forklifts in 2022*” (p.47). This product-specific target **does not represent K8’s overarching goal or action plan**. The low disclosure level in Clarity can be explained by K8’s status quo of dealing with green procurement. Since K8 is in the progress of drawing up a mid-long-term strategy and road map for sustainable products, relevant targets/KPIs are yet to be determined, affecting Significance and Comparability. Despite relatively incompetent information, K8’s honesty and transparency of present status and forward plan somewhat contribute to **Balance**.

Code 30. Emissions

Emissions, including GHG emissions, NO_x, and SO_x, were ranked top **Materiality** among all sample companies. The keywords used in the material topic are “Climate”, “Carbon”, and “GHG emissions”, which are phrased in “Response to climate change,” “Carbon reduction,” and “Carbon neutrality”.

Even though all companies address emissions in the report, analysis of coverage levels reveals moderate differences between the two regions. The average score of Korean firms is 2.1, 0.9 points lower than Scandinavian firms’ average score of 3.0. This is because Korean firms’ score is distributed between 1 and 3, yet it should be noted that three Korean firms (K2, K3, K5) have comparable disclosure levels to Scandinavia.

To begin with, reporting quality of nine companies (K2, K3, K5, S1, S2, S3, S4, S5, S6) is top-notch. Disclosed information such as emissions reduction strategy, targets, action plans, and performance of the reporting year is comprehensive and accessible, indicating complete accordance with the criteria **Clarity**. Not only are action plans and activities during the

reporting year aligned with the underlying climate strategies, but quantitative data was also extensively used to describe performance. A few good examples are:

The amount of GHG emissions from K5's domestic and overseas worksites in 2021 was 367,099 tCO₂eq (GHG converted into CO₂ emissions), and 92% of the emissions were generated by electricity use. Although our sales in 2021 increased by 57% year on year, GHG intensity decreased by 33% from the previous year as a result of our GHG reduction activities, such as introducing high-efficiency facilities and improving the efficiency of UT operation. (K5, p.36)

In Switzerland in 2021, Model Group, a manufacturer of paper packaging, deployed energy-efficient motors and drives from S5 to upgrade its paper machines. Papermaking is an energy-intensive process, and by replacing 36 motors and drives in its factory with new, IE4 super-premium-efficiency models and multidrives, Model Group has reduced its energy consumption by nearly 900,000 kWh per year -equivalent to the power consumption of about 200 single-family homes. (S5, p.27)

On top of quantitative data used in performance description, good practices companies stood out in target and KPIs setting, which shows excellent **Significance**. For instance, S3 has short-(2025), mid-(2030), and long- (2050) term emission reduction target by each scope, “10% Reduction in Scope 1 and 2 by 2025, 30% Reduction in Scope 1 and 2 GHG emission by 2030, Net zero Scope 1 and 2 GHG emissions by 2050 or sooner” (S3, p.75). Likewise, S6 also has a 2030 target:

-50% of CO₂ emissions from energy in operations and transport in relation to cost of sales (baseline: 2018), -46% reduction in line with the 1.5 degree warming trajectory in CO₂ emissions from scopes 1 &2 (baseline: 2019), Reduction in line with the well-below 2 degrees warming trajectory in Co₂ emissions from scope 3 (baseline: 2019) (S6, p.7)

These targets are set based on the company's overarching strategy, and the coverage levels meet Clarity and Significance criteria. On the other hand, a few Korean companies need an improvement.

To illustrate, K1 does not meet the Clarity and Significance criteria due to the **absence of a quantitative target**. While K1 presents its future target as “continue to reduce GHG emissions” (p.22), the definition of future is undefined, as well as to what extent they aim to reduce emissions. Thus, K1's Clarity and Significance level is lower compared to the abovementioned other companies in target setting. K8 is another company that does not disclose quantitative targets. Instead, K8 identifies establishing mid-long-term climate strategy and roadmap as the next step. Considering that most sample companies already have a well-developed climate strategy, K8 appears to have lower maturity levels in emissions management.

Furthermore, a large discrepancy between Korea and Scandinavia has been observed: Scope 3 emissions. Scope 3 emissions are indirect GHG emissions from the companies' value chain activities (GRI, 2022a). All Scandinavian companies include Scope 3 emissions in GHG emissions; however, **only half of the Korean companies (K2, K3, K5, K7) calculate Scope 3 emissions**. K4 and K6 were given a score of 2 as Scope 3 emissions disclosure was missing. It is also critical to explicitly state the methodology (e.g., GHG protocol, calculation scope), which can be recommended for K4 and K8 to achieve a high level of Clarity. Nevertheless, all companies fulfilled **Comparability** criteria by releasing multiple years of GHG emissions and GHG intensity data.

Lastly, limited **Balance** was shown in Korean companies. For example, K8 highlights “-17% reduction in GHG emission per production unit at company in North America and Korea (2020-2021)”

(p.24), whereas the total GHG emissions have increased over the past three years. K1 took a similar approach, **selective disclosure**. K1 put emphasis on their achievement, “*In 2021, we reduced GHG emissions by a total of 6.41 million tonnes through 476 projects*” (p.27). However, total GHG emissions increased from the previous year. It can be inferred that K1 **focus on positive performance** since the report did not explain what caused the total emissions increase. In contrast, Scandinavian companies deliver their performance more objectively by sharing both positive/negative outcomes and challenges experienced during the reporting year. S6’s reporting can be a benchmark for K1 and K8 to improve Balance.

In 2021, the CO2 emissions from energy in operations and transport of goods in relation to cost of sales decreased by 13%. The decrease in absolute numbers was 3%. CO2 emissions from direct energy increased by 10% in absolute numbers, mainly because of increased production volumes. CO2 emissions from indirect energy decreased by 47% in absolute numbers. An increased share of renewable electricity was the main driver for lower emissions from energy. CO2 emissions from transport of goods increased by 15% in absolute numbers, mainly due to increased production levels, and to some extent due to supply chain shortages causing more air freight. (S6, p.44)

Code 31. Energy

Most companies excepting K6 attach significance to energy management, incorporating it into **Materiality** topics. Taking a closer look, six companies (K1, K2, K8, S3, S4, S6) present their specific focus area within energy management in the material topic, which is classified into two types: 1) energy efficiency by K2 “Enhancing energy efficiency”, K8 “Energy efficiency”, S4 “Efficient resource utilization - Energy”, S6 “Energy use and efficiency” and 2) clean energy by K1, S3 “Renewable energy transition”, K2 “Clean energy use”.

Other seven companies, however, take a broader view in phrasing the materiality: five companies (K3, K4, K7, S2, S5) regard energy as a subset of climate change response (K3 “Response to climate change”, K4 “Coping with climate change”, K7 “Carbon neutral”, S2 “Climate change/GHG emissions”, S5 “Carbon reduction”); K5 and S1 consider energy management as a sole topic (K5 “Energy management” S1 “Energy”). In the case of K6, the report states that energy management is not the key issue, highlighting GHG emission and air pollutant management as a focus area to tackle climate change.

Overall, high-quality reporting practices were observed in both regions. All Scandinavian firms were given a score of 3, resulting in an average of 3.0. In a similar fashion, the majority of Korean firms received 3 by fulfilling all assessment criteria Clarity, Significance, Comparability, and Balance. Nevertheless, the average coverage levels of Korean firms ended up at 2.7 due to two firms (K7, K8) with a score of 2.

Above all, K7 and K8 did not measure up to the criteria of **Clarity** and **Significance** in the target setting. Firstly, K7 had one point taken off from the full score of three on account of **lacking a mid-term target**. Although K7 has a long-term target of “*80% purchased energy emission reduction by 2040*” (p.17) to achieve carbon neutrality by 2040, corresponding action plans “*focus on renewable energy generation and procurement of renewable energy certificates (REC), conduct plant-specific energy profile assessments, renewable energy use through on-site solar panels and leveraging Power Purchase Agreements (PPAs)*” (p.18) seem **ambiguous in terms of timeline**.

Given that other companies with Clarity disclose short-mid-term targets when having a long-term target, K7’s **target is deemed intangible as action plans cannot be tracked** without a mid-term goal. For instance, the K5 report, which received a score of 3, explains what actions will be taken in the following year to reach the long-term target of a 100% Renewable

Electricity Transition Rate by 2030. For example, the description of “*The Optics Solution Business Unit is actively responding to the demand by joining the RE100 initiative targeting to achieve 100% renewable energy transition by 2023*” (K5, p.6) and “*We will expand renewable energy use in our overseas production facilities as well including the Vietnamese subsidiary*” (K5, p.37) gives readers Clarity to understand how the company will execute the plan towards the target.

S5 is another good example. S5 has a quantitative target towards 2030, and the report documents current progress and short-term action plan as follows:

Target: By 2030, we will achieve carbon neutrality across our own operations. We have committed to three initiatives of the Climate Group of global companies – EV100, RE100 and EP100. In line with these commitments, by 2030 we will electrify our fleet of more than 10,000 vehicles, source 100 % of our electricity from renewables, and improve energy productivity across our operations. (S5, p.33)

Progress & short-term action plan: In 2021, we refitted three major S5 facilities under the Mission to Zero™ program to reduce their carbon footprints and have plans to refit a growing list of sites by 2024. We are also on track to electrify our vehicle fleet, and we are engaging our suppliers on ways to evaluate and reduce their emissions. (S5, p.24)

Secondly, K8 was given a score of 2 due to **a lack of quantitative targets**. As the performance reporting during the reporting year adequately utilizes qualitative and quantitative data, the assessment criteria Significance is partially met. K8 clearly states the aim and introduces multiple cases related to energy efficiency as below:

Aim: We proactively address global climate risks through efficient energy consumption at our workplaces. We strive to set ambitious energy reduction targets at each of our global worksites. We also continue to set industrial vehicle industry-specific energy action plans for the manufacturing process. (K8, p.56)

Cases: To create green workplaces, K8 installed energy efficient LED lighting at all U.S. business facilities. Decreased energy consumption by 35% through high performance building systems, operating methods and light automation. Use of green power renewable energy to offset 53% of the building’s energy costs. (K8, p.56)

However, K8 is **still in progress to define the future target** related to energy, as described in “*The next step: Setting energy efficiency goals*” (p.32). Therefore, K8 should determine and disclose measurable targets to further enhance Clarity and Significance.

Code 32. Water

Water resource management is **Materiality** to four Korean firms (K1, K5, K6, K8) and five Scandinavian firms except S5. Companies K4 and K7 exclude water from material topics, whereas the other companies (K2, K3) classify it as general issues that need to be managed, disclosing relevant information in the report. Thus, coverage levels analysis extended its scope to include K2 and K3.

Data shows that Scandinavian companies’ average value (2.8) is higher than Korean companies (2.2), resulting from the different score ranges between the two regions. None of the Scandinavian companies were given a score of 1, while Korean companies’ scores varied from 1 to 3. Most Korean companies (K1, K2, K3, K6) comply with the criteria **Clarity** as they provide comprehensive information about their water management approach, action plan, and performance of the reporting year as well as all Scandinavian companies. On the other hand, K5 and K8 were assigned low scores (i.e., 1) due to **insufficient disclosure of the activities**

during the year. Interestingly, both companies had outstanding achievements, such as K5's "CDP Korea Climate Change Response and Water Management Awards" (p.37) and K8's "41% reduction in water use" (p.60). Nonetheless, the elaboration of efforts to reach such accomplishments was lacking. Scandinavian firms' disclosure like S4 seems to be a benchmark for K5 and K8, as the information provided by S4 is supported by several series of activities in connection with the outcome.

We have reported to the investor initiative CDP on our environmental work for many years. In 2021, we scored an A- (leadership level) in the areas of climate and water. In 2021, we carried out a number of process improvements, as a result of which less water is required for production. For example, S4 Latvia has reduced the use of water in its manufacture of chocolate by more than 60 % since opening a new chocolate factory in 2021. Several factories have invested in new, more efficient washing machines and automated the washing process, thereby reducing both water and energy use. In addition, a number of companies report that their employees are receiving training in minimising the use of water in washing processes. (S4, p.117)

In terms of **Significance**, whether qualitative and quantitative data are adequately combined was assessed. All companies disclose KPIs such as the total amount of water consumption, water recycling, and water intensity in the report. As most companies but S2 present multiple years of data in the table, **Comparability** is also overall satisfied.

In the case of S2, the total water consumption of the year is disclosed as, "All water used/consumed by the company is supplied from municipalities. The total amount has been 5,397 m³ for all Nordic offices in 2021. Small offices with less than 10 employees are excluded from this calculation"; comparison with the previous year is inaccessible. However, considering the limited impact related to water as mentioned by S2, "Water consumption in our operation is limited to overhead water usage (cleaning, drinking, washing) for our offices and laboratory operations.", disclosure of water consumption metrics of the past years seems to be negligible to S2.

Companies with a score of 3 (K1, K2, K6, S1, S3, S4, S6) have good **Balance** in the report by addressing their operations' negative impacts on water, whereas other companies (K3, K5, K8) did not disclose such information in the reports. Further, looking closely into Korean companies scored 3, it is noteworthy that the tendency to highlight potential negative impacts on the water was identified. Examples include "our semiconductor sites, which typically require large amounts of water" (K1, p.38), "while the nature of the integrated steelworks means that it is essential to use a large quantity of water" (K2, p.52), and "The deterioration of the water quality of ... source of industrial water supply ... has been feared to reduce the efficiency of water supply and drainage facilities and disrupt industrial water production, which could negatively affect the operation of the steelworks" (K6, p.40).

However, Scandinavian companies go beyond acknowledging the negative impact caused by the business. For instance, S3 disclose water permit breaches in the reporting year, including the overview of breaches and corrective measures received. In addition, S1 and S6 elaborate on the negative performance with their reasons.

The total volume of produced water has increased over the past three years. This is mainly due to the type of fields in our portfolio. Older fields have a higher water cut when producing oil and gas. In 2021, 92% of the produced water was reinjected on Alvheim, and 88% on Ivar Aasen. S1's total volume of discharged produced water was 17% higher in 2021 than in 2020. This is mainly due to higher water cut on our oldest operating field, the Ula field and lower re-injection of produced water on Ivar Aasen caused by operational limitations. (S1, p.51)

In 2021, reached resolution with the Oregon Department of Environmental Quality of certain air and water environmental compliance issues, as well as other self-disclosed issues, involving S3's cast house in The Dalles, Oregon. S3 remitted the required dollar amounts (a total of 695,600 USD for air issues and 69,583 USD for water issues, either directly or through commitments to approved Supplemental Environmental Projects) and is timely fulfilling other required corrective actions. (S3, p.203)

In absolute numbers, the water consumption increased by 3%, mainly due to one-time events such as leakages and increase in production volumes. (S6, p.45)

Code 33. Waste

Waste handling is a material topic for five Korean and five Scandinavian firms. While three Korean firms (K2, K6, K7) and one Scandinavian firm (S3) did not select waste as **Materiality**, all firms disclosed information on their waste management approach and performance during the reporting period. Notably, Korean firms emphasized their efforts to comply with regulations such as Waste Management Act and Framework Act on Resource Circulation, which can explain why all companies addressed this topic in the report.

The average coverage level of the five Korean firms that chose waste as materiality is 2.0, lower than the five Scandinavian firms' average score of 2.6. Looking at the assessment criteria **Clarity** and **Significance**, all ten companies disclose their waste management approach and corresponding target action plan.

However, two Korean firms did not fulfill the Clarity criteria due to a deficiency in target setting. K8 only has a broad qualitative target "*to minimize waste generation*" (p.59) **without a specific quantitative target linked to the action plan**. In the case of K1, two quantitative future targets were disclosed; "*acquire zero waste to landfill certification for all manufacturing sites, 7.5 million tonnes of collected E-waste (cumulative from 2009)*" (p.22). These **targets are ambiguous** because the report does not clarify when the future refers to; thus, the target is not time-bound. In addition, the second target is based on the cumulative amount of E-waste. Since the company publishes an annual report to disclose sustainability performance measured yearly, the **purpose of selecting cumulative targets needs to be elaborated**.

Similar to K8, Scandinavian firm S1 **does not disclose quantitative targets** for the following years. Nevertheless, the difference is that S1 has a qualitative target in alignment with specific action plans for the upcoming year. The other five Scandinavian firms have both qualitative and quantitative mid-long-term targets.

Concerning waste management activities, all Korean and Scandinavian firms utilize quantitative KPIs such as volume of waste generation by waste type, recycling and treatment rate to delineate the outcome of the activities. Although the KPIs vary among companies, all of them disclose multiple years (i.e., three to five years) of KPIs, enabling readers to track down the company's performance in the past years. This indicates that **Comparability** is met.

Balance is the criteria that most Korean firms fell short of compared with Scandinavian firms. In particular, **the tendency to feature positive performance** was found in Korean firms' reporting. For instance, K8 deliberately highlights their achievement of "*zero hazardous waste in North America (2020-2021)*" (p.24, p.91) several times in the report, while their operation site is not limited to North America. Given that the KPI (i.e., hazardous waste) scope contains countries where the company operates, such as Korea, the performance in other regions should also be disclosed. Even if there was underperformance, being transparent about the outcome and addressing the improvement area can strengthen the reporting balance.

In contrast, Scandinavian firms come up with an explanation for the displeasing performance. S6, for example, provides the reason for increased total waste volume, “In 2021, the total waste volume in relation to cost of sales increased by 2%, mainly due to increased production volumes.” (S6, p.44). Furthermore, all Scandinavian firms disclose how well they acknowledge of negative environmental impacts caused by their operations, whereas Korean firms exclude such information in the report.

Table 20. Reporting components in group (c) -1 ≤ Difference value <0: “Social Performance”

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
35	Human rights	2	2	3	2	2	2	1	1	1.9	2	3	3	3	2	3	2.7	-0.8
36	Health and safety	2	3	2	2	3	2	2	2	2.3	3	3	3	3	3	3	3.0	-0.7
38	Product responsibility	1	N/A	3	N/A	2	N/A	2	2	2.0	N/A	N/A	N/A	3	N/A	N/A	3.0	-1.0
39	Corporate philanthropy	2	N/A	N/A	N/A	3	N/A	N/A	3	2.7	3	N/A	3	3	3	N/A	3.0	-0.3

Source: Own study

Code 35. Human Rights

Most companies selected human rights management as **Materiality**. Although K3 places “Human rights protection” as a general issue, the report presents relevant information in a topic-specific disclosure section, “Human rights management”. Thus, coverage levels of K3 on this topic were assessed along with other reports. The majority of companies phrase the Materiality as “Human rights” (K7, K8, S4, S6) or “Human rights management/protection” (K1, K2, K3, K4, K5, K6). Several Scandinavian companies (S2, S3, S5) add on “Labor” or “Workers’ rights”. The material topic of S1 is more specific, “Forced labor and modern slavery”.

Reporting quality on human rights varies among Korean companies, ranging from 1 to 3. The score of 1 was unobserved in Scandinavian companies’ coverage levels to the contrary. Consequently, the average score of Korean reports (1.9) was below the Scandinavian average (2.7).

Korean companies’ disclosure of human rights management system, the statement on aim, and action plans are overall comprehensible. However, there is room for improvement to achieve greater **Clarity** and **Significance** in target setting. As seven Korean companies besides K3 **omit quantitative targets**, utilizing existing KPIs can be suggested. For example, K8 could modify their KPIs “total hours/average hour of (human rights-inclusive) code of conduct training” (p.94) into e.g., percentage of (human rights-inclusive) code of conduct training, in order to raise Clarity of their goal “We strive to ensure our employees and third parties comply with our policies on human rights issues, including mutual respect, a safe and healthy workplace, freedom of association and collective bargaining, wage, and working hours” (p.34).

Tangible targets not only appeal to readers about how they take this topic seriously, but they can also facilitate companies in developing action plans and managing performance. Scandinavian companies show high Clarity and Significance; their commitment to human

rights protection is well-presented in targets, “Zero incidents of human abuses, Zero labor principles violation” (S2, p.132), “2025 target: 100% compliance with S4’s human rights policy” (S4, p.99).

Moving on to **Comparability**, K7 has single-year data of “Total human rights training hours”, which makes a **comparison with the previous years unavailable**. On another note, K7 could set other KPIs representing the outcome of management activities. For instance, K7’s KPI “Total human rights training hours” (p.27) may show the company’s efforts, but it does not necessarily result in zero human rights violations. Thus, KPIs such as the number of breaches of human rights policy or confirmed cases of human rights violation could be employed, as shown in Scandinavian companies.

Finally, **Balance** is the other criterion where two regions have a gap in coverage levels. Scandinavian companies’ reporting addresses challenges such as how their operation is exposed to potential human rights risks and how their business could negatively affect human rights. Examples are:

As a fables company, S2 relies on third parties to manufacture, assemble, and to a large extent, test our products. Our direct exposure to issues related to child labor, forced labor, or human trafficking is therefore limited in our direct operations. Due to this, our focus related to addressing human rights and labor risks are directed to engagement with our supply chain. (S2, p.123)

S6 operates in countries/areas with high risk of human rights abuse, including child labor, forced or compulsory labor, poor working conditions, limitations of the freedom of association and discrimination. Risks to the Group’s reputation may arise from relationships with business suppliers who do not comply with internationally accepted ethical, social and environmental standards. (S6, p.49)

In addition to challenges, Scandinavian reports include the companies’ response to human rights-related non-compliance incidents during the reporting year. S1, for instance, outlines:

The majority of our tier 1 vendors are based in Norway or other low-risk countries. However, we are aware of potential human and labour rights risks that may occur in our operations or further down in our supply chain. In cases where S1’s operations might have caused or contributed to adverse human rights impact, we will provide or cooperate in providing appropriate remediation to individuals, workers and local communities. To such effect, we will also provide or cooperate in effective grievance mechanisms, where relevant. (S1, p.19)

Furthermore, the reports disclose non-compliance incidents during the reporting year by S4 “In 2019, breaches of employee rights were reported in connection with hazelnut farming in Turkey, and as a result our companies have intensified their efforts in this area.” (p.147)

In short, Scandinavian reports are well-balanced, sharing both positive and negative aspects of the company’s practices. On the other hand, Korean reports are **prone to avoid mentioning downside performances**. More Balance is required for Korean companies to have a higher quality of disclosure.

Code 36. Health and Safety

Occupational health and safety, preventing work-related hazards or incidents that result in injury or ill health, are **Materiality** to all sample companies. Companies need sound safety management systems to minimize health and safety accidents by developing internal policies, procedures, and proper budget allocation (Berhan, 2020).

Work-related hazards are not limited to physical harm; psychosocial harm also counts. GRI's definitions are:

Physical harm (e.g., radiation, temperature extremes, constant loud noise, spills on floors or tripping hazards, unguarded machinery, faulty electrical equipment); Ergonomic harm (e.g., improperly adjusted workstations and chairs, awkward movements, vibration); Chemical harm (e.g., exposure to solvents, carbon monoxide, flammable materials, or pesticides); Biological harm (e.g., exposure to blood and bodily fluids, fungi, bacteria, viruses, or insect bites); Psychosocial harm (e.g., verbal abuse, harassment, bullying) (GRIa, 2022, p.685).

Sample companies' material topics converge to "Health and safety" and "Employee wellbeing". In the case of K3, "Widespread safety and health culture" is classified into general issues; however, the report discloses relevant information in the topic-specific disclosure section. Thus, coverage level analysis included K3. Overall, the information provided by the sample companies is satisfactory. Not only is a safety management system consisting of internal safety policy, procedure, and measures in operational processes well developed but also the disclosure of such information appears advantageous and appropriate for stakeholder's use.

The result, however, indicates that 0.7 points lower Korean companies' average score (2.3) compared with Scandinavia's (3.0). This arises from six Korean companies (K1, K3, K4, K6, K7, K8) that scored as 2 due to inadequacy in certain criteria.

To start with, **Clarity** and **Significance** were identified as the most extensive development areas for Korean companies. In respect of target setting, K1, K7, and K8 **do not have quantitative targets**, even though a broad goal is outlined as "To achieve world-class safety at all our business sites..." (K1, p.69), "The company strives to ensure standardized protocols at all its sites and employs expert resources to help drive a best-in-class environmental, health and safety (EHS) culture across all its operations" (K7, p.29), "K8 strives to ensure workplace safety and to minimize injury risks" (K8, p.40).

Scandinavian reports, however, disclose quantifiable targets that are more specific and tangible. Examples include "Zero Tier 1 process safety events, Total Recordable Injury Frequency (TRIF) < 2.0 /million manhours" (S1, p.15), "Zero work-related accidents, Zero Lost Time Incident Rate (LTIR)" (S2, p.132), "Zero fatal accidents and life changing injuries, 3.3 total recordable injury rate per million hours worked" (S3, p.103).

Another pattern seen in Korean companies is **scarce information about performance outcomes**. All companies provide three to five years of data on KPIs (e.g., number of work-related accidents, total recordable injury frequency/incident rate, safety and health training hours), which fulfills the criteria of **Comparability**. Nonetheless, those data are often disclosed separately in the Appendix, meaning that qualitative data interpretation is insufficient, lowering **Clarity** levels.

To illustrate, five companies experienced underperformance (K1: increased incidents frequency rate and injury rate, K3: increased domestic industrial accident rates, K4, K6: increased LTIR, K7: increased number of incidents) in comparison with the previous year, and yet none of them give an explanation the outcome. On the other hand, Scandinavian reports transparently what happened and what they will do for prevention, as seen in S1 and S4 reports:

The Total recordable Injuries Frequency (TRIF) has, however, increased from 1.2 in 2020 to 1.9 in 2021. This is an area we will focus on improving in the coming year, for example through our quarterly HSE learning campaigns where one quarter is devoted to personal injuries. (S1, p.73)

An accident in connection with the starting up of a machine at one of our factories in the Czech Republic in spring 2021 caused the death of a contractor. The accident resulted in an extensive investigation, and the robot systems in all our companies were reviewed. (S4, p.202)

These Scandinavian reporting practices of high Clarity and Balance levels. K3's reporting, however, is in opposition to Scandinavian reporting practices. For example, despite an increase in the domestic industrial accident rate and Lost Time Injury Frequency Rate (LTIFR), the K3 report **only highlights their positive outcomes** "No domestic or overseas deaths between 2018-2021" (p.137), indicating a lack of **Balance**. Considering that some stakeholders may regard safety-related underperformance as social sustainability risks, Korean companies should address negative aspects of corporate practices to alleviate stakeholder concerns and ultimately reinforce reporting quality in Clarity and Balance.

Code 38. Product Responsibility

Five Korean firms (K1, K3, K5, K7, K8) selected product responsibility as one of the material topics, whereas only one Scandinavian firm (S4) views this topic as **Materiality**. A closer look at terminologies of material topics suggests two types of product responsibility. One is high product safety and quality, as seen in reports of K1, K5, and K7 "Product safety and quality", K3 "Develop a modified risk product", K8 "Customer satisfaction" and S4 "Safe products". The other definition is ethical marketing, as K1 "Responsible marketing and customer relations management" and K3 "Implement responsible marketing policies" raise it as key agendas.

Although more Korean companies report on this topic than Scandinavian companies, the average coverage levels show a substantial gap between Korea (2.0) and Scandinavia (3.0). First, not all Korean companies fully meet the criteria of **Clarity**. For instance, K1 reveals its goals, "reinforcement of quality and safety management systems" (p.19) and "promoting the healthy and safe use of digital devices" (p.58), in several sections throughout the report. However, **no specific section outlines a holistic approach to product responsibility**. This indicates that K1 could enhance accessibility to navigate readers interested in product responsibility. S4's reporting can be a benchmark for Korean companies.

S4, one Scandinavian company that addresses "Safe products" as a material topic, outlines their management approach, mid-term target, and progress towards the target in Safe products section. Action plans and activities of S4 are aligned with the target "100% food producing factories at green level in accordance with S4 Food Safety Standards by 2025, 100% approved suppliers in accordance with the S4 Food Safety Standard by 2025" (p.99), fulfilling the assessment criteria Clarity and Significance.

Four other Korean companies have overall high coverage levels in disclosure of detailed activities during the reporting year are easily understandable to readers. However, most Korean companies (K1, K7, K8) **need more quantitative targets**. For example, only K3 has quantitative and time-bound targets "100% follow responsible marketing policies in Korea and exporting countries by 2025, zero non-compliance cases of responsible marketing by 2025" (p.22). While K5 has a quantitative target of "deliver impressive quality to customers by following the principles and basics and keeping promises made to customers" and the qualitative target of "achieving zero defect, zero quality accident, and zero loss" (p.31), it is **uncertain when the target year is and the KPIs' status quo** (i.e., the number of defects, quality accidents, and losses in the reporting year). This explains why Korea has lower Clarity and **Significance** compared with Scandinavia.

Regarding **Comparability**, S4 discloses three years of KPIs such as “*the number of participants in food safety training, share of volume manufactured in compliance with the S4 Food Safety Standard*” (p.179). Likewise, three Korean companies (K3, K7, K8) released quantitative KPIs like number of recalls, number of safety defects, customer satisfaction survey score measured in the past three to four years, meeting the requirements of Comparability. However, K1 **does not have KPIs**; K5 **does not disclose the measured values despite having KPIs**.

Lastly, no significant differences were marked in the **Balance** criteria between the two regions. Although one non-compliance incident related to product safety occurred in S4 during the reporting year, a brief description of the incident was provided, “*One incident linked to possible salmonella contamination of product*” (S4, p.179). This indicates that S4 reports are well-balanced as negative performance is transparently disclosed. Similarly, K3 shares litigation related to marketing, updating the status: “*The NHIS filed a claim for damages against the defendants, claiming that approximately KRW 53.3 billion was used to treat diseases caused by smoking between 2003 and 2012. Currently second trial in progress*” (p.37). Other Korean companies clearly state that there were no significant incidents related to product responsibility.

Code 39. Corporate Philanthropy

Even with exhaustive reporting on philanthropic activities by all samples, seven companies (K2, K3, K4, K6, K7, S2, S6) do not perceive this topic as a **Materiality** issue. This tendency is more dominant in Korean companies as only less than half (K1, K5, K8) assessed corporate philanthropy as a material topic. In contrast, more than half of Scandinavian companies (S1, S3, S4, S5) incorporated it into materiality. The form of wording in materiality topics was indistinguishable between Korea and Scandinavia; “Local communities” and “Community development” appeared as keywords.

The coverage levels of this topic are not significantly different between the two regions, howbeit Scandinavian firms’ average score (3.0) is slightly higher than Korean firms (2.7). Most reports (K5, K8, S1, S3, S4, S5) fully meet four assessment criteria (Clarity, Significance, Comparability, and Balance) other than K1. To address the materiality of “Empowering communities”, K1 has a clear vision of “*Together for Tomorrow! Enabling People*” (p.42) and measures were taken, such as “*we have shared our innovative manufacturing technologies and expertise with SMEs through Smart Factory Support since 2015*” (p.46), “*we operate C-Lab to develop innovative ideas into business opportunities and contribute to vitalizing the Korean startup ecosystem*” (p.47).

Notwithstanding many detailed cases reported, disclosure related to KPIs appears questionable. As already mentioned in Code 33. Waste, K1 adopts **cumulative values when unveiling KPIs**, such as “*total employee volunteer hours: 9,903,186 (cumulative sum 2012-2021), number of beneficiaries of our CSR activities: 22,150,865 (cumulative sum 2012-2021), number of beneficiaries of the Smart Factory Support Program: 2,812 (cumulative sum 2015-2021)*” (p.16). Considering that the annual reports supposedly convey the performances of the reporting period, one could argue that cumulative KPIs debase the **Clarity** and **Comparability** of the report.

Furthermore, **inconsistency among KPIs** was observed in the way of data presentation. For example, KPIs linked to Small and medium-sized enterprises (SMEs) support “*number of beneficiaries of smart factory support*” (K1, p.21) are non-cumulative data (i.e., the data limited to the reporting period), whereas “*number of beneficiaries (persons) of youth training programs*” (K1, p.91) employ cumulative sum as a default. This casts doubt on K1’s reporting principle, whether convincing rationales exist behind this approach or not.

Furthermore, if K1 intentionally opted for accumulative KPIs to display the data more attractively, it damages the **Balance**. K1, thus, should re-examine why cumulative KPIs are suitable in reporting, given that none of the Scandinavian best practices use accumulative KPIs.

Group (d) Difference value = 0

Korea and Scandinavia have indistinguishable reporting quality in Group (d) codes. All 14 sample companies show high coverage levels in four codes: 1) Company Profile, 2) Initiatives and Commitment, 3) Governance Body and Procedure, and 4) Code and Policy.

Table 21. Reporting components in group (d) Difference value=0

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
Child codes		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
11	Company profile	3	3	3	3	3	3	3	3	3.0	3	3	3	3	3	3	3.0	0.0
13	Initiatives and commitment	3	3	3	3	3	3	3	3	3.0	3	3	3	3	3	3	3.0	0.0
20	Governance body and procedure	3	3	3	3	3	3	3	3	3.0	3	3	3	3	3	3	3.0	0.0
21	Code and policy	3	3	3	3	3	3	3	3	3.0	3	3	3	3	3	3	3.0	0.0

Source: Own study

Code 11. Company Profile

All reports have high **Clarity** of company profile, providing a comprehensive description of the company’s industry, business activities (i.e., main products and services), operation sites, and the number of employees. It is worth noting that half of the sample companies (K3, K4, K6, K8, S3, S5, S6) incorporate the word “sustainable” or “sustainability” in the company profile. Examples are:

We are laying the foundation for stable revenue generation and **sustainable** growth through the active market entry and continuous business structure innovation. (K3, p.8)

Moving forward, we will create new possibilities and value for steel through continuous R&D and generate **sustainable** corporate value by leading the steel industry. (K6, p.7)

With an enduring commitment to innovation, technology and **sustainability**, K8 has become a world-renowned brand and industry leader in the global marketplace. (K8, p.8)

S3 is a leading aluminium and energy company committed to a **sustainable** future. (S3, p.5)

S5 is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, **sustainable** future. (S5, p.7)

S6 is a world-leading provider of **sustainable** productivity solutions. (S6, p.21)

Code 13. Initiative and Commitment

Participation in sustainability initiatives can be a starting line for ESG promotion, ultimately leading to long-term business (Özdemir & Ergun, 2021). Analyzing the reports, all companies clearly state the type of initiatives they are partaking in and current progress towards commitment, with a high level of **Clarity**.

UN SDGs and UNGC are the most widespread global initiatives in the two regions, followed by CDP, TCFD, SASB, and Responsible Minerals Initiatives (RMI). Science Based Targets initiative (SBTi) is more prevalent in Scandinavia than Korea since none of the Korean companies' emissions reduction targets are SBTi-validated, whereas two Scandinavian companies (S5, S6) are.

Moreover, Scandinavian companies commit to five to nine initiatives, including regional/local carbon-neutral initiatives. The range of initiative numbers is smaller in Korea, from three to seven. Nonetheless, all reports meet the criterion of **Sustainability context** in that 1) the disclosure of initiative and commitment addresses both environmental and social aspects and 2) the company's sustainability strategy and goal integrate the commitments to initiatives.

Code 20. Governance Body and Procedure

All companies disclose governance composition and relevant procedures to execute sustainability strategies and action plans. ESG/sustainability committee (or council) is the most common primary governance body to promote and manage sustainability practices. Reporting content includes each committee member's responsibility, internal reporting process, and activities during the year, such as the number of meetings and agenda, with high levels of **Clarity** and **Sustainability context**.

While all companies clear the assessment criteria with good quality information on governance composition and procedure, it should be noted that sustainability governance is a contemporary trend. For instance, half of the Korean companies (K1, K3, K5, K7) newly established ESG/sustainability committees between 2021 and 2022. Further, some companies (K4, S2, S5) are restructuring sustainability governance to align with their changing sustainability targets and plans.

Code 21. Code and Policy

All companies have an internal policy to appropriately cope with environmental and social matters. Internal policies, the so-called code of conduct, are based on the legal requirements and commitments to initiatives such as UNGC principles. All companies not only disclose what standards or legislation they benchmarked to establish internal policies but also introduce how they implemented code of conduct effectively, including training for employees, suppliers, and anonymous whistleblower channel operation for internal misconduct reporting. A comprehensive explanation of the company's policy and management system gives high **Clarity**.

In addition, reports fulfill the criteria of **Significance** and **Comparability**. Significance, for instance, was confirmed by combining quantitative KPIs such as the number/percentage of employees who completed code of conduct training with the qualitative explanation. Further, multiple years of KPIs data enable the comparison with the previous years, meeting the criteria of **Comparability**. To sum up, both Korea and Scandinavia show high levels of Clarity, Significance, and Comparability in Code 21. Code and Policy disclosure.

Group (e) $0 < \text{Difference value} \leq 3$

Surprisingly, there was a reporting component where Korean companies' average score is higher than Scandinavia; however, the difference (0.1) is insignificant as seen in Table 22. Considering that the number of companies that scored 2 is the same (one company each in Korea and Scandinavia), the average score difference is due to the non-identical sample size.

Table 22. Reporting components in group (e) $0 < \text{Difference value} \leq 3$

Reporting Components		Korea								AVERAGE [K]	Scandinavia						AVERAGE [S]	Difference Value (Average [K] - Average [S])
Child codes		K1	K2	K3	K4	K5	K6	K7	K8		S1	S2	S3	S4	S5	S6		
16	Materiality assessment	3	3	3	3	3	3	3	2	2.9	3	3	3	3	2	3	2.8	0.1

Code 16. Materiality Assessment

Most companies showed high coverage levels in the materiality section. All reports meet the **Clarity** by providing an overview of the methodology used for materiality assessment (e.g., benchmarking peer group cases, media, and internal press releases analysis, surveys on stakeholders), as well as progress (e.g., material issue pool identification, prioritization, selection of key issues) and the result.

Two reports (K8 and S5) were assessed with a score of 2 due to **Timeliness**. K8 and S5 perform materiality assessments every two years, whereas other companies conduct materiality analyses annually. The annual analysis helps identify major issues that could significantly impact the performance and respond to changing stakeholders’ concerns timely, as mentioned in the reports that scored 3. This suggests that K8 and S5 should consider updating material topics yearly to enhance Timeliness.

Appendix J – Comparison of Clarity Levels in “Diversity and Inclusion” Disclosure

The examples below show the difference in the Clarity level between Korea and Scandinavia.

Low Clarity (Score 1)	
K1	<p>An unwavering commitment to building a diverse and inclusive workplace is necessary for true innovation and progress. We strive to nurture a corporate culture that brings together talented people from different backgrounds and perspectives and encourages them to engage with each other. We do not discriminate against gender, race, nationality, ethnicity, sexual orientation, religion, or any other group identity, while, at the same time, promoting practices that drive greater diversity and equality. We also strive to ensure that diversity and inclusion are represented throughout the entire lifecycle of our products and services. (K1, p.65) (Aim, approach)</p>
K6	<p>Our personnel management regulations explicitly set forth the fundamental principle of diversity that discrimination by reason of gender, race, ethnicity, country of origin, nationality, or cultural background shall not be tolerated in our personnel management system, including recruitment, retirement, and promotion. (K6, p.49) (Aim, approach)</p> <p>As of December 31, 2021, K6 has 11,499 employees with an average length of service of 13 years. We have 221 employees with disabilities and 341 employees with national merits. Across our overseas subsidiaries, we have 684 employees in Asia, 233 employees in America, and 223 employees in Europe. In management, there are 254 women, accounting for 7.7% of total management positions. There is no pay disparity between male and female employees as base pay is determined by job rank and seniority. Whether in a management position or not, all employees are paid the same base pay by job rank with no otherwise pay disparity. (K6, p.49) (Status quo, absence of goal)</p>
High Clarity (Score 3)	
S2	<p>S2 has an ambition to minimize the gender gap and supersede the industry benchmark. Considering that tech is continuously changing our lives, female perspectives as well as participation is important to drive that development in a sustainable direction. (S2, p.127) (Aim, approach)</p> <p>During 2022, S2 will develop and implement a longer-term, global diversity and inclusion strategy with defined organizational targets. Our plan for 2022 includes the following initiatives: Conduct diversity and inclusion awareness training for all people managers, Establish a global job leveling structure as a foundation for a compelling, consistent, fair and market-oriented approach to size and align all roles, Assess all global visual and written employer branding, job advertisements and marketing material to ensure inclusive messaging, Track and analyze gender distribution on all job advertisement applications, Implement an efficient employee engagement tool to continuously measure the internal perception on diversity and inclusion and more, Continue our focus of attracting and promoting female candidates, Leverage best-of-breed assessment tools in internal recruitment and promotions. (S2, p.21) (Action plan)</p>
S3	<p>Our strategic approach to diversity, inclusion and belonging, is founded on our overall business strategy and our three core values: care, courage and collaboration. The ambition is to have a high-performing, inclusive and sustainable work environment based on inclusion of our differences. (S3, p.107) (Aim, approach)</p> <p>In 2022, we will work to further understand the results, root causes and identify mitigating actions, such as Diversity, inclusion and belonging overall strategy approved by the Corporate Management Board, mandatory online diversity, inclusion and belonging training implemented for all white-collar workers,</p>

	<p>roadmaps developed in each business area and corporate staff function to deliver on the overall strategy, integration of compensation data in our people master data system. (S3, p.107) (Action plan)</p> <p>Our goal for the share of women in S3 is 25% by 2025, including permanent and temporary employees. In 2021, we achieved 20 percent. This was reached in part due to the sale of the S3 Rolling business area, which had a higher proportion of men than the S3 average. In reaching our target, retention is as important as recruitment. The share of women in S3's Board of Directors was 40% in 2021. With 3 women among the seven shareholder-elected members and one woman among the three employee representatives on the Board of Directors, S3 complies with the Norwegian legal requirements on women representation. The proportion of women on S3's Corporate Management Board was 44 % in 2021. (S3, p.108) (Clear goal setting, activities and outcomes in alignment with the target, action plan)</p>
S6	<p>Our goal of 30% women in the Group by 2030. In 2021, progress was made towards better gender balance with 20.9% (20.0) women in the workforce by year end. (S6, p.39) (Clear goal with numbers)</p>

Source: Sample companies (K1, K6, S2, S3, S6)' reports