



# UNIVERSITY OF GOTHENBURG

## SCHOOL OF BUSINESS, ECONOMICS AND LAW

### **The ESG reporting quality changes in Sweden**

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## **Abstract**

Motivated by global challenges such as climate change and resource depletion, sustainability has become a crucial focus for businesses. Stakeholders are demanding greater transparency on Environmental, Social and Governance (ESG) issues, making strong ESG reporting essential. This shift has increased the importance of ESG reporting quality, especially in Sweden, which is known for its innovative practices and compliance with the EU ESG reporting directive.

The purpose of this qualitative study was to analyze the changes in the quality of ESG reporting for a specific Swedish listed company industry in a series of dynamic environments such as flu and war outbreaks after 2018 as time and related institutions have evolved. In order to do that, the study used the ESG Information Quality Analysis Framework proposed by Arvidsson and Dumay (2022) to assess ESG reporting along three critical concepts: position, development and performance. The analyses indicated an increase in the ESG index and all its sub-dimensions (Environment score, Social score, and Governance score) in 2019 compared to 2018, as reported in previous literature (Arvidsson & Dumay, 2022). This increasing trend continued through 2021 and 2022. It was concluded that the improvement may be due to the impact of dynamic influences, firms are becoming more adept at integrating reporting standards such as the GHG Protocol (Greenhouse Gas Protocol), SDGs (Sustainable Development Goals), UN Global Compact, and GRI index into their reports.

**Keywords:** ESG reporting quality, sustainability, the EU Directives, Swedish listed companies, Analytical ESG Information Quality Framework

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# **1 Introduction**

## **1.1 Background of the study**

The increasing policing and monitoring of business by the masses that seek for an ethical behavior given the changes faced in the society (Daub, 2007). Challenges about climate change, poverty and extreme use of resources have today increased interest in sustainability at the organizational, governmental and individual levels (Bahnean et al. 2023). Stakeholders' demands on sustainability issues have pressured companies to report with increasing transparency on environmental, social and governance related matters. This is commonly known as ESG, which is a framework used by companies that enables them to determine their business' non-financial risk, ethical behavior, and sustainability priorities (KPMG, 2020). On a global scale companies will focus on planning on ESG-related issues and at the same time ensure that ESG corporate performance information is met.

ESG has become imperative and no longer a choice (KPMG, 2020). It has become a critical factor with profound impact as companies that have been unserious with it from the start incurred loss of financing, employees, and customers consequently affecting their business survival. These have not only given more grounds to ESG reporting in many countries of the world like Sweden, but it has caused more concern to the ESG reporting quality (Marcelius et al., 2024). This importance given to the ESG reporting quality has attracted academic interest within the said area and today we have many studies such as Fernández-Feijóo-Souto et al. (2012), Diouf & Boiral, O. (2017), Daub (2007), Aluchna et al. (2023) and (Arvidsson & Dumay, 2022) that designed frameworks that measure ESG reporting quality and advance reasons for their result patterns.

## **1.2 Statement of the Problem**

Over the past few years, research into the quality of Environmental, Social, and Governance (ESG) reporting has significantly increased. Studies like the Fernández-Feijóo-Souto et al. (2012), Diouf & Boiral, O. (2017), Daub (2007), and Aluchna et al. (2023) have shown a consistent increase in ESG reporting quality across a number of countries and industries. In general, these studies explore aspects of ESG reporting, including its changes with time, application quality, and various influencing factors. Notably, the research by Arvidsson and Dumay (2022) places focus on the Swedish context, stressing that Sweden's innovative

reporting practices, soaring rankings in ESG information integration, and conformity with the 2014 EU ESG Reporting Directive stand as key factors in improving the quality of ESG reporting in Sweden.

Although, regardless of providing valuable insights, Arvidsson and Dumay's study is bound to data up to the year 2018 and does not involve future factors that may perhaps seriously impact the quality of ESG reporting, such as global crises like the Russian-Ukrainian war and the COVID-19 pandemic, the gain in momentum of digitization processes, and the recently amended global and EU-level standards and regulations. These recent developed challenges and environmental changes could have very great effects on the quality and performance of ESG reporting (Zhong et al. 2023, Oliveira .2023, Al Amosh et al. 2023, & Alkayed et al. 2024).

In addition, the ESG practices, disclosures, and responsibilities vary significantly across different industries, the choice of specific industries is crucial for the accuracy of research outcomes. According to studies by Lucy et al. (2022) and the report of KPMG (2024), different industries have varying demands and characteristics regarding ESG reporting's industrial focus, standard frameworks, organizational structures, investor demands, and regulatory environments. This provides the motivation to study a specific industry.

Considering the changes in regulations, standards, and laws in ESG disclosure, it is particularly important to conduct a current study on the quality of ESG reporting. Although Arvidsson and Dumay provided a preliminary framework, considering the dynamic and evolving global context, there is a need for more updated and detailed research to supplement and expand the existing knowledge base, for Sweden, a country that holds a leading position in global ESG practices. Such research would not only help understand the current state of ESG reporting but also assist in predicting and shaping future strategies and frameworks for ESG reporting.

### **1.3 Purpose and research question**

The quality of ESG reporting has become increasingly important over time, while its development is being influenced by many factors. The aim of this study is to analyze the changes in the quality of ESG reporting for a specific Swedish listed company industry in a series of dynamic environments such as flu and war outbreaks after 2018 as time and related institutions have evolved.

For this purpose, the study starts with the existing literature in order to build confidence in conducting research on current ESG reporting quality. Secondly, the focus is on the Analytical ESG Information Quality Framework which was developed by Arvidsson & Dumay, (2022) in order to assess the quality of ESG reporting. Within this framework, the ESG information quality is measured in terms of the three critical concepts: *position*, *development* and *performance*. After analyzing the collected sample reports, the results are discussed and summarized.

Based on all of the above, the research question is:

*How has the quality of ESG reporting in Sweden changed since 2018?*

## 2 Theoretical Framework

### 2.1 Definition of ESG Reporting Quality

According to Arvidsson & Dumay (2022), the quality of ESG (Environmental, Social, and Governance) reporting can be operationalized through three critical concepts: *position*, *development*, and *performance* as seen in Table 1, which collectively assess the comprehensiveness and effectiveness of a company's ESG disclosures.

The reporting quality under *Position* shows “whether a company highlights any environmental initiatives and how many of these are described in detail” for the Environmental dimension; “whether a company highlights its stakeholders and how many of these stakeholder” for the Social initiative; and “whether a company highlights its governance system and describes the present status of its governance system” for Governance (Arvidsson & Dumay, 2022).

The reporting quality under *Development* shows “whether a company describes progress related to its environmental initiative(s) in its report”; “whether a company describes both the overall objective and design of its stakeholder engagements and how it engages with its different stakeholders” for Social; and “whether a company is a member of UNGC and at least describes what UNGC is and whether the company applies GRI and at least describes what GRI is” for Governance (Arvidsson & Dumay, 2022).

The reporting quality under *Performance* shows “whether a company highlights target (s), states a time frame for achieving target (s) and describes outcome (s) related to the environmental initiatives that it highlights in its report”; “whether a company conducts a materiality analysis and how much detail it provides and whether it describes the process and outcome of this materiality analysis” for social; and “whether a company includes a GRIindex with indicators in its report” for Governance (Arvidsson & Dumay, 2022) .

The above framework holds up to regulatory contexts such as the EU Directives, particularly Directive 2017/C215/01 and the amended 2019/C 209/01, that emphasize on the importance of disclosing non-financial information that is essential for the comprehension of an organization's impact on sustainability. These directives point out reasons as to why companies should be transparent in reporting environmental, social, and governance-related information, alongside the risks and impacts of climate change on the company and vice

**Table 1: Analytical ESG Information Quality Framework**

	Environmental (E)	Social (S)	Governance (G)
<i>Position:</i> describes the current status of the initiative(s)	Whether a company highlights any environmental initiatives and how many of these are described in detail	Whether a company highlights its stakeholders and how many of these stakeholder relationships are described in detail and whether the company identifies its most relevant stakeholders	Whether a company highlights its governance system and describes the present status of its governance system
<i>Development:</i> shows progress related to the initiative(s)	Whether a company describes progress related to its environmental initiative(s) in its report	Whether a company describes both the overall objective and design of its stakeholder engagements and how it engages with its different stakeholders	Whether a company is a member of UNGC and at least describes what UNGC is and whether the company applies GRI and at least describes what GRI is
<i>Performance:</i> highlights target(s) related to the initiative(s)	Whether a company highlights target(s), states a time frame for achieving target(s) and describes outcome(s) related to the environmental initiatives that it highlights in its report	Whether a company conducts a materiality analysis and how much detail it provides and whether it describes the process and outcome of this materiality analysis	Whether a company includes a GRI index with indicators in its report

(Modified from Arvidsson and Dumay 2022)

versa. The above structured approach enables an analysis that has every necessary part of a company's ESG reporting quality by evaluating the current state and at the same time the evolution and effectiveness of their sustainability practices over time. This is important for both the investors and the financial analysts who use this information to assess an

organization's sustainability performance and align their investment decisions with sustainability goals.

## **2.2 The Development of ESG reporting quality**

Recent studies have shown the increasing importance of ESG (Environmental, Social, and Governance) reporting in the corporate sector. Ndung'u (2022) and Monica & Neha (2023) indicated that ESG reporting has gained an increasing significant value, encouraging companies to integrate these criteria into their investment strategies. This shift has led to a remarkable increase in the all-encompassing ESG investments, with a 15% increase observed over the past two and a half years. The European continent solely accounts for half of the global ESG assets. Distinctively, in the years 2017 and 2018, 78% and 95% of investors, respectively, had included ESG into their investment strategy and decision-making processes.

The change in ESG reporting has indicated significant improvement, as documented by Bosi et al. (2022). This improvement in ESG and sustainability reporting is as the result of the growing importance placed on ESG by stakeholders, corporations, and policymakers, pioneered by the global emphasis on sustainable practices. The years 2006 to 2018 report a steady increase in ESG reporting. After 2018, specifically from the year 2021 onwards, report an even more pronounced increase in ESG reporting, with projections in the year 2022 indicating continued growth relative to the existing years.

In Sweden, the trend in ESG reporting quality has also been on the rise. Arvidsson and Dumay (2022) indicated an improvement of ESG reporting quality within the years 2008 to 2013. The year 2018 marked a peak in ESG reporting quality, with all major listed companies issuing sustainability reports. However, it was noted that some smaller companies might not have complied with publishing requirements on platforms like [corporateregister.com](https://www.corporateregister.com). This distinction highlights a disparity in reporting practices between large and smaller enterprises, underscoring the need for broader compliance and standardization in ESG reporting across all business scales.

## **2.3 Swedish context**

Sweden is an excellent subject for studying the disclosure of ESG. Regarding the disclosure of social and governance, Swedish companies are among the top tier (Cahan et al., 2016; KPMG, 2015, 2019, 2022). The national reporting rates in Finland, Iceland, Norway, and

Sweden (Denmark was not included in the study) were 94%, 91%, 91%, and 98%, respectively (KPMG, 2022). Sweden held the highest score among Nordic countries and it reached the 98% reporting rate already in 2020 (KPMG, 2020). Which makes it convincing to say Sweden has been at the forefront of corporate sustainability reporting. From early implementations of environmental and social responsibility reporting to the adoption of comprehensive integrated ESG reporting, Sweden has set high standards in corporate transparency and accountability.

One could argue that due to the emergence of more stateless firms, the ESG reporting will be less dependent on the difference of culture and differences in social and political regulations for different countries (Chen & Bouvain, 2009; Levi-Faur, 2005; Whittington & Mayer, 2002). But on the other hand international companies experience a sense of ‘home embeddedness’ and shape their reporting style based on its “origin” country (Hall & Soskice, 2001; Whitley, 1999).

But why is Sweden positioned in such a high tier regarding ESG disclosure? Initially, Sweden has consistently been a breeding ground for the development and experimentation of diverse, innovative reporting methodologies. Historically, the nation has pioneered in areas such as human resource costing and accounting (Gröjer & Johanson, 1998), reporting on intellectual capital (Mouritsen et al., 2001), and integrated reporting frameworks (Eccles & Serafeim, 2011). Thus, the ESG environment of Sweden is frequently attracting new aspects of corporate reporting and transparency begins to emerge (Chen et al., 2015; Rimmel & Jonäll, 2013).

While voluntary ESG reporting has played a significant role in Sweden, the implementation of the EU Directive (2014/94/EU) on non-financial reporting, effective from 2017, now forces all large Swedish companies to engage in such reporting. This shift has led to numerous companies reporting on ESG matters for the first time. The Directive has significantly increased the emphasis on ESG issues within corporate sectors (EU, 2014; La Torre et al., 2018). This directive is closely linked to the European Green Deal, a policy from the European Commission (2019) designed to shape the EU into a just and thriving society with a modern, resource-efficient, and competitive economy that achieves no net emissions of greenhouse gas by 2050 and decouples economic growth from resource consumption.

Tanguy van de Werve, the Director General of the European Fund and Asset Management Association (EFAMA), backs this new policy and highlights the need for investors to have access to 'strong, comparable, reliable, and widely available ESG data on companies they invest in' (Rust, 2020, p. 15). Consequently, the existing EU Directive is currently under revision, with the upcoming Corporate Sustainability Reporting Directive (CSRD) anticipated to enhance the availability of ESG data (Rust, 2020). Sweden as part of EU member has responded to the call and has sent its CSRD proposal on Feb 15th, 2024 (News released from Ministry of Justice, Sweden on Feb 15th 2024) to its council. Which suggests that new reporting roles will be applied to the listed company with more than 500 employees from July 1st, 2024. Effectively, this means that the first Sweden company covered by the CSRD will start reporting against role from fiscal year 2025.

The current legislation of ESG reporting starts from the financial year 2017, the EU Directive has been incorporated into Sweden's corporate reporting regulations. Swedish firms that either have over 250 employees, a net sale of at least SEK 350 million, or a total balance sheet more than SEK 175 million must prepare the annual report according to the EU Directive. These reports are required to cover a number of topics including environmental, social and employee-related issues, also related to human rights, anti-corruption and bribery practices (CSR Europe & GRI, 2017).

The study shows that the number of sustainability reports in Sweden has significantly increased from 82 in 2008 to 351 in 2018. This indicates a continued upward trend in the increase of sustainability reports by Swedish companies (Arvidsson and Dumay, 2022).

## **2.4 The dynamic influences**

Apart from the Swedish context, the dynamic influences are considered to affect the ESG reporting quality since 2018. Some dynamic influences serve as a catalyst to the ESG reporting quality as they increase part or the whole of ESG scores in Swedish firms. A higher ESG score for either E, S, and G imply strong adherence to ESG policies at the environmental, social, and governmental levels hence an increase in reporting quality. Dynamic influences may highly impact the scores of particular components of ESG than the others and may remain adamant to some.

### **2.4.1 Digitalization**

Environmental, Social, and Governance (ESG) has significantly improved with digitization according to Zhong et al. (2023). The use of advanced digital technologies makes it easy for companies to have quality monitoring and management of their environmental impacts. For example, the use of Internet of Things (IoT) sensors to track real-time energy consumption and emissions, and the use of big data and artificial intelligence to predict environmental risks, results in efficient strategies for addressing climate change. In addition, these technologies also add to the accomplishment of social responsibilities, like improving the measurement of impacts on the society and employee welfare via adding to data analysis capabilities, therefore increasing corporate social responsibility strategies.

Besides monitoring and management techniques in digitalization, Low et al. (2022) pointed out that the application of blockchain technology guarantees the authenticity and security of information found in corporate governance, braggging down fraudulent activities and expanding the trust among shareholders and the regulatory bodies. This technology-enhanced ESG performance at the same time boosts the competitive market position of organizations then draws and keeps investors, especially the ones with high attention on sustainable investments. With these integration, enterprises can be responsible actors and boost their image on the global stage, making sure of their social contribution and business success in the long term.

In conclusion, as Fang et al. (2023) stated, digitalization improves the transparency and the traceability of information, and having quality monitoring and management of companies' environmental impacts improves ESG performance scores. As a result of digitalization, the agency cost reduces and there is an increase in the governance (G) performance scores. Moreover, digitalization yields an improved goodwill and keeps the social (S) performance scores on the higher level. However, digitalization leads to high quality of environment monitoring but will not increase environmental (E) performance scores (Fang et al., 2023). Increasing ESG performance scores imply companies' increased adherence to ESG practices and hence high reporting quality (Anderson & Safdie, 2023).

## **2.4.2 The Pandemic influenza : Covid-19**

The recent Covid-19 pandemic, as established in the study by Al Amosh et al. (2023) and Alkayed et al. (2024), had an outstanding constructive impact on the Environmental, Social, and Governance (ESG) reporting quality. Their studies indicated a rise in sustainability initiatives under the period affected by the pandemic relative to the pre-pandemic period. This improvement in ESG quality was broadly as a result of enterprises trying to show their ethical adherence during the crisis.

Al Amosh et al. (2023) and Alkayed et al. (2024) additionally pointed out that this movement to an increased compliance with ESG benchmarks was motivated by the importance of demonstrating their ethical adherence given the global health crisis. This implied great changes in corporate strategies, including added investments in health and safety, additional elaborate disclosures on employee welfare and community engagement, and increased adherence with environmental regulations to ascertain a global reaction towards the pandemic's challenges.

In general, the practice of ESG measures increased during the pandemic and as a result companies witnessed an increase in reporting quality as this was important to businesses located in areas deeply attacked by the pandemic (Gao & Geng, 2024). The scores for good governance level (G) and Social Performance (S) remained high as they were very important in fostering corporate resilience. Strengthening the companies' ability to endure adverse incidents caused by the crisis. Globally, companies highly affected by the epidemic reflected a high level of ESG scores as they were ready to remain resilient. This has been considered the catalyst to the ESG reporting quality since the outbreak of the crisis.

## **2.4.3 The Influence of Wars**

Oliveira (2023) assessed the impact of the Russian-Ukrainian war on the Environmental, Social, and Governance (ESG) reporting quality, reaching important conclusions. In the period of geopolitical crisis, investors chose to render their support to enterprises that complied to high-quality ESG practices. This attitude did not only increase the general ESG reporting quality but also showed investors' desire to pay a premium to companies that serves as a motivation for them to follow the robust ESG strategies amid complex and turbulent market conditions. This investor behavior shows an increased stability and ethical assurances under circumstances of macroeconomic and geopolitical turmoil.

Furthermore, this support goes above the simple direction of financial capital. As a result of uncertainties caused by the Russian-Ukrainian war, businesses were bound to reconsider their operational and strategic decision-making frameworks, especially within aspects closely linked to environmental and social responsibilities. This condition warrants that, enterprises that could show that their business models and operational strategies were in compliance with long-term sustainability and social responsibility gained attraction from ethically minded investors.

As claimed by a 2024 report by Marcellius et al. (2024), the impacts of the Russian-Ukrainian war went far above the direct realms of finance and investment. The EU energy crisis, the NATO processes challenging Swedish self-sufficiency, pro-ESG defense investments, and a broader acceptance of nuclear energy all positively impacted the ESG quality. These complex factors catalyzed the adoption and implementation of ESG principles, yielding to better ways to address future uncertainties and challenges.

In conclusion, during periods of wars, ESG scores remain on the increase so as to reduce the investors' risk as ESG investment seems to be the safe haven during such times (Katsampos et al., 2024). As a result, existing ESG investments are developed and new ones created which lead to an increase in funding in MSCI Europe ESG Leaders Index together with the MSCI North America ESG Leaders Index. Therefore investors preferring to invest in investments that meet ESG criteria is a catalyst to increasing ESG score hence increasing ESG reporting quality. In this case, ESG becomes paramount and companies are pushed to have to report with an increased quality.

### **2.4.3 The development of EU regulations, GRI standards, and Swedish local laws**

The latest amendments in EU regulations have greatly affected the situation of ESG reporting quality (Bahnean et al., 2023). Particularly, the EU Directive 2019/2088 brought about recent disclosure requirements for the financial sector pertaining to sustainability, which were in addition amended by the EU Directive 2020/852. This amendment confirmed a framework with the objective to increase sustainable investments. Furthermore, the EU Directive 2022/2464, which amends earlier directives such as EU 537/2014, 2013/34/EU, 2006/43/EC, and 2004/109/EC, seeks to solidify the inclusion of sustainability information into corporate reporting (Bahnean et al., 2023). In spite of these amendments, Cordazzo et al. (2020)

pointed out that these amendments in regulation have not increased ESG reporting quality, since they do not foster investor understanding of the added value of the information provided. This is because all listed companies already adopted these new regulations when it was voluntary. Therefore, they do not make any difference in the ESG reporting quality when they become mandatory. The study seems to be a contradiction but rather gives credit to new regulations as a catalyst to quality reporting as indicated by Aluchna et al. (2023) who pointed out that these amendments made that led to new directives have indeed improved ESG report quality, especially within larger corporations.

As regard to circumstances surrounding the Swedish laws, existing acts such as “Sw. årsredovisningslagen 1995:1554” known as the “Swedish Annual Accounts Act”, “Sw. revisionslagen 1999:1079” known as the “Swedish Auditing Act” , and “Sw. aktiebolagslagen 2005:551” known as the “Swedish Companies Act” have been aligned with the EU’s Non-Financial Reporting Directive (NFRD) for reporting purposes (Gernandt & Danielsson, 2023). Furthermore, the Corporate Sustainability Reporting Directive (CSRD) is set to be transposed into Swedish local laws through “Sw. lagen 2007:528 om värdepappersmarknaden” known as “Swedish Securities Market Act”, effective by July 6, 2024. This transition suggests that by 2025, ESG reporting in Sweden will be conducted in accordance with the CSRD, aiming to further enhance the quality of these reports (Gernandt & Danielsson, 2023).

Furthermore, the Global Reporting Initiative (GRI) holds an important role in providing comprehensive guidelines for reporting on environmental, social, and governance aspects, which are fundamental elements of ESG. The aim is to increase the quality of ESG reporting and help companies increase their ESG scores. Therefore through their constant amendments, GRI plays a crucial role to enhance the SG reporting quality and scores in businesses across all sectors. The use of GRI standards for reporting has been widespread among Swedish companies since 2007, supported by the Swedish government's mandate for state-owned enterprises to utilize these guidelines (Marcelius et al., 2024). In Sweden, the GRI standards are the standards adopted for all listed companies within several industries, guaranteeing a harmonious approach to ESG reporting.

## **3 Method**

### **3.1 Design of Study**

This thesis is a qualitative study, dedicated to evaluate the Environmental, Social, and Governance (ESG) content within annual reports or sustainability reports among firms listed on the OMXS30 index.

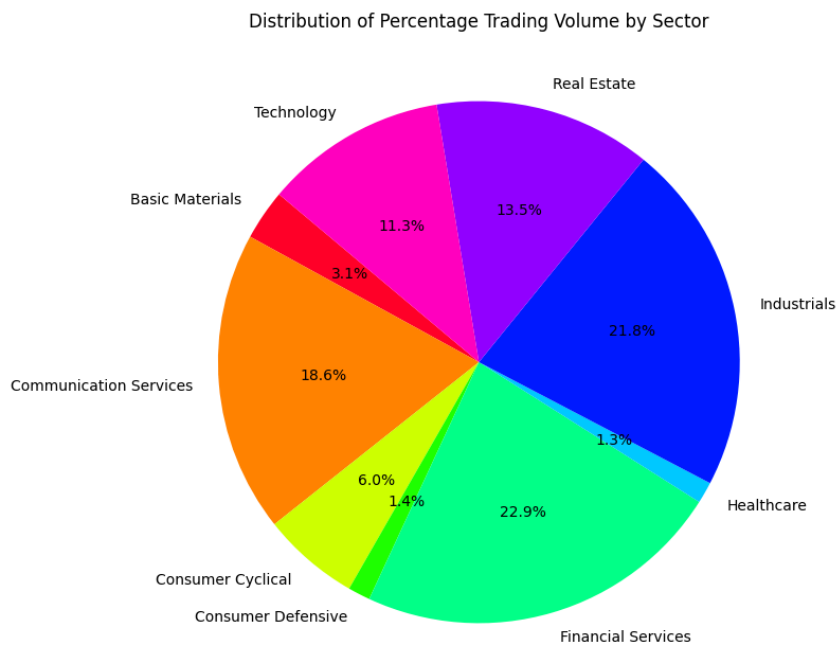
Due to the limited time available for our research, instead of analyzing all the firms listed in the OMXS30, we focus on one sector from the OMXS30. For selecting the firm for our study, we thought that the introduction of mandates by the G20's Task Force on Climate-Related Financial Disclosures (TCFD) and the 2017 EU directive together with the 2019 EU directive requires firms to disclose more financial information related to climate change. These regulations necessitate significant changes in firms' energy consumption and waste recycling practices. Thus, we chose the industrial sector as our main focus, believing that firms in this sector are more responsive to climate change issues, and we could learn from this particular sector how the ESG reporting quality is affected.

We used the ESG information quality framework developed by Arvidsson and Dumay (2022). This framework focuses on evaluating the quality of ESG disclosures through a predefined coding procedure. We selected the reports which start from 2019, the year following the last data point in the referenced study, and continue through 2021 and 2022. The year 2021 was of particular interest due to the potential changes in ESG reporting precipitated by the global disruptions caused by the COVID-19 pandemic. We consider that these disruptions might have uniquely affected ESG reporting norms and practices. Additionally, The year 2022 was selected as it provided the most recent data available at the onset of our research, allowing us to examine current trends and practices.

As in the previous literature, We used the binary score to evaluate the ESG if certain ESG content is mentioned or not. Which helped in visualizing the quality of ESG reports across the sampled firms. The raw data is collected on the excel and follows the calculation of ESG quality scores (Table 4) or sub-scores within each part. Finally the data score of quality for each dimension and ESG index was calculated and visualized with a bar plot.

## 3.2 Data Collection

We selected nine firms, all from the industrial sector of the OMXS30 index (Table 5). These firms together, representing 21.8% of the trading volume in the OMXS30 (Figure 1). As the first step of analysis, we collected the ESG report from the firm's official website (Table 6). We first downloaded the annual and sustainability reports or separate sustainability reports



**Figure 1**

Distribution of percentage trading volume by sector. (Data from yahoo finance)

for the years 2019, 2021, and 2022. We considered

ATCO-A.ST and ATCO-B.ST as a single firm since they shared the same annual reports. This led to the concentration of eight companies in our selection of industrial industry. Then 8 companies with 3 different years, finally we gathered 24 reports

in total. Regarding the different ESG reporting style, for the integrated annual and sustainability reports, we restricted the analyzing content specifically to the pages which are under the sustainability sector. For the firms who only issue separate sustainability reports, the whole report is treated as subject of analysis.

## 3.3 Data Analysis

### 3.3.1 Analyzing the ESG information ratio

We noticed a major change from separate ESG reports to integrated annual and sustainability reports starting in 2018. As a result, the way we collected ESG information pages changed. For companies with integrated reports, we counted the number of pages in the sustainability section of the annual report. We calculated the ratio of ESG content by dividing the number

of ESG pages by the total number of pages in the report. For companies that still issue separate annual and sustainability reports, the total pages number is calculated as the sum of the pages number in the annual report and sustainability report . For more details, please see Table 5.

### **3.3.2 The analyzing procedure**

According to the ESG information quality analysis framework provided (Arvidsson & Dumay, 2022), we divided the ESG report into three dimensional: Environment (E), Social (S) and Governance (G). The evaluations specifically address: the environmental-related initiatives mentioned in the report; identification and ongoing engagement of the company's stakeholders; and the company's overall governance policy and report writing guidelines.

Once we have identified the focus of the horizontal assessment of the quality of information in ESG reports, which are the three general aspects of Environment (E), Social (S) and Governance (G), each dimension was evaluated and given a score based on the vertical assessment framework developed by Arvidsson and Dumay (2022). *Position*, *Development*, and *Performance* three critical concepts thoroughly analyzed and scored. To explain briefly, the *position* is to assess the current state of the different aspects, the *development* is to collect the progress or achievements over time, meanwhile the *performance* is to summarize the relevant results or information related to the future. The detailed scoring criteria will be shown in the next sections with explanations and mostly supported by examples.

#### **3.3.2.1 Environmental dimension**

When evaluating environmental information, the analysis focused on the text and content of the report that described various environmental initiatives such as climate changes, waste, CO2 emissions, GHG (greenhouse gas) emissions.

##### ***Position***

According to the literature statement, when measuring environmental status, it is required to find the number of A, which is the total number of environment-related initiatives mentioned in the report. Then capture the number of initiatives B detailed in the report. In the end, B is divided by A to get the score for this section. For example, in our analysis, one sample company is mentioned in the report:

*We improve the energy efficiency of our products and our operations, while also managing our water use and waste. We have adopted science-based targets for the reduction of greenhouse gas emissions, throughout the whole value chain.*

*(ATCO annual report-2022, p42)*

We observed here that the report mentioned environmental initiatives such as GHG (greenhouse gas) emissions, water use and waste. In addition, in line with the goals of the Paris Agreement and to develop energy-efficient products are also mentioned in this report. So we get the number 5 in part A of the calculation of the environmental *position*.

Continuing to look at what is described in detail in the report, we observed that there are specific and detailed statements on: *Reducing emissions; Waste management; and Water management*. So the score for the environmental *position* part B is 3.

This gives a score of 3/5 (=0.6) for the *position* in the environment dimension of the company's 2022 ESG report.

### ***Development***

In this section we continued to use the total number of environment-related initiatives mentioned in the report A, and then looked for each one that describes the company's environmental performance or development over the last few years (most companies in our samples showed data on development over the last three years). This is usually done in the form of a table that directly shows the numerical changes that have taken place in the last few years. In addition to this, reports with textual descriptions are also counted. Once we have calculated the number C for a specific development project, we need to divide C by A (C/A) to get the score for the *development* in the environment dimension.

### ***Performance***

This is the point where we need to find the part of the report that refers to specific qualitative or quantitative objectives to be achieved in the future. Again, we continued to use the total number of environmental initiatives, A. We then found the report's description of the D specific goals to be achieved ( with information on when the goals are to be achieved and the outcomes that need to be achieved). Finally divided by A (D/A) to get the score for the performance score of the environment dimension.

For instance, to demonstrate how our framework facilitates the analysis of both development and performance, consider the following example from our study :

THE ENVIRONMENT				
Key performance indicators	Target	2022	2021	2020
Reduction in CO <sub>2</sub> e <sup>1)</sup> emissions (tonnes) from scopes 1 and 2, compared to the baseline 2019	-46% by 2030 <sup>2)</sup>	-33%	-17%	-2%
Reduction in CO <sub>2</sub> e <sup>1)</sup> emissions (tonnes) from scope 3, compared to the baseline 2019	-28% by 2030 <sup>3)</sup>	+29%	+5%	+1%
Significant direct suppliers with an approved Environmental Management System	Continuous increase	31%	31%	30%
Water consumption (m <sup>3</sup> )/in relation to cost of sales <sup>4)</sup>	Continuous decrease	8.4	-	-
Reused, recycled or recovered waste from internal operations <sup>4)</sup>	100% by 2030	92%	-	-

(Table retrieved from ATCO annual report-2022, p42)

In the table we can see that the company has given a comparison of the relevant data for 2020, 2021 as well as 2022. The last two items have only data for 2022 and therefore are not recorded in the score. For our assessment, the score C for the *development* section was 3. Putting C/A, we got a final score of 3/5(0.6).

Then look at the three qualitative goals specifically mentioned, -46% by 2030, -28% by 2030, and 100% by 2030. So the D in the performance part of the score is 3. Putting D/ A, we get 3/5 (0.6).

### 3.3.2.2 Social dimension

Arvidsson, S., & Dumay, J. 's (2022) associated the social section of the ESG report with the company's stakeholders, focusing on how the company defines and describes its relationships with its stakeholders. In the process of analysis, we found that this section is usually found in the “stakeholder engagement” section of the reports. We continued to assess the quality of information in the sample reports based on structure of *position*, *development* and *performance*.

#### ***Position***

According to Arvidsson, S., & Dumay, J. 's (2022) framework, the section is scored in two parts. The first one is done by calculating the number of stakeholders mentioned in detail in the report divided by the total number of stakeholders mentioned. For example, in our analysis, one sample firm wrote:

*... of which the most significant are customers, employees and investors.*

(SAND Annual report-2022, p142)

The example clearly mentioned that there are 3 stakeholders of the company as stated above and each of them is described in detail in the following text. So the score for this section can be calculated as 3/3 (detailed/mentioned) to get a result of 1.

The second score for *position* is whether or not the relevant text on how to identify stakeholders is clearly given in the report. If yes, get 1 point. If not, 0 points. During the analysis, it is helpful to find words such as “identified, defined” to assist us in targeting specific areas of text. We used the same sample report mentioned above as an example:

*We have defined a number of stakeholders who can be expected to be affected by THE COMPANY or have an effect on THE COMPANY,...*

*(SAND Annual report-2022, p142)*

We clearly recognize that the company uses the word “defined” to identify their stakeholders. Therefore, the second indicator of position gets a score of 1.

### ***Development***

The scoring of *development* in the social dimension is different from the scoring of the *development* in the environment dimension, the latter one focuses on assessing the performance over time. *Development* of social dimension is to score 1 or 0 based on whether or not detailed descriptions of stakeholder interactions in the report were given. Specifically, the report was able to score a 1 if it described how the company usually engages with its stakeholders, or 0 if it did the opposite. Below is a sample that gives a detailed explanation in our analysis:

*The work to engage with the stakeholder groups is conducted by respective functions within the Group (e.g. Investor Relations, Human Resources, Communication, Sales, Bearing Operations and Purchasing) including managing the direct dialogue and, identifying individuals from whom to seek feedback.*

*(SKF annual report-2019, p120)*

In this example, we saw that the company reached out by having direct conversations. So the company scored 1 for the social development component.

### ***Performance***

Lastly *performance* of social dimension was scored based on whether the company's report includes materiality analysis that are relevant to its stakeholders or not. In the analyzing process, we found that the section with relevant content generally starts with the words “Stakeholder feedback” or “materiality analysis” or as a title. Below is the text of the information that scored 1 for *performance* of social dimension:

*In 2013 we conducted our first materiality analysis. The analysis was reviewed in 2015, and again in 2017. During 2018, we performed a materiality analysis based on requirements in the GRI Standards. Together with selected sustainability experts THE COMPANY's Sustainability Council identified and analyzed the significant impact of sustainability topics on the outside world. In addition, over 250 stakeholders in the form of customers, suppliers and employees assessed which sustainability topics they perceive have a substantive influence on their assessments and decisions in relation to our business.*

*The materiality analysis highlights the following sustainability topics as the most significant ones....*

*(ASSA Sustainability Report- 2021,p41)*

### **3.3.2.3 Governance dimension**

According to the Arvidsson & Dumay (2022) analytic framework, each *position*, *development* and *performance* part of the governance dimension was assessed using the following methodology.

#### ***Position***

A score of 1 is given when the report clearly demonstrates the company's governance structure as well as describes the current state of governance system. A score of 0 is given if no information on the current corporate governance system is presented.

*Corporate governance within THE COMPANY is based on external rules such as the Swedish Companies Act, the Stockholm Stock Exchange's Rule Book for Issuers, the Swedish Code of Corporate Governance (the "Code") and other relevant laws and regulations.*

*(SAND Annual report-2019, p48)*

### ***Development***

The score for *development* needs to be calculated in different steps: firstly, retrieve whether the company states that it is a member of the UNGC and describe what the organization is, as well as having a relevant explanation. If yes, scored 1 and vice versa 0. Secondly, check whether the company follows the GRI standards for the preparation of the report or not. If yes, score 1. and 0 for not. Lastly, the scores from the first two steps are summed together and divided by two to obtain an average, which is the *development* score for the governance dimension. These two points were chosen as assessment criteria for development due to that, being a member of UNGC and applying the GRI standards can be seen as a strong willingness on the company side to show that they are concerned about sustainable governance.

Here are examples of the firm which received a score of 1 for *development*. First is a description of UNGC:

*THE COMPANY has been a signatory to the UN Global Compact since 2008. Our affiliation with the UN Global Compact means that we support and commit to actively promoting and respecting the 10 principles on human rights, labor standards, the environment, and anti-corruption in our operations and in dealings with external stakeholders.*

*(ASSA Sustainability Report- 2022,p38)*

The second is about applying GRI standards:

*This report has been prepared in accordance with the GRI Standards.*

*(ASSA Sustainability Report- 2022,p1)*

Also:

*Global Reporting Initiative (GRI): Global guidelines for sustainability reporting.*

*(ASSA Sustainability Report- 2022,p60)*

We can easily see that this report of the company fulfills both conditions for assessing the *dimension* of governance. Thus, we made the following calculations:  $(1+1)/2=1$ .

### ***Performance***

The last part is assessed based on whether or not the GRI index is listed in the report. If so, we score 1 and vice versa 0 for *performance*. In our analysis process, this section can usually be found by doing a text search of the report and entering the GRI to find the counterpart.

### **3.3.3 ESG index**

After collecting the points for *position*, *development*, and *performance*, we computed the scores for each dimension: Environment (E), Social (S), and Governance (G). For each dimension, the score is calculated by taking the mean of the *position*, *development*, and *performance*. Subsequently, the ESG index is calculated as the mean of the Environment score, Social score, and Governance score.

## **3.4 Research quality**

According to the previous literature, we collected a group of keywords to search for the relevant content in each report. Then based on the keywords that we collected we perform the manual keyword research to screen out the ESG content within the report and then examine the quality of the information. To reduce the error that during the analysis, we performed the analysis twice for each of the reports.

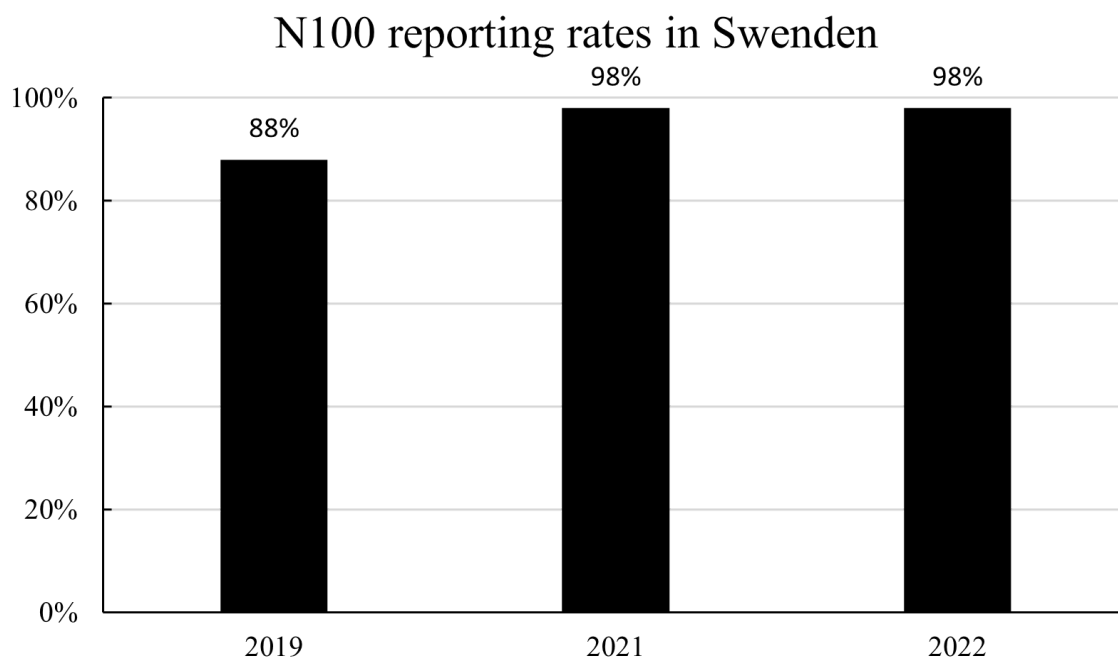
To test the reliability of the coding procedure that we used in the current study, we asked two external volunteers to conduct the same analysis and examined the robustness of the framework in 3 sample companies for 2019, 2021 and 2022. These volunteers received a full instruction of how to search the ESG content in the report, and the standard role of how to score the quality of ESG as we used in the analysis. Afterward the score of ESG reporting quality from external and ours were compared. We confirmed that the coding procedure was robust, volunteers showed similar scores as ours, and we performed the final analysis for all the reports.

## 4 Results

### 4.1 Analyzing the ESG Content Proportion in the Report

In line with the increasing trend reported by Arvidsson and Dumay (2022), ESG reporting has grown since 2017. In this study, we reviewed the KPMG reports in 2020 and 2022. These reports show the ESG reporting rates for a global sample of the top 100 companies (N100) by revenue in 58 countries, territories, and jurisdictions. As shown in Figure 2, Sweden's ESG reporting rate is out of 90% of the samples in 2017, 2020, and 2022, with the reporting rate increasing from 88% to 98% over this period.

As discussed by Arvidsson and Dumay (2022), companies with more than 250 employees must prepare a report in line with the EU Directive (CSR Europe & GRI, 2017). Since 2018, this EU directive has been a mandatory reporting regulation, which may contribute to the increase of N100's reporting rate. Arvidsson and Dumay (2022) concluded that the number of reporting in Sweden is still in increasing trend in 2018. And by reviewing the KPMG's report we confirmed that the ESG reporting in Sweden is still increasing. Even though KPMG's report only focused on N100, considering that there are 832 listed companies on Nasdaq Stockholm and thousands more affected by this regulation, there is still potential for the number of reports to increase beyond the N100. Nevertheless, the increasing trend highlights



**Figure 2**  
Sustainability reporting in N100 sweden during 2019-2022

**Table 2. Number of pages in selected sustainability reporting in swedish company**

Average	16	31	43
Median	8.5	32	39
Min	2	6	7
Max	55	103	144

the growing importance and adoption of ESG reporting, driven by regulatory requirements and increasing awareness of sustainability issues among corporations worldwide. The data from the KPMG reports underscores the significant progress made, especially in regions like Sweden, where compliance with ESG reporting standards has become notably high.

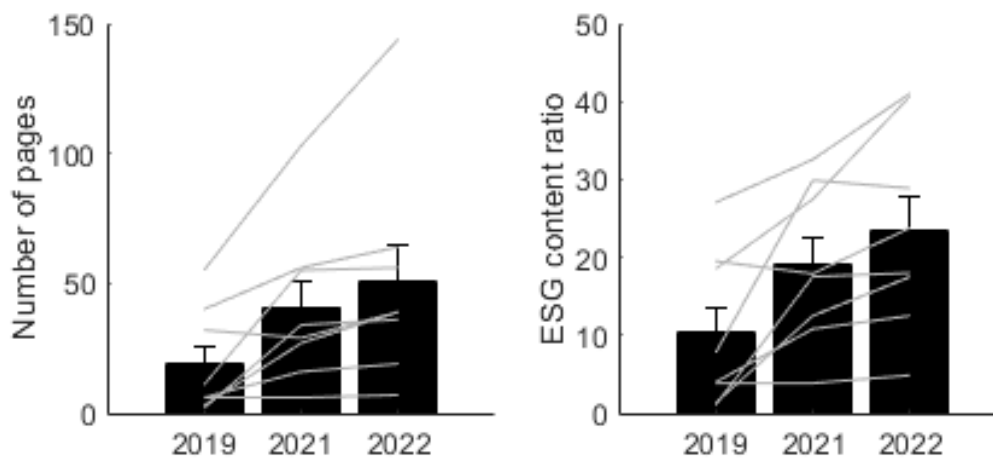
However, there was a notable decrease in the number of ESG reporting pages in 2019 compared to 2018. Arvidsson and Dumay (2022) reported an average of 40 pages in 2019. One reason for this decrease could be the difference in sample sizes between the two studies. In our study, we focused solely on firms listed in the industry sector, which means we could not exclude the possibility of variation in ESG reporting pages across different sectors. A more convincing reason could be the requirement for companies to report their ESG metrics mandatorily under the EU Directive (CSR Europe & GRI, 2017). This directive might lead many companies to start issuing combined Annual and Sustainability Reports instead of separate reports, a trend that began around 2017. This could explain why both the number of ESG reporting pages and the ESG content ratio were low in 2019.

Despite the initial decline, the number of ESG reporting pages and the ESG content ratio steadily increased from 2019 to 2022. As shown in Figure 3 and Table 2, the average number

**Table 3. ESG content ratio in selected sustainability reporting in swedish company**

Average	104	19.1	23.4
Median	5.9	17.7	20.9
Min	1.0	3.8	4.9
Max	27.0	32.6	41.0

of ESG reporting pages increased from 19 in 2019 to 41 in 2021, and finally reached 50 in 2022. This upward trend is not merely due to an overall increase in reporting length. As shown in Figure 3 and Table 3, The average ESG content ratio also increased significantly, from 10.3% to 23%, representing a twofold increase. This suggests that under the pressure of new legislation, companies are integrating more ESG content into their reports.



**Figure 3**

*Left*, Number of ESG reporting pages in selected sustainability reporting in Swedish companies. *right*, ESG reporting ratio. grey lines are the data point of individual firms

Overall, this analysis reflects a clear trend toward enhanced ESG reporting, both in terms of reporting number and reporting volume. The regulatory push, particularly from the EU Directive, has played a crucial role in driving this change.

## 4.2 Analyzing the quality of ESG report

Under the same evaluative framework established by Arvidsson and Dumay (2022), we assessed the quality of ESG reporting for the years 2019, 2021, and 2022. As shown in Table 4 and Figure 4, our findings revealed a relatively high ESG index in 2019 compared with previous years, which is 85.6. In 2018 this value is 75.6, as documented in previous literature. Additionally, we observed that the ESG index further increased from 85.6 to 91.2 in 2021 and remained steady at 91.5 in 2022. Overall, the ESG index demonstrated significant improvement over previous reports and also during 2019 - 2022. The improvement is not only reflected in terms of total ESG information (our ESG Index) but also reflected in the three sub dimension scores (Environmental, Social, and Governance; see Table 4). Upon reviewing the contents of the ESG reports, we found that in the environmental dimension, most companies have aligned their ESG disclosure information with the specific terms of the GHG Protocol (Greenhouse Gas Protocol) and the SDGs (Sustainable Development Goals). These guidelines require companies to address specific initiatives and provide analytical data, which has considerably enhanced the quality of their environmental dimension, and might

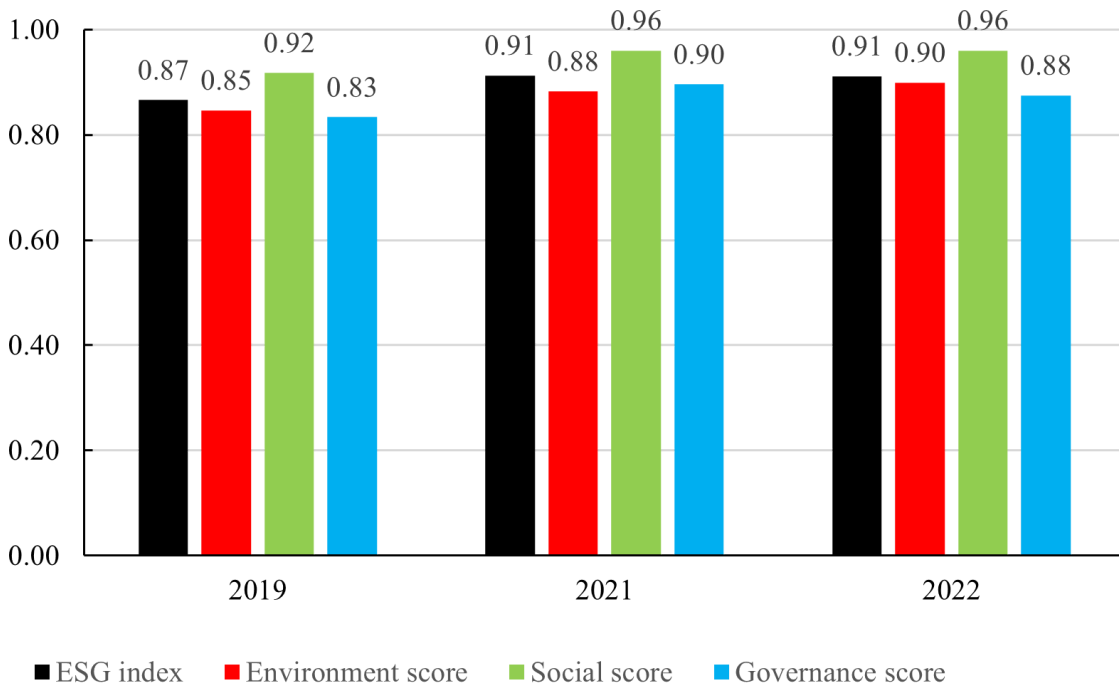
reflect higher *position* (E) and *development* (E) scores. Regarding *performance* (E), the European Climate Law commits the EU to achieving carbon neutrality by 2050. And this could help us explain our observation of an increasing number of companies aligning their initiatives with carbon neutrality goals, setting targets to achieve internal carbon neutrality by the mid-term (2030) or long-term (2050). To support these goals, companies often need to establish short-term targets (1-2 years) for environmental initiatives, which has significantly improved the *performance* (E) scores. Overall, the quality of the environmental dimension has increased markedly.

**Table 4. Results structured according to the three ESG dimensions and the scores of position, development and performance**

	Environment			Social			Governance		
	2019	2021	2022	2019	2021	2022	2019	2021	2022
<i>Position</i> : Describe the initiatives	0.93	1.00	0.95	0.75	0.88	0.88	0.88	1.00	0.88
<i>Development</i> : show progress related to initiatives	0.91	0.84	0.93	1.00	1.00	1.00	0.63	0.69	0.75
<i>Performance</i> : highlight targets related to initiatives	0.70	0.80	0.81	1.00	1.00	1.00	1.00	1.00	1.00
Average	0.85	0.88	0.90	0.92	0.96	0.96	0.83	0.90	0.88

Furthermore, the social and governance dimensions have also seen considerable improvements. According to the analysis, the companies have enhanced their disclosures on issues such as relationships with stakeholders, community engagement, and the mapping of the impacts of initiatives to the UN Global Compact and UN Sustainable Development Goals. These efforts have significantly increased the quality of the social dimension. As a result, there have been higher scores in the social dimension of the ESG index.

Similarly, the governance dimension has advanced by aligning more closely with the GRI standards and the UN Global Compact standards. This alignment has led to improved governance scores. Companies are now more transparent about their governance practices, which include detailing board structure, executive compensation, risk management, and compliance with ethical standards. These improvements not only reflect better governance practices but also enhance overall corporate accountability and integrity. Consequently, both



**Figure 4**

Results Structured according to the three ESG aspects and ESG Index.

the social and governance dimensions contribute to the robust enhancement of the ESG index, indicating a holistic improvement in corporate sustainability reporting.

In summary, the overall quality of ESG reporting has improved in 2019 compared with 2018, and also increased during 2019 - 2022. The environmental, social, and governance dimensions have all shown marked improvements, contributing to the enhanced ESG index scores across the years. These improvements reflect a growing commitment among companies to align their operations with sustainable practices and transparent reporting standards.

## 5 Discussion and conclusion

### 5.1 Answer to the Research Question

Our study was guided by the question of how the ESG reporting quality has changed since 2019 in Swedish companies, specifically in terms of reporting volume and reporting quality. Our analysis has shown that there has been an increase in reporting quantity from 2019 to 2022. ESG reporting has risen from 88% in 2019 to 98% in 2022 among the N100 companies, indicating that almost all N100 companies now integrate ESG reporting into their disclosures. This could be a reflection of the EU directive on mandatory reporting regulation (CSR Europe & GRI, 2017), effective from the end of the 2017 financial year. According to this regulation, Swedish companies with more than 250 employees, a net turnover of SEK 350 million or more, or a balance sheet total of over SEK 175 million are required to issue an EU Directive-compliant report annually.

We also found that the number of ESG reporting pages decreased in 2019 compared to the previous year, as noted in the literature (Arvidsson & Dumay, 2022). This decline could be attributed to more companies transitioning to issuing a combined annual and sustainability report instead of separate sustainability and annual reports. However, we observed that the number of ESG reporting pages increased in 2021 and 2022. Not only did the number of pages increase, but the ratio of ESG content compared to the entire report also increased.

The quality of ESG reporting has also improved. We evaluated ESG reporting quality using the Analytical ESG Information Quality Framework (Arvidsson & Dumay, 2022). Firstly, we observed an increase in the ESG index and all its sub-dimensions (Environment score, Social score, and Governance score) in 2019 compared to 2018, as reported in previous literature (Arvidsson & Dumay, 2022). This increasing trend continued through 2021 and 2022. This improvement may be due to firms becoming more adept at integrating reporting standards such as the GHG Protocol (Greenhouse Gas Protocol), SDGs (Sustainable Development Goals), UN Global Compact, and GRI index into their reports. These standards often provide procedures for disclosing the status, performance, and targets of ESG, which align with the *position*, *development*, and *performance* reflected in our study.

Relating to dynamic influences in ESG reporting quality, increasing ESG reporting quality might also be a reflection of progress in digitalization. This progress enhances the

transparency of disclosures and makes ESG information easier to collect and report. Due to the uncertainty of the COVID-19 pandemic, regional wars, and the energy crisis, investors are considering sustainable investment as a safe choice (Katsampoxakis et al., 2024), which in turn might be putting pressure on firms to improve their ESG reporting quality.

Our findings indicate that both the reporting volume and quality of ESG reporting among Swedish companies have significantly improved since 2019, highlighting the impact of dynamic influences, regulatory requirements and the growing sophistication of firms in their reporting practices.

## **5.2 Limitations & Suggestions for Future Research**

One of our limitations is that our sample consists solely of firms listed in the OMXS30 index, specifically from the industry sector. The reason for choosing an industry sector is that, given our limited study time, we aimed to focus on one representative industry that is most likely to be significantly affected during the 2019-2022 period. Considering the carbon neutrality goals and the recently released reporting standards related to these goals, we believe this industry sector should be the most impacted. These firms are highly energy-consuming, and their products are often closely related to energy consumption. However, this focus may result in bias towards a single sector, making it difficult to generalize our findings across different sectors. To mitigate this limitation, future studies could expand the sample size to include firms from various sectors. Given the constraints of our research duration, expanding the sample size was not feasible for this study. Thus, we recommend this approach for future research.

The previous literature discussed the relationship between ESG reporting and ESG performance (Arvidsson & Dumay, 2022). It shows that the quality of ESG reporting increased from 2009 to 2018; however, ESG performance plateaued in 2015. Thus, they argue that setting regulations to standardize ESG reporting and improving ESG reporting quality contribute little to enhancing ESG performance. We would also support this idea, based on what we reviewed in the 2022 Country Report - Sweden. According to the 2022 Country Report - Sweden, EUROPEAN COMMISSION, 2022, Sweden has made some progress in the performance of the environmental dimension. For example, the circular (secondary) use of material in Sweden increased from 6.8% in 2016 to 7.1% in 2020, but this is still quite low compared to the EU average of 12.8%. Additionally, Sweden has adopted a

new action plan to address this issue. Another environmental initiative mentioned in the 2022 Country Report - Sweden, EUROPEAN COMMISSION, 2022 is the waste recycling rate of Swedish firms, which was 38% in 2020, below the EU average of around 48% and the 2020 EU target of 50%. Therefore, it's hard to say that improved ESG reporting quality is contributing to the improvement of ESG performance.

However, this highlights the importance of monitoring the relationship between ESG reporting quality and ESG performance to check for any alignment or misalignment. This kind of study could potentially help policymakers correct their direction, to not only improve the quality of ESG reporting but also improve the performance of ESG. Therefore, future studies on the relationship between ESG reporting quality and ESG performance are suggested.

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# Appendix

**Table 5. ESG content pages and ratios compared with the entire report.**

Company's Name	The year	The total page number of the reports	The ESG reports number	The ESG information pages	ESG content ratio
ATCO-A.ST	2022	152	126--145	19	12.5%
	2021	148	128--144	16	10.8%
	2019	150	130--136	6	4%
VOLV-B.ST	2022	223	147--186	39	17.5%
	2021	216	153--180	27	12.5%
	2019	227	110--113	3	1.3%
NIBE-B.ST	2022	194	10--64, 181--183	56	28.9%
	2021	184	10--64, 172--173	55	29.9%
	2019	142	22--24,26-34,126--127	11	7.7%
SAND.ST	2022	144	12--14, 58--63	7	4.9%
	2021	156	14--17, 68--71	6	3.9%
	2019	156	63-69	6	3.9%
ASSA-B.ST*	2022	156	1-40	40	41%
	2021	172	1-56	56	32.5%
	2019	148	1-40	40	27%
SKF	2022	164	92--131	39	23.8%
	2021	162	110--139	29	17.9%
	2019	164	116--148	32	19.5%
ABB*	2022	354	1-144	144	40.7%
	2021	375	1--103	103	5%
	2019	297	1--55	55	18.5%

ALFA.ST	2022	200	54--90	36	18%
	2021	194	54-88	34	17.5%
	2019	193	46-48	2	1%

\* The sustainability report and the annual report are reported separately.

Table 6. Firms listed in OMXS30.

LongName	Ticker	Sector	Industry	Final Cumulative Volume	Volume Percentage	Website
Samhällsbyggnadsbolaget i Norden AB (publ)	SBB-B.ST	Real Estate	Real Estate Services	18305461153	13.5	<a href="https://www.sbbnorden.se">https://www.sbbnorden.se</a>
Telia Company AB (publ)	TELIA.ST	Communication Services	Telecom Services	14939111106	11.0	<a href="https://www.teliacompany.com">https://www.teliacompany.com</a>
Sinch AB (publ)	SINCH.ST	Communication Services	Telecom Services	7405768556	5.4	<a href="https://www.sinch.com">https://www.sinch.com</a>
Tele2 AB (publ)	TEL2-B.ST	Communication Services	Telecom Services	3010859997	2.2	<a href="https://www.tele2.com">https://www.tele2.com</a>
Telefonaktiebolaget LM Ericsson (publ)	ERIC-B.ST	Technology	Communication Equipment	10270885381	7.6	<a href="https://www.ericsson.com">https://www.ericsson.com</a>
Hexagon AB (publ)	HEXA-B.ST	Technology	Scientific & Technical Instruments	5088472209	3.7	<a href="https://www.hexagon.com">https://www.hexagon.com</a>
Nordea Bank Abp	NDA-SE.ST	Financial Services	Banks - Regional	9431611598	6.9	<a href="https://www.nordea.com">https://www.nordea.com</a>
Svenska Handelsbanken AB (publ)	SHB-A.ST	Financial Services	Banks - Diversified	5906895030	4.3	<a href="https://www.handelsbanken.se">https://www.handelsbanken.se</a>
Skandinaviska Enskilda Banken AB (publ)	SEB-A.ST	Financial Services	Banks - Regional	5269904530	3.9	<a href="https://sebgroupp.com">https://sebgroupp.com</a>
Swedbank AB (publ)	SWED-A.ST	Financial Services	Banks - Regional	4581063994	3.4	<a href="https://www.swedbank.com">https://www.swedbank.com</a>
Investor AB (publ)	INVE-B.ST	Financial Services	Asset Management	4541195584	3.3	<a href="https://www.investorab.com">https://www.investorab.com</a>

Kinnevik AB	KINV-B .ST	Financial Services	Asset Management	142346991 8	1.0	<a href="https://www.kinnevik.com">https://www.kinnevik.com</a>
Atlas Copco AB	ATCO- A.ST	Industrials	Specialty Industrial Machinery	666714651 6	4.9	<a href="https://www.atlascopcogroup.com">https://www.atlascopcogroup.com</a>
AB Volvo (publ)	VOLV-B .ST	Industrials	Farm & Heavy Construction Machinery	537891991 6	4.0	<a href="https://www.volvogroup.com">https://www.volvogroup.com</a>
NIBE Industrier AB (publ)	NIBE-B. ST	Industrials	Building Products & Equipment	410543487 8	3.0	<a href="https://www.nibe.com">https://www.nibe.com</a>
Sandvik AB (publ)	SAND.S T	Industrials	Specialty Industrial Machinery	337936571 0	2.5	<a href="https://www.home.sandvik">https://www.home.sandvik</a>
Atlas Copco AB	ATCO- B.ST	Industrials	Specialty Industrial Machinery	301460460 5	2.2	<a href="https://www.atlascopcogroup.com">https://www.atlascopcogroup.com</a>
ASSA ABLOY AB (publ)	ASSA-B .ST	Industrials	Security & Protection Services	230605465 8	1.7	<a href="https://www.assaabloy.com">https://www.assaabloy.com</a>
AB SKF (publ)	SKF-B. ST	Industrials	Tools & Accessories	212948660 4	1.6	<a href="https://www.skf.com">https://www.skf.com</a>
ABB Ltd	ABB.ST	Industrials	Electrical Equipment & Parts	154879665 9	1.1	<a href="https://global.abb/group/en">https://global.abb/group/en</a>
Alfa Laval Corporate AB	ALFA.S T	Industrials	Specialty Industrial Machinery	112092645 2	0.8	<a href="https://www.alfalaval.com">https://www.alfalaval.com</a>
H & M Hennes & Mauritz AB (publ)	HM-B.S T	Consumer Cyclical	Apparel Manufacturing	499245597 8	3.7	<a href="https://hmgroup.com">https://hmgroup.com</a>
AB Electrolux (publ)	ELUX- B.ST	Consumer Cyclical	Furnishings, Fixtures & Appliances	195859250 8	1.4	<a href="https://www.electroluxgroup.com">https://www.electroluxgroup.com</a>
Evolution AB (publ)	EVO.ST	Consumer Cyclical	Gambling	977595576	0.7	<a href="https://www.evolution.com">https://www.evolution.com</a>
Autoliv, Inc.	ALIV-S DB.ST	Consumer Cyclical	Auto Parts	298257914	0.2	<a href="https://www.autoliv.com">https://www.autoliv.com</a>

Svenska Cellulosa Aktiebolaget SCA (publ)	SCA-B.ST	Basic Materials	Lumber & Wood Production Other	2426022283	1.8	<a href="https://www.sca.com/sv">https://www.sca.com/sv</a>
Boliden AB (publ)	BOL.ST	Basic Materials	Industrial Metals & Mining	1830566202	1.3	<a href="https://www.boliden.com">https://www.boliden.com</a>
Essity AB (publ)	ESSITY-B.ST	Consumer Defensive	Household & Personal Products	1875587869	1.4	<a href="https://www.essity.com">https://www.essity.com</a>
Getinge AB (publ)	GETI-B.ST	Healthcare	Medical Devices	1234454996	0.9	<a href="https://www.getinge.com">https://www.getinge.com</a>
AstraZeneca PLC	AZN.ST	Healthcare	Drug Manufacturers - General	568138080	0.4	<a href="https://www.astrazeneca.com">https://www.astrazeneca.com</a>

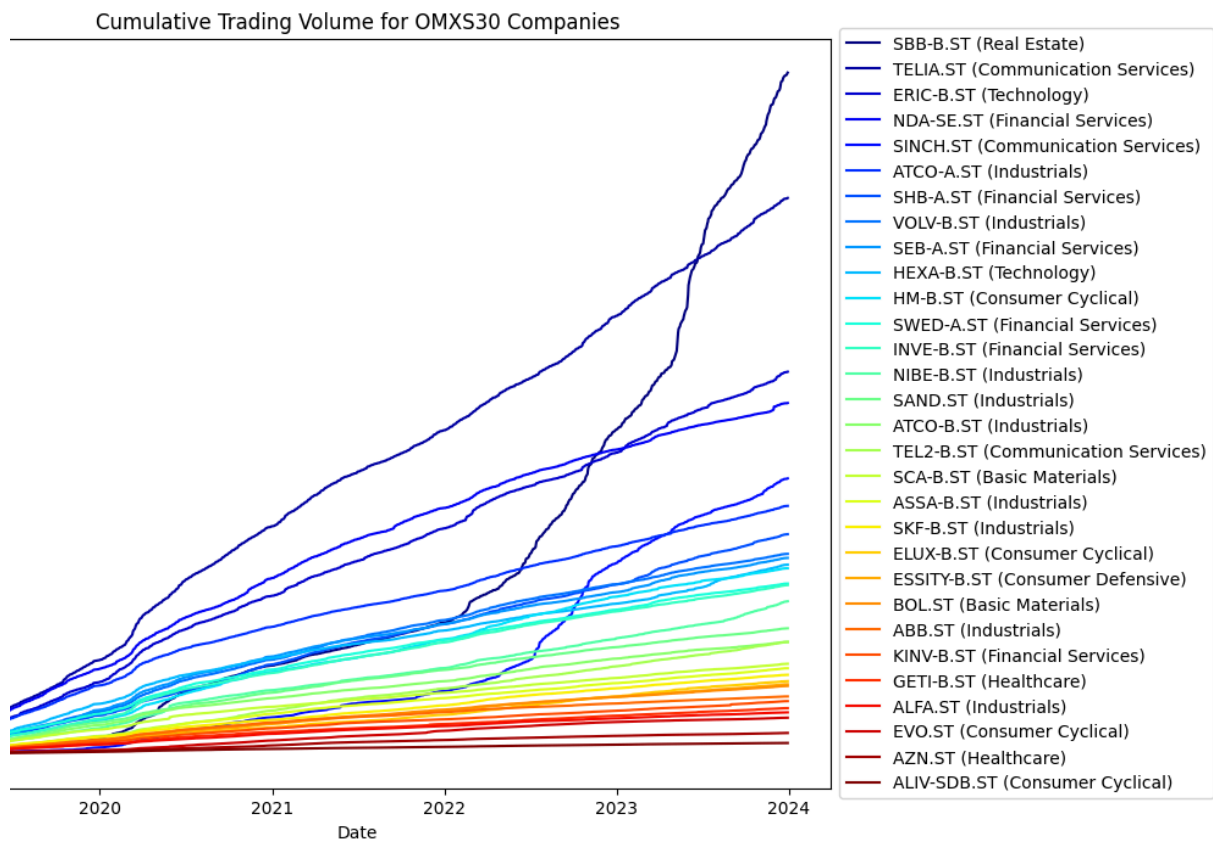


Figure 5: The ranking of the 30 largest Swedish companies by trading volume listed on the Stockholm Stock Exchange's Nasdaq OMXS30 index from 2019 to 2024. Source: Yahoo finance

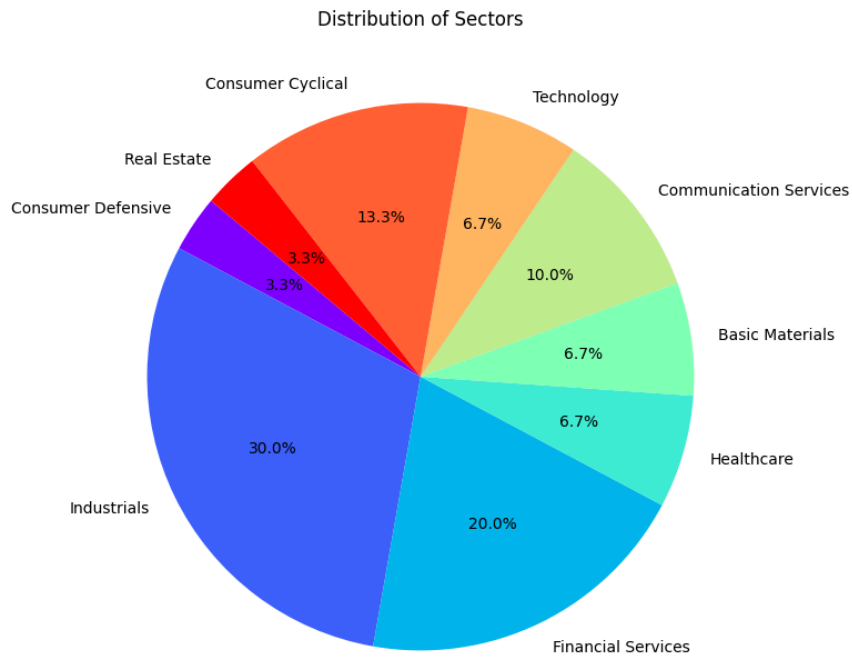


Figure 6: Distribution of Sector. Source: Yahoo finance