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**The relationship between environmental
performance and firm value: the moderating role
of board gender diversity**

Evidence from Nordic companies

School of Accounting and Finance
Master's thesis in Accounting and Auditing

Vaasa 2025

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Degree: Master of Science in Economic and Business Administration
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Year of Graduation: 2025 **Pages:** 90

ABSTRACT:

Corporate Social Responsibility (CSR) has attracted significant attention during the recent years, both in academic research and among businesses and their stakeholders. Additionally, Environmental, Social, and Governance (ESG) factors are continuously being integrated into companies core business actions and implemented into companies strategies. As the importance of ESG initiatives grows, this has led to the need of different regulations being needed to monitor these initiatives, as ESG initiatives are no longer completely voluntary for companies. Thus, for instance the European Union has taken a leading role when it comes to sustainability and has continuously worked to maintain the progress of ESG initiatives and disclosure of these. Recently, the European Union has increased regulation related to companies disclosure of ESG initiatives called the Corporate Sustainability Reporting Directive, which requires companies in the EU to disclose their ESG matters as part of their annual reports.

The effect of ESG performance on firm value measured by Tobin's Q has been historically studied among academic literature, focusing only on the environmental performance and its relationship to firm value has been fewer. Former studies have found conflicting results from researching ESG performance and firm value, thus it has been suggested that it could be more beneficial to focus the research on only one of the dimension, as it could give more extensive results to the subject and give more insight.

Prior research on the subject of analyzing the matter of environmental performance and firm value are fewer in the Nordic region. Nordic region has been identified as an interesting region to conduct research on ESG performance and firm value, as the culture among Nordic countries demands a strong transparency between companies and its stakeholders. Hence, it has gained interest on researching whether the relationship in this kind of region might give different results.

As the market demands and needs continuously keep evolving, companies are demanded to consider not only the value generation of the company but also the expectations of the stakeholders. Thus, the subject of board gender diversity has emerged in academic research. Prior research has indicated that having more gender diversity on the boards of companies might lead more comprehensive decision-making and decisions that take sustainability factors more into consideration. Thus, the growing need from stakeholders for firms to implement processes and strategies that take social responsibility into account, has resulted in the emergence of the subject of board gender diversity.

AVAINSANAT: ESG, CSR, Environmental Performance, Tobin's Q, ROA, Board Gender Diversity

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Tutkielman nimi:	The relationship between environmental performance and firm value: the moderating role of board gender diversity: Evidence from Nordic companies	
Tutkinto:	Kauppätieteiden maisteri	
Oppiaine:	Laskentatoimi ja tilintarkastus	
Työn ohjaaja:	Tatiana King	
Valmistumisvuosi:	2025	Sivumäärä: 90

TIIVISTELMÄ:

Lähivuosien aikana yritysvastuu on herättänyt merkittävää kiinnostusta niin tieteellisissä tutkimuksissa kuin yrityksissä ja niiden sidosryhmissä. Lisäksi ympäristöön, yhteiskuntaan ja hyvään hallintotapaan (ESG) liittyvät tekijät ovat yhä tiiviimmin osa yritysten ydinliiketoimintaa ja strategioita. ESG-aloitteiden merkityksen kasvaessa on syntynyt tarve sääntelylle, jolla näitä aloitteita voidaan valvoa, sillä ESG-toimet eivät enää ole yrityksille täysin vapaaehtoisia. Euroopan unioni on ollut edelläkävijä kestäväen kehityksen saralla ja pyrkinyt jatkuvasti edistämään ESG-aloitteita ja niiden raportointia. Viime aikoina EU on kiristänyt sääntelyä, joka koskee yritysten ESG-raporttien julkistamista. Uuden yritysvastuudirektiivin (Corporate Sustainability Reporting Directive) myötä EU:ssa toimivien yritysten on sisällytettävä ESG-asiat osaksi tilinpäätöksiään.

Vaikka ESG-suorituskyvyn vaikutusta yrityksen arvoon (mitattuna Tobinin Q:lla) on aiemmin tutkittu laajasti tieteellisissä tutkimuksissa, ympäristöllisen suorituskyvyn ja sen yhteyden yrityksen arvoon on keskitytty huomattavasti vähemmän. Aiemmat tieteelliset tutkimukset ovat havainneet ristiriitaisia tuloksia ESG-suorituskyvyn ja yrityksen arvon välisestä suhteesta. Tämän vuoksi, tieteellisissä tutkimuksissa on herännyt kysymys siitä, voisiko tutkimuksen kohdentaminen vain yhteen ESG:n ulottuvuuteen tuottaa merkityksellisempää tietoa aiheesta.

Aiempia tutkimuksia ympäristöllisen suorituskyvyn ja yrityksen arvon välisestä yhteydestä on Pohjoismaisessa kontekstissa tehty ainoastaan muutamia. Pohjoismaita pidetään kuitenkin kiinnostavana alueena tutkia ESG suorituskyvyn ja yrityksen arvon välistä suhdetta, sillä pohjoismainen kulttuuri korostaa vahvaa avoimuutta yritysten ja niiden sidosryhmien välillä. Tämän vuoksi lähivuosina kiinnostus on herännyt siitä, mikäli tällainen toimintaympäristö voisi antaa aiheen tutkimukselle eriäviä tuloksia.

Markkinoiden jatkuvasti kasvavat vaatimukset ja tarpeet kehittyvät kehittymistään ja yrityksiltä edellytetään nykyään arvon tuottamisen lisäksi myös sidosryhmien odotusten huomioon ottamista. Tämän seurauksena yritysten hallitusten sukupuolten monimuotoisuus on noussut akateemisen tutkimuksen kohteeksi. Aiemmat tutkimukset ovat osoittaneet, että sukupuolten monimuotoisuus yritysten hallituksissa saattaa johtaa kokonaisvaltaisempaan päätöksentekoon sekä päätöksiin, joissa kestävyteen liittyvät tekijät otetaan paremmin huomioon. Sidosryhmien kasvavat odotukset yhteiskuntavastuullisesta toiminnasta ovatkin osaltaan nostaneet esiin hallitusten sukupuolten monimuotoisuuden merkityksen.

AVAINSANAT: ESG, CSR, Environmental Performance, Tobin's Q, ROA, Board Gender Diversity

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1 Introduction

The interest in Corporate Social Responsibility (CSR) has risen among businesses and its stakeholders during the recent years. Stakeholders are growingly becoming more conscious about their choices and opinions, which encourages businesses to adapt to these new advanced needs. Consequently, businesses need to initiate CSR matters into their core operations with the aim of answering society's new expected standards of acting in a socially responsible way. Creating environmentally and socially responsible initiatives could result in financial gains for a firm, for instance increasing its firm value (Porter & Kramer, 2006, p. 80–81). In practice implementing CSR activities in a firm could mean reducing carbon footprints, improving diversity and equality or improving labor policies. Many firms have begun to implement these CSR actions into their business ambitions and goals, for instance IKEA have committed to reduce the absolute GHG across the value chain by 50% the year 2030 and reaching net-zero emissions by the year 2050 (IKEA, 2025). Similarly Google have committed to become totally carbon-free by 2030 (Google, 2025). These initiatives are merely examples of creating a strategy to implement socially responsible processes and business practices in order to answer to stakeholders' needs and furthermore create financial benefits to the company and the surrounding communities (Ksiezak, 2017, p. 53–54).

Due to globalization and its effect causing societal and environmental problems, stakeholders require firms to act more responsively and transparently. Social responsibility means taking the environment, stakeholders, social and governmental issues and human resources into more consideration in business processes and strategy of a company. It refers to companies' needing to take responsibility and fulfilling more than just legal requirements (Aguilera, Rupp, Williams & Ganapathi, 2007, p. 836–837). As a stakeholder-oriented concept, CSR refers to organizations needing to face the demands of stakeholders and turning them into CSR policies and objectives. Achieving successful implementation of CSR, companies need to engage with stakeholders and build sustainable relationships with stakeholders of the firm (Lindgreen & Swaen, 2010, p. 2).

One prominent theme of CSR is board composition the effect it has on CSR disclosure and actions. Prior academic literature have suggested that gender diverse boards could lead to improving decision making among companies, which could then lead to financial performance additionally improving. Gender diversity among boardrooms has thus become an interesting theme among literature regarding the effect of CSR on firm value. Current state of more gender-diverse boards affirms there to be still a large lack of gender diversity on the boards in firms across the world. Women board members in boardrooms and the possible effects on increasing firm value has become of higher interest in the academic literature (Cabeza-García, Fernández-Gago & Nieto, 2017, p. 559–560).

1.1 Purpose of the thesis

This master's thesis examines the relationship between environmental performance and firm value. Environmental performance is a part of disclosing firm's CSR/ESG actions, as it refers to how firms have succeeded in their environmental initiatives that are disclosed to stakeholders. Environmental disclosure refers to firm's disclosure of their environmental actions as well as environmental initiatives. Environmental disclosure should provide valuable insight into company's environmental issues, shedding light on their influence on the firm's future standing and performance (Deswanto & Siregar, 2018, p. 181). The relationship of environmental performance and firm value is further examined by including the number of women on board of directors as a moderator. The thesis focuses on studies conducted across the world in order to get the broadest picture of environmental performance and its effect on firm value. The study is conducted by examining Nordic listed companies through the years of 2019-2023. The study will consider companies from Finland, Sweden, Norway and Denmark.

Prior academic research has found conflicting results regarding the subject of CSR and ESG performance with firm value. This can be explained by different approaches to the studies, as well as different datasets. For instance, Benlemih, Jaballah and Peillex (2018) examined how the relationship between CSR ratings affect firm value by analyzing US

firms. Cellier and Chollet (2016) conducted their study with a similar approach, but a different dataset as they analyzed European firms. Conflicting results were found as, Benlemih et al. (2018) found a strong positive correlation between CSR ratings and firm value, while Cellier and Chollet (2016) found differing results among different dimensions of CSR. These findings suggest that by using a dataset from companies that operate in different parts of the world, could lead to contradicting results. Hence, prior research regarding the subject has been fewer with a dataset of Nordic companies this study aims to give new insight as to whether different results could be found from Nordic companies.

In the subject of environmental performance and firm value, it could be beneficial to target the research in the Nordic region, as the culture among Nordic countries demands a strong transparency between companies and its stakeholders. Furthermore, this transparency combined with the proactiveness that Nordic companies have had historically with implementing socially and environmentally friendly actions and the prioritization of corporate accountability, make the Nordic region ideal to further study the subject (Vaihekoski & Yahya, 2024, p. 150–151). The intent of this study is to further broaden existing research and to research whether by conducting the study in a region where stakeholders demand more transparency from the companies and where there are higher expectations for taking part in ESG efforts could result in different results to preceding studies. Thus, one of the aims of this study is to examine the relationship between environmental performance and firm value in Finnish, Swedish, Norwegian and Danish publicly listed companies.

As prior academic literature on the subject of CSR or ESG has examined the relationship between all dimensions of CSR or ESG and firm value, this study intends to focus on only the environmental performance of a company as well as the effect it has on firm value. A few prior studies that have researched the subject of CSR or ESG performance and firm value have disaggregated the different elements of ESG, in order to gain insight on whether the different dimensions have divergent effects on firm value. For instance Taylor, Vithayathil and Yim (2018) researched the subject of ESG disclosure and firm

value measured by Tobin's Q, where the findings suggested that environmental disclosure might not have a prominent relationship with firm value. The study was performed by analyzing companies in the US. Similar results were found by Gholami, Sands and Rahman (2022), who researched the relationship between ESG disclosure and firm profitability calculated by return on assets, using a dataset from Australian publicly listed companies. They found that when analyzing the effect of ESG disclosure on firm value, there was found to be a significant positive effect, only when all dimensions of ESG are considered. This suggests that only considering the environmental dimension of ESG disclosure when examining the relationship between firm value, the results may vary from when considering all the dimensions. This implies, that to gain more valuable and significant findings the different dimensions of ESG must be analyzed separately when examining the subject of ESG performance and firm value (Cellier & Chollet, 2016, p. 658). Consequently, the study aims to gain more valuable information regarding subject of ESG performance and firm value, through focusing on only the environmental dimension.

Diversity among the board of directors has become of higher interest among the subject of CSR. Multiple countries have started to require the disclosure of matters regarding board diversity from their publicly listed companies. Stakeholders have additionally gained higher interest on the matter of gender diversity on companies' boards (Harjoto, Laksmana & Lee, 2015, p. 641–642). Thus, the need to examine ESG matters and board gender diversity has intensified recently. Historically academic research have focused on finding a direct significant relationship between ESG activities and firm value, without acknowledging possible moderating factors. Although, a few recent studies have used board gender diversity as a possibly moderating effect when researching the relationship between ESG and firm value (Khunkaew, Wichianrak & Suttipun, 2023; Ma, Ahmad & Torelli, 2024). These recent studies have examined all dimensions of ESG and firm value moderated by the effect of board gender diversity. Consequently, the aim of this study is to further identify whether it could give new insight into the topic when examining only environmental performance.

1.2 Structure of the thesis

The thesis first introduced the main purpose of the thesis as well as the reasons behind the subject of the thesis. The theoretical framework and definitions regarding the subject of the study is dived into in the second chapter. The subject of CSR and ESG will be first explained and defined in order for the reader to understand the theoretical background for this thesis. The most prominent theories on the subject of CSR and ESG is stakeholder theory and legitimacy theory, thus the theories are introduced in the second chapter. As the thesis takes the moderating role of board gender diversity into account, when finding results between the effect of environmental performance and firm value, the theory behind gender-diverse boards is additionally explained. In the third chapter, a literature review regarding the subject of environmental performance and firm value will be executed, additionally the moderating effect of gender-diverse boardrooms could affect this relationship. Consequently, two hypotheses are developed. Chapter four introduces the data sample as well as the methodology, that will answer the hypotheses developed. In chapter five, the empirical findings regarding the methodology of quantitative research are explained and analysed. Furthermore, the last chapter summarizes the results and the conclusions of the thesis. Additionally, suggestions are given for regarding possible research that could be further studied. Lastly, the practical significance and the possible limitations are explained.

2 Theoretical background and definitions

The subject of CSR and ESG has become a crucial instrument of corporate strategy. As stakeholders become more conscious about firms being socially and environmentally responsible, it is essential for firms to respond to these expectations of stakeholders and perform in a socially responsible way. As the subject of CSR and ESG has emerged, the need for firms to disclose the environmental activities as well as the performance of them has become more influential to stakeholders. Environmental disclosure is a crucial part of the disclosure of a firm's CSR and ESG initiatives and it gives stakeholders insight into how firms have performed environmentally (D'Amico, Coluccia, Fontana & Solimene, 2016, p. 178; Khan, 2024).

2.1 The definition and evolution of CSR

For the sake of understanding the subject of the thesis, the term Corporate Social Responsibility should be understood. CSR is not a term simply explained in one exact way rather it can be defined by multiple different descriptions. Commonly CSR is defined as different protocols and processes that consider stakeholders' assumptions and three dimensions of economic, social and environmental performance (Aguinis & Glavas, 2012, p. 933; Belu & Manescu, 2013, p. 2751–2752). Although there is plenty of differing opinions of the definition as well. One definition refers to CSR being company's reply to matters past technical, legal and economic concerns to develop social, environmental and economic assets, similarly to previous definitions of the term (Aguilera et al. 2007, p. 836–837). According to Dahlsrud (2008) CSR is divided into five dimensions. "The environmental dimension, the social dimension, the economic dimension, the stakeholder dimension and the voluntariness dimension." (Dahlsrud, 2008). The environmental dimension means for businesses to make sustainable choices in order to be more environmentally conscious and taking environmental matters into consideration. Dahlsrud defines the social dimension representing the relationship between businesses and society and how businesses need to consider communities when making decisions. The economic dimension considers CSR through business

operations. This means that CSR is looked at as a way to add to businesses economic growth. The stakeholder dimension is quite self-explanatory as it means interaction with stakeholders, e.g., employees, communities and customers. The last dimension, voluntariness means actions done without legal obligations to better responsibility of a firm (Dahlsrud, 2008).

Why is it important to implement CSR initiatives? Making strategic choices with regards to taking these CSR initiatives on board? Not only implementing them as to look good for stakeholders but to really benefit economically from implementing these CSR initiatives. It can create competitive advantage in the long-term if these CSR initiatives are also considered as a core part in businesses strategy and valued as a core part of one's business operations (Porter & Kramer, 2006). Ksiezak (2017) explains there being multiple benefits for companies when implementing CSR actions to their business operations. When companies aim to gain competitive advantage among the field of business they are in, creating a positive image to the stakeholders through paying more attention to CSR initiatives is key. Furthermore, improving relationships with all of the stakeholders shows that the company cares of their stakeholders needs and opinions. Consequently, when a company shows interest in improving their relationships through for example increasing transparency with company's CSR actions to their stakeholders, it could result in gaining competitive advantage. Competitive advantage can also be gained within CSR elements through creating socially responsible choices for potential customers (Yu, Kuo & Kao, 2017, p. 547–548). Customers have gained knowledge and interest more and more in making sustainable, socially responsible choices. As a result, customers prefer making these socially responsible and sustainable choices even though they may have a higher price than other products. This is why customers should be taken into consideration when contemplating investing in CSR activities (Sun & Yoon, 2022, p. 2).

The evolution of CSR is crucial in order to understand its importance to organizational performance. The evolution of the concept goes as far as to the year of 1953 when

Bowen (1953) argued that firms should make their decisions, policies and follow the actions in terms of what the society demands and finds acceptable. This was the earliest explanation of social responsibility and from that, the term has had a long progression. In the 1950s and 1960s CSR was mainly examined at a macro-social level and studies did not examine the effect of CSR on corporate financial performance. This started to get more focus in research in the 1970s (Moura-Leite & Padgett, 2011, p. 529–531). Before the 1960s CSR was concentrated on achieving economic goals and merely focusing on legal requirements concerning CSR. In the 1960s firms started to explore social responsibility more and started to realize that they in addition with economic goals and legal requirements need to answer to society's needs as well (Lee & Carroll, 2011, p. 116).

In 1973 Davis explained that if firms do not use their social power to the best ability they can, firms will lose their competitive advantage as other firms will fill these socially responsible requirements. In the 1970s the research of CSR focused greatly on the implementation process of CSR in order for it to lead into better corporate financial performance and not conflicting with the elemental goal of a corporation (Lee, 2007, p. 55). Moreover, it was very common in the 1970s that firms and managers integrated management processes to answer to CSR concerns. Multiple firms followed the enlightened self-interest model, which means that taking part in socially responsible activities is justified with the self-interest of the firm. This means that if firms gain profits and increase their financial performance through implementing socially responsible initiatives the social responsibility is acceptable (Moura-Leite & Padgett, 2011, p. 531–532).

From 1990s until this day CSR has become a term known and supported world-wide by the society. At the end of 1990 almost 90 percent of the Fortune 500 companies listed CSR as one of the goals of their organizational growth, which clearly suggests that CSR had become an important component of a firm's strategy. It was clear that the research started to evaluate more into concentrating to the strategic implication of CSR (Lee, 2007, p. 53–54; Moura-Leite & Padgett, 2011, p. 533–534). Similar to the 1980s in the 1990s

the stakeholder theory was implemented into many studies. In contrast to the literature in the 1980s new perspectives were introduced regarding the stakeholder theory and CSR. One of these new perspectives was a so called “instrumental stakeholder theory”, which refers to “the connections, or lack of connections, between stakeholder management and the achievement of traditional corporate objectives”. When using this highly important stakeholder theory researchers commonly examined the effect of CSR activities on economic results as well as the competitive advantages of a firm. The instrumental aspect of the stakeholder has become one of the most utilized theories in CSR literature since the 1990s (Moura-Leite & Padgett, 2011, p. 534).

In conclusion the evolution of the term CSR and research regarding it from its first emergence in 1953 has moved from a more ethical approach to a performance focused approach. In 2002 PricewaterhouseCoopers executed a survey, where 70 percent of international leaders determined that CSR was a crucial part of their organizational performance and profitability. This suggests that since the beginning of the emergence of CSR it has clearly become part of companies’ core business functions and is critical to firms’ success. The progression of CSR has changed the way organizations do their business, as the new normal of CSR processes go further than answering to shareholders needs but to perform better in environmental, governance and social issues. One of the known phrases explaining the meaning of CSR in the present day is “doing good to do well”, which suggests that when implementing CSR actions, it leads to better results in regards of financial performance of the company. Although, this is not always the case as not all CSR activities do not lead to improving one’s financial performance. The problem that may emerge from CSR is that all socially responsible activities do not influence the execution of the company to the same extend, which could lead to firms focusing on activities that leads to increasing the value of a firm the most with being cost-effective. This could lead to there being some important activities dismissed as they are more costly and do not increase the performance of a firm enough (Moura-Leite & Padgett, 2011, p. 535–536).

As the matter of CSR has evolved from its first emergence, criticism of CSR has surfaced as well. Criticism usually focuses on the fact that the application of CSR and its reporting has evolved to a point that some only consider the financial benefits behind the implementation. This suggests that the actions are not actually socially responsible, as the main focus of implementing CSR activities is on the financial gains it may lead to. Some criticism has proposed that firms to some extent could be hypocrite when it comes to CSR actions and disclosing them (Pacheco-Ortiz, Escobar-Sierra & Suárez-Monsalve, 2024; Jauernig & Valentinov, 2019, p. 13). Firms may praise CSR ideas to stakeholders and suggest that they do implement CSR activities when this is not the truth and in fact, they could be taking part in abuse of socially responsible behavior such as, exploiting labor conditions, destructing the environment or violating safety standards. Firms could constantly promote to the public that they have implemented various CSR regulations when in reality these could just be campaigns to seem more socially responsible to the stakeholders, and not actually act socially responsibly (Miao & Zhou, 2020, p. 14).

One topic of criticism has to do with the reality that the actual impact of CSR implementation is fairly difficult to measure. There is no clear way or one specific way on measuring CSR implementation within a firm, as it is not possible to measure it in one exact way (Crane, Henriques, Husted & Matten, 2017, p. 787–789). Some criticism has arisen from the discussion of CSR effecting profitability. The main argument is that companies should focus on improving the profitability of a firm from the shareholders point of view and not through considering social benefits as it may decrease from the possible profitability improvement. Moreover, focusing more on socially responsible activities could lead to decreasing possible competitive advantage, if not focusing merely on increasing shareholders benefits. It has also been suggested that different stakeholders could have conflicting ideas behind the best possible way to implement CSR, which leads to directors of firms having to choose some ideas over others (Ksiezak, 2017).

Commonly CSR is explained through already mentioned three primary pillars: the economic, social and environmental dimensions. These are also referred to as the “triple bottom line”. The “triple bottom line” was introduced by Elkington (1994). The triple bottom line has become popular since its introduction as it is a great approach to CSR considering it demonstrates how companies need to take socially and environmentally responsible behavior to consideration and balance them with economic ambitions. Elkington (1994) has suggested that in order to achieve superior triple bottom line performance a company needs to create successful relationships with stakeholders as well as private and public sectors (Ksiezak & Fischbach, 2018, p. 99; Milne & Gray, 2013, p. 14). Harmaala and Jallinoja (2012, p. 17) agreed that CSR should be defined from the three similar dimensions. Consequently, the thesis next concentrates on explaining the main pillars behind the “triple bottom line” concept.

2.1.1 Economic dimension

Behind the economic dimension of CSR is the ambition for firms to act responsively locally and globally, as well as maintaining to be economically profitable. Firms need to maintain competitiveness and economic growth while at the same time take part in socially responsible activities. Long-time financial growth is at the center of CSR implementation in firms (Currás-Pérez, Dolz-Dolz, Miquel-Romero & Sánchez-García, 2018, p. 733–736; Harmaala & Jallinoja, 2012, p. 18–19). When aiming for long-time financial growth, firms need to for example consider investments in improving environmental matters and well-being of employees, which could lead to firms gaining higher profitability in a longer time period. In the eyes of CSR companies need to generate economic well-being to the surrounding society as well as aiming for generating economic growth to their own benefits. Economic responsibility includes large number of legal obligations that differ between countries. The minimum expectancy of companies to take part in economic responsibilities is acting according to the laws and regulations. Companies have a chance to voluntarily act more responsively as to what is expected from them, which leads to stakeholders seeing companies in a more positive way (Harmaala & Jallinoja, 2012, p. 18–19).

2.1.2 Social Dimension

Social responsibility concentrates on the people who are influenced through the actions of a firm, especially on the employees of a firm. Social responsibility is thought to include improving safety and advancing know-how in the workplace as well as enhancing employee's well-being beyond legal obligations and collective labor agreements. From society's point of view, it can be indicated that companies must improve the employment rate and minimize losing jobs in order to act socially responsibly. There are some differences in social responsibility in companies between developing countries and developed countries, as in developing countries social responsibility could mean trying to put an end to child labor or slave labor, when in western countries the focus is on completely different objectives. In this thesis the focus is more on the developed countries and social responsibility in these countries. Social responsibility in the western countries concludes taking employees, affiliates, products and society into consideration when making business decisions. Social responsibility for employees suggests that companies must take care of their employees' improvement, development, training, safety and well-being in order to create value through CSR activities. Affiliates demand indirect care of their employees, responsibly conducting business with one another and acting against bribery. Socially responsible business includes making sure that customers receive safe and responsible products, as well as confirming that customers' opinions and concerns about products are taken as valid (Harmaala & Jallinoja, 2012, p. 20–21). Currás-Pérez et al. (2018) define the social dimension to referring to the relationship a firm has with its surrounding society. When firms can help with community issues, improve the cultural environment and help in various social causes, firms are acting socially responsibly

2.1.3 Environmental dimension

Environmental dimension means the business processes that ensure companies to act environmentally responsibly and harm the environment as little as possible. Acting

environmentally responsibly includes protecting air, soil and water, diminishing the amount of garbage, recycling, ensuring nature diversity, effective and conserving utilization of nature's assets as well as controlling environmental and health risks regarding chemicals. Companies have to take responsibility of the impacts to environment that are caused by them (Harmaala & Jallinoja, 2012, p. 22). Environmental responsibility has moved from only concentrating on decreasing emissions to controlling the emissions concerning the whole lifecycle of a product. Since climate change has become ever more present, the ways to decrease emissions and to act environmentally responsibly have increased and advanced. When talking about a company that is environmentally responsible, one is referring to a company that acts according to the legal obligations, develops its processes and knows its weaknesses regarding environmentally responsible activities. In practice this means that companies keep developing their manufacturing processes, property controls, products and services to become more environmentally friendly. Companies need to adopt an environmental management system in order to systematically monitor environmental activities and produce credibility among internal and external stakeholders (Torugsa, O'Donohue & Hecker, 2013, p. 385–386).

Many companies have created objectives to advance their technologies and solutions that help customers to better their environmental performance and eco-efficiency of their actions. Companies commonly set clear and precise goals to gain better environmental performance for example in diminishing carbon dioxide emissions (Harmaala & Jallinoja, 2012, p. 22–23). Environmental dimension likewise concludes treating environmental issues as a way of improving business processes and gaining benefits through that. According to Choi & Ng (2011) this could lead to both positive as well as negative outcomes to the environment. They argue that by treating environmental concerns as a way of improving business, one can help sustainability matters in society. In contrast they further suggest that it could lead to negative outcomes to the environment by promoting consumption, when aiming to improve profits.

Companies can find it difficult to separate these dimensions from each other in practice, due to them being dependent on the other dimensions. For example, when importing avocados from developing countries to developed countries all the dimensions are considered in the process. The process acknowledges the social dimension through for instance considering child labor, compensation for executed work and farmers working rights. Environmental dimension is considered when making sustainable decisions about importation or improving the effectiveness of farming. Thus, by increasing the amount of farmers education more sustainable solutions can be achieved as well as more effective farming and higher wages could be accomplished. Consequently, when companies can successfully merge these three dimensions together in their business operations, CSR could be used to its full potential to help businesses to gain the most advantages economically (Harmaala & Jallinoja, 2012, p. 18–23).

2.2 ESG definition

Environmental, Social and Governance refers to ESG, which encapsulates the integration of these concerns into corporate strategies by both corporations and investors. Unlike CSR, which historically has focused more on activities aimed at social responsibility and corporate improvement, ESG explicitly incorporates governance issues alongside environmental and social aspects. ESG gives governance a more explicit role in evaluating corporate practices (Gillan, Koch & Starks, 2021, p. 2). ESG can also be explained by referring to ESG frameworks that are founded on the main dimensions of environmental, social and governance (ESG). These pillars encompass the primary topic areas that companies are required to report on (Deloitte, 2024). ESG has evolved within the realm of CSR, resulting in a close association between the two terms. The thesis will examine both studies regarding CSR and ESG as these terms are closely related, and previous studies have commonly used both terms.

As the social dimension and environmental dimension were explained in the previous chapter, these do not need more extensive explanations. As ESG differs from CSR, in that

it gives governance issues a more explicit role, the governance aspect is next explained more extensively. Corporate governance commonly acts as a controlling factor for matters such as board composition, anti-corruption, tax, internal control, shareholders' impact, business ethics and internal control (Nordea, 2023.) As the criticism has risen among CSR not including the factor of governance into account, the popularity of ESG has risen. Furthermore, environmental and social factors have formerly gained higher interest among companies and stakeholders than governance. In order to fully gain knowledge of companies' social responsibility, it is of high importance to take governance factors into account, as it is significant to the realization of environmental factors and social factors. For instance, if companies breach their environmental commitments it is due to the level of corporate governance not being up to par (KPMG, 2022).

2.2.1 ESG reporting

Disclosing matters regarding companies' social responsibility actions is formally known as Corporate Social Responsibility reporting (Fortanier, Kolk & Pinkse, 2011, p. 666). As disclosing companies' environmentally responsible matters is a part of CSR reporting, it is fundamental to gain insight into the concept of CSR reporting. CSR reporting does not have clear and mandatory rules such as there are mandatory rules for financial reporting. Consequently, CSR reporting has faced criticism due to its lack of applicability and trustworthiness (Michelon, Pilonato & Ricceri, 2015, p. 59–60). There are certain standards and guidelines for CSR reporting such as the European Union's directive 2014/95, which mandated large, listed EU firms to begin disclosing their social responsibility actions in an annual CSR report. The aim of this directive was "to increase the relevance, consistency and comparability" of CSR reporting. The results of this directive remained quite insignificant compared to the growing need of stakeholders to gain clear information about companies CSR actions (Fiechter, Hitz & Lehmann, 2022). Consequently, the EU introduced new rules on corporate sustainability reporting by introducing The Corporate Sustainability Reporting Directive on 5th of January in 2023. The new directive mandates a larger number of large companies, and additionally listed

SMEs to report on sustainability. This new directive will become mandatory for firms to report for the financial year of 2024, for reports that will be published in 2025. These companies are required to report corresponding to the European Sustainability Reporting Standards (ESRS). On February 2025 European Commission released a package of proposals regarding CSRD, which recommended to only apply the CSRD to the largest companies, whose CSR operations have the largest impacts on the environment and people. The Commission introduced this package of proposals in order to not strain smaller companies in their value chains (European Commission, 2025).

There are various theories, as to why companies disclose their CSR actions. One of the most prominent theories regarding CSR reporting is the stakeholder theory. As stakeholders increasingly urge companies to prioritize social responsibility, the necessity for firms to disclose their CSR activities has escalated significantly (Hetze, 2016, p. 281–282). CSR reporting is one way of communicating and providing information to stakeholders of companies CSR actions. Basing on the stakeholder theory it can be argued that CSR reporting could be used as a way to control stakeholder pressure. From CSR reports stakeholders can gather information of the firms processes and about the impacts of their operations on the stakeholders (Fortanier et al., 2011, p. 666).

In the perspective of legitimacy theory, one can understand CSR reporting as a strategy to legitimize firms' CSR operations to the stakeholders and to improve the firms' legitimacy. Legitimacy theory is another prominent theory regarding CSR reporting. Although, legitimacy theory could suggest that companies may seek to enhance their credibility with stakeholders through presenting their CSR initiatives in a more favorable light within their CSR reports. Organizations are able to implement social and environmental disclosures to build a certain image to their stakeholders, which could in fact be very different from the actual social and environmental performance of the company. This could mean that CSR reports could be constructed by companies to answer to specific stakeholders demands (García-Sánchez, Hussain, Aibar-Guzmán & Aibar-Guzmán, 2022, p. 120).

As mentioned earlier, CSR reporting has gained some critique regarding its lack of credibility and trustworthiness (Michelon et al., 2015, p. 60). Thus, ESG reporting has gained popularity among non-financial reporting initiatives. ESG reporting entails companies detailing their environmental, social, and governance activities. Serving as a non-financial reporting mechanism, it aids stakeholders in gaining deeper insights into a company's ESG initiatives. (Fuadah, Mukhtaruddin, Andriana & Arisman, 2022, p. 1–2). With sustainability and CSR becoming increasingly prominent, there is a growing imperative for standardized reporting practices that utilize quantifiable metrics to showcase a company's ESG initiatives, thereby illustrating its commitment to responsible business practices. As mentioned before, the new Corporate Sustainability Reporting Directive (CSRD) 2022/2464/EU has been made in order to modernize and strengthen the ESG reporting standards. The CSRD additionally mandates assurance of the sustainable responsible information firms are disclosing, which is furthermore able to strengthen the legitimacy and trustworthiness of sustainability information (European Commission, 2025).

Reporting of the company's environmental actions is a part of ESG reports, as it discloses the environmental, social and governance factors of a company. A firm's disclosure of its environmental metrics is grounded in the Triple Bottom Line (TBL) framework, which extends beyond financial performance but additionally environmental and social considerations. Other standards, such as the GRI standards, additionally offer frameworks that assists organizations in disclosing their environmental metrics and ESG initiatives. (Friske, Hoelscher & Nikolov, 2023, p. 372).

2.2.1.1 Global Reporting Initiative

One of the most important landmarks in ESG reporting is the Global Reporting Initiative (GRI) guidelines. The first edition of the guidelines was released in 2000. Since the year 2000, the GRI has solidified its position as perhaps the most impactful set of ESG reporting guidelines (Laine, Tregidga & Unerman, 2021; Levy, Brown & de Jong 2010, p.

88–89). The GRI guidelines were established with the objective to have an international standardized format for firms to additionally report their environmental and social performance and how companies are applying them. By having these standardized guidelines for companies around the world to report their environmental and social performance, it has become possible to compare CSR reports of companies that operate in different countries (Jeriji, Louhichi & Ftiti, 2023, p. 555).

Sustainability standards, for instance the GRI are of high importance for companies in order to report their environmental, social and governance activities to stakeholders. GRI guidelines are generally combined with reporting standards, with the aim to disclose the ESG information of a company in the most reliable matter. As the credibility of disclosing companies' ESG matters has faced criticism, for example for green-washing, the adaptation of GRI guidelines with a set of reporting standards is crucial to gain credibility among stakeholders. Additionally, if ESG information is not disclosed openly and routinely stakeholders are not able to conclude precise valuation of the companies ESG matters. Thus, for companies to gain stakeholders trust and through that possibly gain higher market value the adaptation of GRI guidelines and a set of reporting standards is key for companies disclosure of their ESG information (Friske, Nikolov & Morgan, 2024, p. 2098–2100).

2.2.2 ESG Ratings

Throughout the recent years, there has been a growing objective on incorporating ESG factors into how investments are evaluated and valued. Investors have consequently started to look into companies ESG issues before making an investment. Thus, ESG ratings have become a prominent theme among ESG issues. ESG ratings entail appraising a company by comparing its performance, standards, or quality across environmental, social and governance domains. Moreover, these ratings often culminate in an overall assessment of a firm's performance, derived from a composite score integrating various individual ESG factors (Clementino & Perkins, 2021, p. 379–380). ESG ratings and ESG scores are commonly terms that are used interchangeably, as they both refer to the

companies' ESG performance, the main difference being the grade on how the performance is rated. ESG scores are commonly given as a numerical value and ESG ratings are given a letter-based grade (CFA Institute, 2024.) There are multiple different agencies that provide ESG ratings. The agencies evaluate firms' ESG performance, and they commonly make their evaluations through publicly available information, firms' sustainability reports, third-party research and information on firms' websites (Clementino & Perkins, 2021, p. 380–381). A few of the major rating agencies include for example LSEG (formerly Asset4), MSCI, Sustainalytics and Bloomberg (Avramov, Cheng, Lioui & Tarelli, 2022, p. 643). ESG rating methodology is not unified among the different agencies, thus, different agencies can use various methods and criteria for the purpose of company evaluation. The data is retrieved from many different sources (PwC, 2024).

ESG ratings have received some criticism over being uncertain. For example, uncertainty has risen regarding how ESG ratings could focus too excessively on the internal processes regarding ESG rather than on the effects outside of firm's operations, possibly driving into firms seeming more sustainable to the stakeholders than they actually are. Another criticism has emerged regarding, how the availability of data could lead to biased ratings, as larger firms are commonly producing more data than smaller firms, which might affect there to be biased ratings when comparing larger and smaller companies. Additionally, research has shown that Index providers that sell ESG rating services might give biased ratings. As ESG raters with strong financial incentives from licensing are prone to give higher ESG ratings to companies with better stock performance or companies that are included in their ESG indexes, compared to raters with fewer licensing incentives (CFA Institute, 2024). These uncertainties illustrate further the ambiguity of CSR and ESG reporting as different rating agencies can have different ratings for the same companies. ESG ratings are rooted in ESG reporting, and as the EU introduced the new 2022/2464/EU directive ESG reporting has become more trustworthy and standardized, thus it could help ESG ratings to be more certain and less divergent among the different agencies (Avramov et al., 2022, p. 643).

Different agencies can give individual ratings to companies regarding the different dimensions of ESG. For instance, LSEG in addition to the ESG scores gives each individual dimension of ESG their own ratings. The environmental score is called the environmental pillar score and it gives insight into companies' environmental performance. For the purpose of gaining knowledge about the environmental performance of companies, ESG ratings are of highest importance (LSEG, 2024). As ESG ratings take information mainly from companies' ESG disclosures, the concept of ESG disclosure is mandatory to comprehend as well as what it contains. As this thesis focuses on examining the relationship between environmental performance and firm value, the concept of environmental performance is next explained.

2.3 Environmental performance

Environmental performance explains how well companies are able to initiate environmental practices into core business strategies and how well these are implemented without heightening costs. These environmental performance factors are reported by companies in their ESG disclosures. Furthermore, ESG disclosures are one of the core factors that create firms ESG ratings and scores. The prior discussion in academic research regarding environmental performance has focused on the fact how investing in environmental operations might require choosing between costs and financial benefits. Thus, the core question behind environmental performance remains to be whether environmental practices could improve firms financial performance. Hence, among academic literature the relationship between environmental performance and firm value has gained higher interest and needs to be further researched (Dohrmann, Martinez-Blasco, Moring & Margarit, 2024, p. 1).

In order to understand the concept of environmental performance, it is important to understand how firms need to simultaneously act environmentally responsibly while maintaining profitability and financial performance. As performance is related to the valuations of stakeholders, environmental performance can be realized as how firms are able to perform in order to answer the demands of stakeholders when it comes to

environmental operations. However, the concept of environmental performance is quite complex as while it includes the environmental influences to the firm, its stakeholders, as well as the environment, it additionally entails the environmental responsibility activities impacting performance subsequently. Environmental performance is best understood as a reflection of corporate actions, while stakeholder reactions to environmental efforts are influenced by other factors. If the factor of external influences are not properly accounted for, the results of environmental performance might be biased. Thus, to understand the concept of environmental performance, stakeholder theory is one prominent theory that can further aid to understand this (Schultze & Trommer, 2012, p. 375-377).

2.4 The main theoretical concepts

The main theoretical concepts regarding the subject of environmental performance and firm value are stakeholder theory and legitimacy theory. These theories are further explained next and their relation to the subject of the thesis.

2.4.1 Stakeholder theory

Although CSR as a concept has been universally used for decades, there has not been one clear broadly acknowledged theoretical framework to answer to issues related to CSR implementation or environmental disclosure in firms. The most common theoretical framework emerging in research relating to CSR and its dimensions is the stakeholder theory (Russo & Perrini, 2010, p. 208–209). The stakeholder theory, proposed by Freeman in 1984 in the publication “Strategic Management: A Stakeholder approach”. The term stakeholder refers to corporations’ customers, suppliers, governments, employees and to anyone who could benefit from the corporation. The main concept behind the stakeholder theory introduced by Freeman in 1984 is that behind every business decision is the stakeholders of firms’. Freeman argues that the stakeholder theory refers to steering the benefits of companies’ success to its stakeholders as well as the power to make decisions about important matters. Freeman alludes that by allowing

the stakeholders to take part in important decision-making processes companies can create a logical approach of measuring performance of a firm possibly leading to success in the long run (Stieb, 2009, p. 401–402).

In the 1980s the evolution of CSR was bringing businesses and social responsibilities even closer, and the interest of stakeholders was taken even more into consideration. As concepts grew and world was changing the evolution of the term CSR began as well. Other complementary concepts to add to the theme of CSR were created, such as corporate social performance, corporate social responsiveness, stakeholder theory, business ethics and many more. The highest importance in additions to the area of CSR was an article by Jones (1980) where it was suggested that all opinions of stakeholders should be considered when firms implement CSR processes. He was one of the first researchers to suggest that it was more crucial to concentrate on the decision-making process regarding CSR implementation than to concentrate on the outcomes of implementing CSR processes. In the 1980s similar research concentrating on the subject of CSR being a benefit to businesses, a way of improving businesses profitability and financial performance. Moreover, the stakeholder theory was focused on highly in the 1980s when it came to studies about CSR. Although the stakeholder theory and literature regarding it could be already found before this, in the 1980s the studies began evolving and taking the stakeholder theory more into consideration when researching CSR. Within these studies it was introduced that the main issue in the stakeholder framework was that the performance of a firm is influenced by companies' shareholders but additionally by their customers, governments and employees. The distinction between socially responsible intentions as well as financial performance intentions of corporations was further explained to be not as relevant at that time (Moura-Leite & Padgett, 2011, p. 532).

The fundamental target of stakeholder theory is to generate value for all stakeholders involved in the firm. According to the stakeholder theory companies should be seen through the prism of various relationships between its stakeholders. Moreover, firms'

leaders should manage and take care of the relationships between stakeholders, as well as concentrate on hearing stakeholders' opinions in order to avoid stakeholders conspiring together for trade-offs. Therefore, it is very crucial for leaders to find measures that benefit multiple groups of stakeholders. Ethical decisions are highly associated with the stakeholder theory considering stakeholders often take responsibility for the repercussion of their operations on other stakeholders, as the relationships between stakeholders are crucial for the company to create value under the stakeholder theory (Dmytriyev, Freeman & Hörisch, 2021, p. 1444–1445).

The reason behind stakeholder theory being the most common theory in CSR literature is that by involving stakeholders in the decision-making processes it could possibly result in ethical, economic and environmental performance improving and taken more into consideration. Furthermore, when allowing stakeholders to partake in making crucial decisions, it is more likely that decisions are being considered from various perspectives and thus decisions may be more insightful and ethical when stakeholders participate. When employees, customers and governments create business decisions together the probability of making more socially responsible decisions may be higher. Under stakeholder theory, CSR could contrary to mentioned before exacerbate the issue that lies between financial goals and ethical goals. According to the stakeholder theory, stakeholders main focus is to create value to the company in spite of social responsibility, which indicates that only when CSR activities conclude to financial gains stakeholders consider taking part in these activities (Brown & Forster, 2013, p. 301–303).

2.4.2 Legitimacy theory

Legitimacy theory is another prominent theory on the academic literature on the subject of CSR. Researchers have suggested that legitimacy theory refers to CSR disclosure possibly resolving legitimization problems that organizations might face. When organizations disclose their social and environmental information to the public voluntarily it helps maintaining good relationships with stakeholders and gives

stakeholders more trust regarding the organization. Legitimacy itself refers to companies' actions seen as proper, desirable and appropriate by the public. This indicates that in the perspective of the legitimacy theory the implementation of CSR disclosure and reporting CSR practices are highly essential, as they can raise stakeholders' awareness of companies' activities and results (Michelon et al., 2015, p. 60). Agreeing with this description, Cho & Patten (2007, p. 639–640) explain that legitimacy theory refers to firms aiming to gain legitimacy through communication to stakeholders such as disclosing financial reports in order to influence the public's perceptions of the firm. They emphasize on environmental disclosure and how that influences legitimacy, but still remind that all environmental disclosure does not act as a tool for legitimacy.

Legitimacy theory further explains that CSR actions are completed by management of companies in order to seek legitimacy. When CSR actions are accepted and valued by the stakeholders of a firm the legitimacy of a firm increases (Chauvey, Giordano-Spring, Cho & Patten, 2015, p. 794). If society does not agree with companies' way of operating their business in a legitimate manner, society could then act against the company by for example not buying the products of the company they do not agree with. This could lead into companies suffering losses and decreasing their financial performance. Consequently, according to the legitimacy theory managers have to adopt strategies in order to answer to society's expectations of the way companies conduct their business. As society's needs, expectations and values evolves constantly companies need to develop their processes to be more socially responsible to be able to legitimize their operations in the perspective of the society. The strategies managers commonly implement in order to gain legitimacy have to do with CSR disclosure. Research have found that the strategic importance of CSR disclosure in companies' yearly reports is of high value. Hence, the legitimacy theory has been found to be a very useful theory on the subject of CSR (Chan, Watson & Woodliff, 2014, p. 61).

2.5 Gender diversity in boardrooms

Recently the issue of gender-diverse boards of companies is becoming very present in boardrooms across the world. Especially in European companies the subject of the amount of women board members is ever more present as an impact of the European Commission new legislation regarding the matter. Furthermore, as stakeholders have become more socially responsible and awake, stakeholders' demands about female leaders have influenced this matter to become up to date. One of the biggest reasons for the argument behind having more gender diversity in boardrooms is its influence on firm's financial performance and firm value. The reasons behind gender-diverse boards possibly affecting firm value will be further examined in this thesis (Isidro & Sobral, 2015, p. 1).

As mentioned before gender-diverse boardrooms have become legally obligated in some countries. The European Commission introduced its new legal framework for a larger representation of women on corporate boards in Europe. The proposal applies to around 5000 listed companies in the European Union. It does not regard companies that are with less than 250 employees and annually do not exceed worldwide turnover over 50 million euros. The legislation proposes that 40 percent of board-members in corporate board should be female members, at least in publicly listed companies. Small and medium companies do not have the same requirements. The aim of this proposal was that the 40 percent female board members requirement should be met by the year of 2020. In 2012 only 15 percent of non-executive board members and 8 percent of executive board members were female, which represents the huge imbalance of genders on the boards of European firms. In 2012 European publicly listed companies did have differences in the percentages of female board members. For instance, in Finland the percentage of female board members was 27 percent and in contrary it was only 3 percent in Malta. This also indicates that in Europe there is a need to increase the percentages of female board members as well as equalize the amounts between different countries (European Commission, 2012).

Before the legislation European Commission introduced in 2012, some European countries had already adopted legislation regarding having a certain percentage of female members in boardrooms. Norway was one of the first countries to implement such legislation in 2006, when Norway mandated for 40 percent of board members to be female in publicly listed companies. Similar to European Commission the legal obligations is required for publicly listed companies. Belgium and France have since followed behind Norway by having similar legislations put in order. These countries have also adopted there to be sanctions if the firms do not implement these legislations. Some countries have implemented legislation but do not have sanctions in place, such as the Netherlands, Spain, Denmark, Finland and Greece. Multiple countries have not implemented legislation at all and have decided to implement a voluntary approach to the subject, such as the United Kingdom (Isidro & Sobral, 2015, p. 2–3).

As mentioned before, previously academic literature have found that more gender-diverse boards could have the potential to increase firm value. This is due to the fact that having more female members could initiate more diverse incentives and decisions that might lead to greater outcomes regarding firms' performance (European Commission, 2012). One of the main arguments behind suggesting that more gender-diversity in the boardrooms can possibly lead to multiple various benefits for firms is that female leaders tend to be more risk-averse and to consider decisions more long-term. One prominent theme supporting speeding up the matter of having more gender-diverse boardrooms is that it is an equality issue (Isidro & Sobral, 2015, p. 3–4).

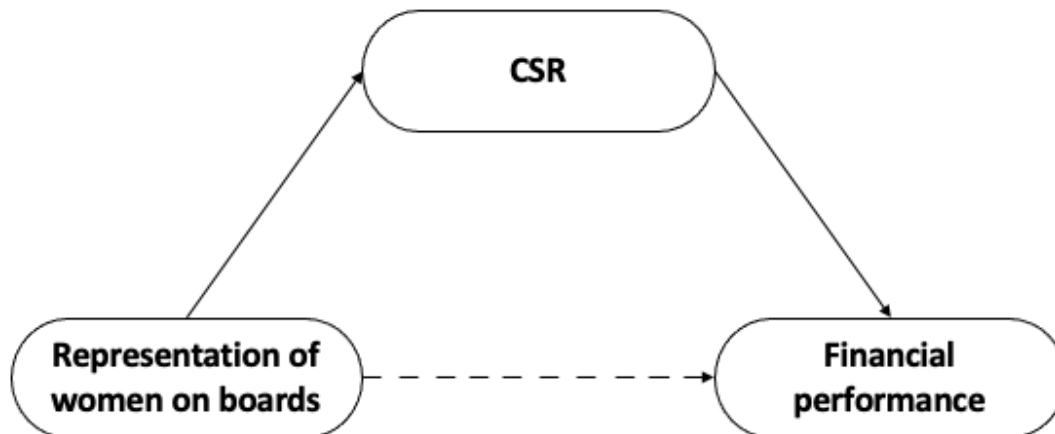


Figure 1. Women on boards – CSR – Financial performance (Galbreath 2018).

Studies have previously shown that according to the stakeholder theory, women board members are able to consider stakeholders more comprehensively which in addition results to higher level of CSR and environmental actions. Gender-diverse boards have found to be linked to CSR as well as environmental activities by preceding papers, as women board members seem to be of high interest to stakeholder perceptions in companies' engagement to social responsibility. From the above figure 1 it is represented that the amount of female board members contribute to firms CSR activities and additionally through that could affect firms' financial performance. Stakeholder theory suggests that when higher levels of CSR actions are established, companies tend to secure long-term value from their stakeholders as well as create resources that might lead to financial performance increasing. According to some studies women leaders might be more likely to affect firms' engagement in CSR and its implementation. Women leaders are likewise considered to take stakeholders interests into consideration to a greater extent than men leaders. As stakeholders demand firms to implement CSR initiatives, having female board members, where they can take stakeholders opinions into account leads to firms increasing their engagement in CSR activities (Galbreath, 2018).

2.6 Theoretical background for women on the board of directors

A common theory within the subject of gender diversity on boardrooms is the agency theory. The main objective of the agency theory is that the board of directors have to share the information between managers and shareholders, as well as align their needs and opinions of the firms' operations (Fama and Jensen, 1983). The agency theory states that independent corporate boards provide information for monitoring and counselling, coordinates the objectives of shareholders and top management and has to establish successful decision-making. In the perspective of the agency theory gender diversity is a key aspect of firms' performance as the decision-making process is impacted by the boards various characteristics. It is argued that by having a more diverse board, board independency could be affected positively, as it could be suggested that when a board has more diverse members it may also affect in having more diverse opinions and ideas. Diversity in boards is also seen as a positive element of a firm by its shareholders, which could lead into increasing firm value. Moreover, it is suggested that diverse boards could elevate firms' decision-making through having more diverse initiatives and opinions, as well as bringing more quality to the boards. Agency theory further proposes that when women are taken into consideration as board members there is a higher chance of finding the best possible person for the position. Furthermore, firms' productivity could increase as women have higher possibilities to advance their careers. (Marinova, Plantenga & Remery, 2016, p. 1777–1779).

Board monitoring is one of the main objectives of the agency theory. It is suggested that having female representation in the boardrooms could increase and promote board monitoring, possibly leading into an increase in firm value. Effective monitoring has been associated with female directors due to the fact that female directors commonly take monitoring more into consideration than male directors. Prior academic literature has concluded that gender diversity in the boardrooms could also lead to the board being more independent which as well improves board monitoring. According to the agency theory female directors could lead to economic benefits for firms as well as ethical benefits (Isidro and Sobral, 2015, p. 3).

3 ESG and its effect on firm value: literature review

This chapter aims to examine preceding research on the subject of ESG and its effect on firm value, focusing on the environmental dimension. Furthermore, the intention is to gather evidence on the literature regarding the correlation between environmental performance and firm value measured by Tobin's Q. The literature review additionally focuses on examining prior academic research on how this correlation might act when moderated by women on board of directors. As prior studies have focused primarily on researching CSR and ESG and their effect as a whole on firm value, these studies are thus considered on this thesis. The effect environmental performance could possibly have on firm value has gained a great amount of interest in academic literature. Ksiezak (2017) explained the reason behind attention growing for CSR and firm value in academic literature being the possible benefits CSR could bring to firm value for a company. As companies get more interested in gaining more benefits economically from CSR, literature needs to further examine the different ways in doing so. When companies gain trust, legitimacy and improve their reputation in the perspective of the stakeholders through implementing CSR activities, gains and value can be achieved.

Theoretically firm value will equal its estimated future returns discounted to a present value by a risk-adjusted rate of return. There are various different ways to calculate firm value, but the same principle of discounting estimated future returns to a present value by a risk-adjusted rate of return stays the same in these approaches to calculate firm value (Bernström, 2014, p. 14). Tobin's Q is very commonly used in academic literature regarding ESG and firm value, as it is regularly used as a firm value measurement that gives great insight into the future. Consequently, it is also the prominent ratio used in this thesis to gain insight to the effect ESG could have on firm value (Awaysheh, Heron, Perry & Wilson, 2020; Gregory, Tharyan & Whittaker, 2014; El Ghouli et al. 2011).

3.1 ESG and firm value

There have been plenty of prior research done on the subject of ESG performance and firm value with conflicting results. Disparities between previous literature could be subdue to multiple various reasons on how the research has been conducted, such as industry, time or the country or even the difference on methodological approaches (Gregory et al., 2014, p. 633). Multiple studies have found there to be a positive influence regarding ESG performance and firm value but in contrast multiple studies have found there to be a negative result (Tahmid, Hoque, Said, Saona & Azad, 2022). Research regarding only the environmental dimension of ESG performance are fewer compared to research regarding ESG performance as a whole, consequently this next chapter mainly considers studies regarding ESG performance and firm value as environmental performance is a part of ESG performance. According to Cellier & Chollet (2016, p. 661) prior literature have found that the reason behind varying results regarding ESG performance and firm value might be demonstrated by the use of aggregate measures. Thus, future research could further examine the relationship separately through the different dimensions of environmental, social and governance. By doing this, it is more probable to get clearer results about the various impacts of ESG performance on firm value.

One of the core questions behind ESG and its correlation to firm value is that if there is a positive relationship that could cause the growth of firm value through ESG actions and disclosure of these actions. As mentioned before multiple various studies have discovered there to be a relationship but the question is whether the correlation is strong and consistently found in different studies (Taylor et al., 2018). Gregory et al. (2014) focused on inspecting the source of firm value through CSR activities. The approach in this study differs from previous ones as the objective is to extend previous analyses with capturing expected future cash flow and cost of capital effects on the relationship between CSR and firm value. The reason behind examining this matter through this angle is to further justify to managers and investors that it is financially important to participate in CSR. The findings from this particular study were clear and

the correlation between firms that apply CSR activities the most and firm value was found to be the strongest. According to the research, long-time growth for “Green” firms that have reported more environmentally friendly actions was much larger than in “Toxic” firms, which leads to sustainable competitive advantage to those firms that participate in environmental activities diligently. Similar results were found by El Ghoul et al. (2011) who found CSR investments to add to firm’s value by cutting down cost of equity. The conclusion of the research was not totally comparable to Gregory et al. (2014) as the findings of long-time effectiveness of CSR activities growing firm value were not so strong. This is in contrast of Gregory et al. (2014) research which suggested there to be clear financial benefits in the long-run from applying CSR activities. Despite the fact, that these two studies found there to be positive correlation the results still are not clear when considering different time periods and how the conclusions differ in especially the long-time period. There should be more evidence shown on how the relationship between CSR initiatives especially regarding environmental issues and firm value is in longer time periods, and whether the relationship is sustainable.

Benlemih et al. (2018) focused on their research on the aspect of whether positive changes in CSR ratings can lead to firm value growing and to gain competitive advantage through that. The approach differs from previous papers as they have concentrated more on CSR involvement as the factor that generates firm value rather than focusing on the efforts firms make to improve their CSR practices. The data used for this study was gathered from 1,621 US firms from 1996-2011 and it was combined from three different databases: Compustat North America, The Center for Research in Security Prices and KLD Research Analytics. In order to gain the best knowledge possible these databases are merged, as they give different kind of data regarding the issue. Conclusions from this study further proved the strong positive correlation between CSR activities and firm value. Moreover, the angle used in this research gave a new insight to the matter at hand. It demonstrated that firm value is positively affected by variation in firms CSR ratings, which was one of the hypotheses of the study. A similar way of approaching the relationship behind CSR and firm value was introduced by Cellier and Chollet (2016). In

their study the effect of CSR to firm value was again explored by focusing on CSR ratings and how the positive changes in CSR ratings can lead to firm value growing and in contrary negative changes could lead to firm value diminishing. The study focuses more on short-time perspective, and it differs from Benlemih et al. (2018) as the data is gathered from European firms..

Yoo et al. (2021) focused on examining CSR and firm value through disclosure and action. In this research the methodological approach in figuring out if CSR affects financial performance positively is done by creating a model where disclosure and actions are taken into consideration and it is examined if scores from this model affects financial performance in the short and long term. The data used is gathered from 1,064,000 observations from Bloomberg data through years 2007-2019 and from 600,000 observations from MSCI data through years 2005-2015. This study uses Tobin's Q as a method of calculating financial performance. The results show that higher the Tobin's Q the more a firm can perform CSR actions as the market value is higher. Many studies before have focused on the relationship between CSR and financial performance and whether the relationship is causal or if they correlate. This study finds that there is clear correlation and the relationship is not causal, but there might be reverse causality or at least concern of it. It is indicated from this study that taking action in CSR related initiatives benefits firm value but disclosing these CSR initiatives to the public does not directly cultivate firm value.

D'Amato and Falivena (2020) explored CSR and firm value through firm size and its age. The focus of the study was to determine whether firm size and age moderate the effect of CSR on firm value. The study was based on examining Western European listed companies during the time period of 2008-2018. Firm value in this study was measured by using Tobin's Q, annual stock price return and market-to-book value. According to their study CSR and firm value correlate negatively to each other when inspecting small or young companies. Opposed to large or old companies that clearly grow their firm value when incorporating CSR activities into corporate strategy. The reason behind

smaller or younger companies not benefiting from CSR strategies to firm value can be due to lack of resources, reputation or experience. This suggests that firms need to deliberate whether there are enough positive effects to their firm value when investing to CSR activities. Considering CSR activities through making sure that resources and experience in firms are enough to establish growth in firm value and benefit from CSR activities is important to smaller and younger firms. Large companies and older companies clearly benefit from taking CSR activities into consideration. According to the research of Baumann-Pauly, Wickert, Spence and Scherer (2013) which examined CSR through smaller companies, smaller and younger firms would be as capable as larger firms in implementing CSR activities into strategy. They find that the problem with smaller firms and CSR activities comes into question when regards to promoting about CSR externally or when reporting about CSR initiatives. This argues with the previous study's conclusion of smaller firms being not able to implement CSR actions as well as larger firms. The findings indicate that, when researching the effect of disclosure of CSR matters and firm value, firm size should be taken into account.

Although results of CSR and firm value have found there to be positive correlation between the two, it is important to remain critical about the results as they could be influenced by multiple different variants in the studies. For example, different time periods, statistical methods, datasets or countries used in studies can influence the outcomes. Considering this, a certain critical way of thinking is important to hold on to when examining results about CSR and its effect on firm value (Gregory et al. 2014). Ding, Ferreira and Wonchoti (2016) researched the possible influence of CSR has on firm value through different industries the companies' conduct their business. Their findings conclude that CSR does not correlate positively with firm value in every industry, but rather the industry where firms conduct their business effects change significantly. They found that in some industries positive correlation between CSR and firm value was only found if the firm in question was performing superiorly compared to other firms in their industry, and whether they were communicating CSR performance to the stakeholders.

They suggest that only firms that do distinguish themselves from their industry can cultivate to firm value through implementing CSR actions.

3.2 Environmental dimension and firm value

As the prior review of academic literature regarding the subject of ESG and firm value demonstrated, the relationship between ESG and firm value has prominently been found to be positive (Benlemih et al., 2018; Cellier & Chollet, 2016; El Ghoual et al., 2011; Gregory et al., 2014; Yoo et al., 2021). D'Amato and Falivena (2020) and Baumann-Pauly et al. (2013) found there to be conflicting results when examining CSR actions and firm value, which could be due to firm size affecting the relationship. Ding et al. (2016) additionally found conflicting results, as they found that in some industries the relationship between CSR and firm value was positive, contrary to this, in some industries the relationship was found to be negative. Concluding the previous academic literature among the topic of ESG and firm value, the relationship between them has been mostly found to be positive. The next part of the literature review considers, whether the results may vary when focusing on the environmental dimension and its effect on firm value.

Similar dataset was used in Taylor et al. (2018) research as in Yoo et al. (2021) research. The data used in this research was gathered from Bloomberg ESG data and Compustat from years 2009-2014 with 11 430 observations from 1 688 firms. The intend behind the research was to determine whether CSR disclosure increases firm value measured by Tobin's Q. Contrary to prior studies the findings from this research indicated that only the social dimension was positively affecting firm value. This could suggest that investing and focusing further on socially responsible choices rather than focusing solely on environmentally responsible choices could constitute to increase in firm value. Findings from this study additionally identified there to be a stronger correlation between firm value and CSR activities for consumer-facing firms. As the conclusion from this research encounters there to not be any significant relationship between environmental or economic dimension and firm value measured by Tobin's Q, there should be further

examination as to why this study differs from other prior conclusions. The findings indicates to the possibly being a negative relationship between environmental disclosure and firm value. There might be multiple different reasons for the differing results including small number of observations which could affect results being too narrow. Furthermore, it should be taken into consideration that as competition grows the margins and profits of firms will decrease. As firms have become more informed of the possible profits of implementing CSR activities, these extra profits could be competed away.

Contrary to Taylor et al. (2018) research which showed that implementing environmental actions might not increase firm value, Guenster, Bauer, Derwall and Koedijk (2011) found that at least environmental activities could lead to increase in firm value measured by Tobin's Q. The findings further indicate through Tobin's Q regression that market increases value to those companies that perform environmentally more effectively. Results displayed that in the long run the influence of environmental actions on firm value increased even more compared to shorter time period. This could be interpreted that when managers are aiming to gain competitive advantage and increase their firm value in a sustainable way, investing in environmental activities and disclosing them is worth considering.

Gholami et al. (2022, p. 2–5) studied the subject of ESG disclosure and firm profitability by utilizing a sample of Australian publicly listed companies during the years of 2007-2017. The sample was gathered from Bloomberg's ESG disclosure score, and the score was disaggregated in order to gain insight, how differently environmental, social and governance scores act in the relationship between firm profitability. The study was conducted by using ROA as a measurement for profitability. As ROA is considered as an accounting-based method to calculate firm value, it is beneficial to review the findings of the study by Gholami et. Al (2022). The findings from this study indicated that ESG disclosure as a whole has a meaningful and positive effect on firm value calculated by ROA among all industry sectors. Contrary to this, Gholami et. Al (2022, p. 12) found that

only in the financial industry all dimensions of ESG disclosure had a positive relationship with firm value. They found that companies acting in non-financial industries did not have a significant relationship between environmental disclosure and firm value.

Vaihekoski and Yahya (2025) studied the relationship between firm value measured by Tobin's Q and ESG ratings using a dataset consisting of Nordic companies. The research is conducted by examining the relationship between ESG performance and firm value, while using audit quality as a moderating factor. This study disaggregated the different pillars of ESG scores from LSEG Workspace to research whether the different dimensions could have conflicting results. Regarding the environmental dimension, the research found that only when the moderating factor of audit quality was calculated in the model, the relationship between environmental performance and firm value is significantly positive. This could suggest, that the relationship between environmental performance and firm value might require moderating effects such as board gender diversity in order to become significantly positive. Similarly, Cellier and Chollet (2016) discovered differing results in different dimensions of CSR affecting firm value in contrasting ways. They found that even when CSR as a whole does positively affect firm value, all of the dimensions do not and can rather even destroy firm value. These findings propose that CSR and ESG ratings can affect firm value positively when all the dimensions are considered, as stakeholders are progressively gaining more knowledge about CSR actions and value companies that take these into consideration. Additionally, the findings indicate that environmental, social and governance score and their effects on firm value should be examined individually.

Dohrmann et al. (2024) examined the relationship between environmental performance and financial performance from European evidence. The research concluded, how the prior academic literature regarding the relationship between environmental performance and financial performance has been relatively difficult to measure with conflicting results. Furthermore, similarly to Vaihekoski and Yahya (2025) the research found that this has resulted to the importance of including moderating factors to

examining this relationship in order to gain significant results. One of the moderating factors used in this study was board gender diversity. The findings from this study differs from previous research as the influence of environmental performance on firm performance measured by Tobin's Q was found to be positive and significant at a 1% level. Furthermore, the moderating factor of having more women on the board was found to be significant at a 1% level, which suggested that more gender-diverse boards increases firm performance. Interestingly, the results found there to be a negative coefficient on the interaction term between environmental performance and board gender diversity. Hence, when there are more female board members the positive effect that environmental performance has on firm performance decreases. It is important to consider that, in comparison to previous findings, these results may be influenced by differences across the countries and regions analyzed, as varying corporate governance factors may have differing effects depending on the cultural and institutional contexts (Dohrmann et al., 2024).

To conclude the academic literature reviewed in this chapter, similar results regarding the environmental dimension of ESG or CSR disclosure and its relationship with firm value were found by the studies of Taylor et al. (2018), Gholami et al. (2022), Yoo et al. (2021), Vaihekoski and Yahya (2025) as well as Cellier and Chollet (2016), who discovered that while ESG or CSR disclosure and ratings might have a positive relationship with firm value, in contrast the environmental disclosure has a negative relationship with firm value. This could indicate that companies that incorporate environmental issues into their strategy, invest in environmentally friendly initiatives, processes and operations, might not have significant influence to the firm value of the company. This is due to the high environmental performance level of a company not necessarily correlating with firm value. This indicates that whether a company performs highly or lowly environmentally this does not necessarily have any impact on the market valuation of the firm. Thus, companies that invest in environmental matters aiming to improve the firm value through improving the environmental performance might not gain the results they are aiming for. Therefore, the first hypothesis of the thesis is proposed as:

H1: The environmental performance of a firm has a negative relationship with firm value in Nordic companies

3.3 Environmental dimension and firm value moderated by the effect of board gender diversity

Diversity on the board of directors has recently become progressively more current when implementing CSR actions into firms. Most countries require their publicly traded companies to disclose their board diversity matters and require them to be improved. According to the stakeholder theory mentioned before, firms could decrease their value in the eyes of stakeholders if firms fail to perform to the standard expected by their stakeholders. As stakeholders have become predominantly interested in diversity in the board of directors it is crucial to have diversity in order to maintain firm value (Harjoto, Laksmana & Lee, 2015, p. 641–642).

Setó-Pamies (2013) researched the influence female board members have on CSR initiatives and processes. The research aimed to determine whether female talent in top management could improve firms CSR performance. Prior research on the matter have commonly concluded there to be a positive influence of having more female board members on CSR, which means that female leaders could affect positively to firms CSR performance. Although there have been some conflicting results as well. Some preceding studies have not found there to be any relationship at all. This is why it is important to study the nature of the relation between female talent in top management and CSR. Setó-Pamies (2013) conducts the study with using a dataset containing a sample of firms from 22 countries from different industries. With regards to the stakeholder theory it seems clear that female leaders could affect positively to more diverse groups of stakeholders which could lead to firm value increasing. The empirical results show that female directors tend to take all dimensions of CSR into account more than male directors and make decisions more socially responsibly. Findings support the hypothesis of the study that female directors positively influence corporate social

responsibility of a firm, for the reason that when the percentage of female directors grows companies tend to act more socially responsibly.

Similar results were found by Alahdal, Hashim, Amaqtari, Salleh and Pandey (2024) who studied ESG and firm performance with the moderating factor of board gender diversity. The study used data of Gulf non-financial listed firms from 2018-2021. The study found there to be significant strengthening impact from more gender-diverse boards to firms' ESG performance. Alodat and Hao (2025) studied the relationship between ESG disclosure and firm performance with the moderating role of board gender diversity and sustainability committee. They similarly found there to be a significant and positive impact between ESG disclosure and gender-diverse boards. The results of this research agreed that having more female representation in the boardrooms could better stakeholder relationships, accountability, sustainability activities and socially responsible activities. These results are relevant as they suggest that choosing female directors continuously can lead to bettering ESG performance and this could lead to firm value increasing as well.

A different approach was conducted by Isidro and Sobral (2015) who took direct and indirect effects of women on the board of directors to firm value into consideration, when conducting the model for this study. The dataset used was taken of large European firms from the period 2010-2012. The study found that women on the board of directors does not necessarily influence firm value measured by Tobin's Q directly, but it could affect firm value indirectly through financial performance improving. The results before have not been conclusive as others find there to be increase in firm value from having higher amount of female board members while some studies suggests that it might even decrease firm value. Regardless whether studies find more gender-diverse boards to decrease or increase firm value they have found there to be a direct link between the two. This study differs from prior as it suggests there to be an indirect link. This means that the firm value is not directly an effect of having women on the board of directors but that it is an effect of improving financial performance, social and ethical values of a

firm. The conclusion of the study is that in large European firms having higher amount of women on the board of directors do indirectly lead to increasing firm value as it directly affects social and ethical dimensions of firms and through that could increase firm value. As the results are from only large European firms these same effects could possibly be inconsistent in for instance smaller companies or different countries.

Isidro and Sobral (2015) further examined whether legislation versus voluntary initiatives with regards to the higher representation of females in the boardrooms have a different effect on firm value. Since the issue of more female representation in the boardrooms have become recently very present in corporate strategy some countries have introduced legislation regarding the issue, for instance Belgium, France, Italy and Norway. This study found there to be variation for the firms from countries that have legislation versus the firms from countries that does not legislate firms to have a specific percentage of female board members. The mean of firm value measured by Tobin's Q suggests that voluntary initiatives in board gender diversity leads to possibly higher firm value when comparing to firms from countries that have legal obligations to have a specific amount of women directors with sanctions. The countries taken into consideration that do not have legislation to board gender diversity are Ireland, Germany, Sweden and UK. This finding suggests that voluntary board gender diversity could be more beneficial regarding firm value than having legal obligations with sanctions.

One of the main arguments behind the reason of women board members creating positive changes to firms value or financial performance is that women are commonly more risk-averse and tend to concentrate to long-term performance more than male directors. This could then indirectly lead to firm value increasing. Marinova et al. (2016) examined whether board gender diversity has an influence on firm performance through examining with Dutch and Danish boardrooms. They found there not to be direct effects to firm performance through having more gender diversity in boardrooms. Although the dataset being only from two different countries and examining only for one year, could be too narrow to determine the effects of having higher percentage of women on the

board. They agreed to Isidro and Sobral's (2015) study regarding that the reason women may affect indirectly to firm value growing is behind behavioral aspects. Like mentioned before these behavioral aspects mean women's tendency to be less risk-averse than men. Marinova et al. (2016) study differs from Isidro and Sobral's (2015) study in the way that the latter found evidence of gender diversity affecting firm value and the former study did not support the relation between gender diversity and firm value. Although Isidro and Sobral (2015) findings suggest that board gender diversity does not directly lead to firm value increasing which does agree with Marinova et al. (2016) findings. These both studies have examined the matter through European firms, which means that these results should be examined critically as the data could be too narrow.

Studies suggesting that having more female representation in the boardrooms of companies could lead to diminishing firm value are also present in the academic literature. Adams and Ferreira (2009) introduced that despite the fact that female leaders lead to improving board effectiveness it does not lead to firm value increasing, and in contrary may lead to firm value diminishing. This is due to the fact that when boards become more gender-diverse boards may as well start to unreasonably monitor the business processes of the firm, which could lead to value decreasing. Similar results have been found in other preceding papers, as it has been suggested that gender-diverse boards could lead to decision-making and the effectiveness of the board to decrease. This argument is supported by a social psychology argument that when minorities are more represented on the board, communication and cooperation of the board may reduce. (Isidro & Sobral, 2015, p. 4).

Khunkaew, Wichianrak and Suttipun (2023) studied whether more gender-diverse boardrooms could act as the moderating factor between CSR reporting and firm value. Their research was conducted in the ASEAN region through the years 2010-2019. Khunkaew et Al. (2023) found that gender diversity did moderate the negative relationship between energy use management, water management, work safety, and corporate performance. They claim that the reason behind this finding is that women on

boardrooms tend to focus more on environmental and social factors. For instance, it is implied that women directors may prioritize the adoption of renewable resources to diminish water and energy consumption, which not only lowers cost but could additionally lead to enhancing the firm's overall value. Similar results were found by Agyemang-Mintah and Schadewitz (2019), who found there to be a positive association between having a higher amount of female board members and firm value, by researching 63 British financial institutions through the years 2000-2011. Ma, Ahmad and Torelli (2024) researched ESG disclosure and board gender diversity with the moderating role of audit committee. The study was performed by analyzing Chinese listed firm in the energy sector from 2012-2022. As previous research stated, this study furthermore found similar results that a more gender-diverse board affected the environmental scores positively. Therefore, the next hypothesis of the study is proposed:

H2: Gender diversity positively moderates the relationship between environmental performance and firm value

4 Data and Methodology

The previous chapter focused on introducing the topic of CSR and ESG, with a focus on the environmental dimension of these terms. Additionally, the matter of environmental performance and its relationship to firm value were introduced, as well as board gender diversity. As these are the topics analyzed in this next empirical part of the study, it is first important to understand the theory behind the subject of environmental performance and firm value. The aim of the theory part of the study was to introduce and examine the previous academic literature on the subject, as well as to propose hypotheses according to previous literature. The empirical part of the study aims to answer to these hypotheses and to illustrate how the research has been constructed, and to analyze the results regarding the results. The hypotheses of this thesis are presented as:

H1: The environmental performance of a company has a negative impact on firm value in Nordic companies

H2: Gender diversity positively moderates the relationship between environmental performance and firm value

4.1 Research methodology

This thesis was executed as quantitative research according to the previous research of Vaihekoski and Yahya (2025) and Dohrmann et al. (2024). Furthermore, this method was chosen due to the intent of finding the impact of environmental performance on firm value. The quantitative method to conduct research is crucial when researching a subject that demands a voluminous and complex datasets to conclude research results. The method supports researches to generate valid and solid conclusions. Quantitative research is a method that aims to understand the research through different variables and quantifiable data. The method aims to diminish the factor of biases, as it measures numerical data, contrary to for example human perceptions and experiences. The goal

of quantitative research is to answer hypotheses that are constructed in the study. In order to answer these hypotheses, the quantitative method can be constructed by using statistical software and mathematical models to analyze the dataset of the research. Although, quantitative research aims to conclude valid and reliable conclusions to the research it can lack in the interpretation of the results as researches might need to speculate the findings. This could lead to different interpretation of similar findings among researchers (Lim, 2024).

Additionally, the quantitative research method was chosen as regression analysis is a method to conduct quantitative research. In order to examine how multiple different variables are connected to one another, regression analysis is a statistical tool that allows to do so. Regression analysis helps to determine the how one variable acts compared to one or more other variables (Wilson, Beal & Keating, 2015, p. 11). As this study aims to conclude, if there is found to be a relationship between the environmental performance of a company with its firm value and whether board gender diversity could act as a moderator in this relationship, a regression analysis is key to examine this. This study utilizes a panel data fixed effects regression to analyze the relationship between environmental performance and firm value and further employs an interaction term in the model, in order to test for the moderating effect of board gender diversity. Additionally, a Pooled Ordinary Least (OLS) regression is utilized to compare two different models. This study employs the dependent variable of Tobin's Q (TQ), independent variables of environmental pillar score (EPS) and board gender diversity (BDG), and lastly control variables of leverage (LEV), firm size (FS), board size (BS) and return on assets (ROA).

4.2 Regression models

The first aim of this study is to determine whether there is a relationship between the environmental performance of a firm and firm value. This is researched through examining the relationship between environmental pillar scores and Tobin's Q of a firm. For the examination of the relationship a regression model is constructed. As mentioned

before, regression analysis helps to determine how different variables affect one another. Regression analysis cannot explain a causal relationship between variables but rather it can explain correlations between variables. The regression models will be constructed as a fixed effect panel regression similarly to Vaihekoski and Yahya (2025) as well as a Pooled OLS regression similarly to Dohrmann et al. (2024) for the aim to consider the differences between the models. The fixed effects model is especially well-suited for panel data analysis, as it better takes into account the unobserved heterogeneity across units observed over time, consequently providing more consistent and interpretable estimates when working with longitudinal data from multiple entities. The Hausman test was constructed in order to examine whether the fixed effect model or the random effect model is better suited to utilize in the study. As the Hausman test indicated that the fixed effects model can produce more regular estimates than the random effects model, it is justified to use this in the analysis. The Pooled OLS model regression model was conducted in order to serve as a baseline comparison to the fixed effects model. While the fixed effects model offers examination for unobserved time-invariant firm-level heterogeneity, the Pooled OLS model incorporates both between and within firm variation, which offers a broader perspective on the data.

Firm value measured by Tobin's Q is utilized as the dependent variable and environmental pillar score is utilized as the independent variable. The regression models 1 and 2 are determined to response to H1 and is completed with control variables, leverage, firm size, board size and return on assets. Additionally, firm and year fixed effect are used in this first regression model. Thus, the following fixed effects regression model is constructed:

$$(1) \quad \text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 EPS_{i,t} + \beta_2 Lev_{i,t} + \beta_3 FS_{i,t} + \beta_4 BS_{i,t} + \beta_5 ROA_{i,t} + \alpha_i + \gamma_i + \varepsilon_{i,t}$$

where β_0 = Constant intercept
 B_{1-5} = Regression coefficient

α_i = Firm fixed effect

γ_t = Year fixed effect

After the fixed effects model the Pooled OLS regression model is constructed to answer H1, in order to examine differences between the two models. The same dependent variables, independent variable and control variables are utilized in the model. Additionally, firm dummy variables and year dummy variables are added to the model contrary to firm fixed effects and year fixed effects. Thus, the following model is constructed:

$$(2) \quad \text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 \text{EPS}_{i,t} + \beta_2 \text{Lev}_{i,t} + \beta_3 \text{FS}_{i,t} + \beta_4 \text{BS}_{i,t} + \beta_5 \text{ROA}_{i,t} + \delta_i + \lambda_i + \varepsilon_{i,t}$$

where δ_i = Firm dummy variable

λ_i = Year dummy variable

Additionally, the study is determined to examine whether board gender diversity might moderate the relationship between environmental performance and firm value. In order to address the H2 of the study, another regression model is constructed, which incorporates the board gender diversity (BGD) as a moderating variable. This is achieved by proposing an interaction term between environmental performance and board gender diversity, which captures the potential moderating effect. The model additionally incorporates the firm and year fixed effects used in the initial model 1. The following regression model is employed according to this:

$$(3) \quad \text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 \text{EPS}_{i,t} + \beta_2 \text{BGD}_{i,t} + \beta_3 (\text{EPS} * \text{BGD})_{i,t} + \beta_4 \text{Lev}_{i,t} + \beta_5 \text{FS}_{i,t} + \beta_6 \text{BS}_{i,t} + \beta_7 \text{ROA}_{i,t} + \alpha_i + \gamma_t + \varepsilon_{i,t}$$

After the third regression model, a Pooled OLS regression model is constructed in order to examine the differences between the third model and the fourth model. This is

constructed similarly to answer the H2 of the study. Similar firm and year dummy variables are used in the fourth model as in the second model. The following regression is thus created:

$$(4) \quad \text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 \text{EPS}_{i,t} + \beta_2 \text{BGD}_{i,t} + \beta_3 (\text{EPS} * \text{BGD})_{i,t} + \beta_4 \text{Lev}_{i,t} + \beta_5 \text{FS}_{i,t} + \beta_6 \text{BS}_{i,t} + \beta_7 \text{ROA}_{i,t} + \delta_i + \lambda_i + \varepsilon_{i,t}$$

4.3 Regression variables

In the next part of the study the regression variables used in the regression model in this study are introduced. The regression model used in this study has a dependent variable, independent variables and control variables. These all are explained next.

4.3.1 Dependent variable

To analyze firm value this study applies a market-based measure to evaluate firm value as it can predict future firm value more extensively than accounting-based methods. Prior research on the relationship between environmental performance and firm value has prominently used Tobin's Q (TQ) as the market-based measurement to evaluate firm value (Mikolajek-Gocejna, 2024). Thus, this study further applies this measure of Tobin's Q as the dependent variable.

Tobin's Q is widely utilized in prior academic research as prominently used as a market-based measurement. There are multiple ways to measure Tobin's Q. This study uses the same measurement as Vaihekoski and Yahya (2025) and Mikolajek-Gocejna (2024) where Tobin's Q is calculated by approximating by the ratio of a firm's market capitalization value to the book value of its assets.

Tobin's Q is one calculative method to measure firm value. Tobin's Q is a ratio between market valuation and the replacement or reproduction cost. Market valuation refers to

the current trading price of existing assets, while reproduction cost denotes the market price of newly manufactured goods. Tobin's Q was introduced by Tobin and Brainard (1967) and has since been commonly used as a method to calculate value of a firm. Tobin and Brainard (1967) suggested that Tobin's Q could have a great macro-economic value and could be used as a tool between financial markets and markets for goods and services (Tobin & Brainard 1976: 1-2). The formula for Tobin's Q in this thesis is measured according to the study of Vaihekoski and Yahya (2025) and it goes as follows:

$$Tobin's\ Q = \frac{Market\ Capitalization}{Book\ Value\ of\ Assets},$$

where *Market Capitalization* represents the market value of a firm by multiplying market price of shares by the number of shares and *Book Value of Assets* are as reported on the firm's balance sheet. This formula in practice measures the market value of the company assets to the replacement cost (Vaihekoski & Yahya, 2025). It has been examined that the common equilibrium value for Tobin's Q is 1 for reproducible assets and less than 1 for other assets. If companies do get values of Tobin's Q above 1 it should encourage companies to invest and values below 1 should in contrast discourage investment (Tobin & Brainard 1976: 6).

Tobin's Q has become very popular amongst studies about firm value since its creation in 1976. The reason behind this thesis using Tobin's Q as a ratio for firm value is that in studies regarding the subject of CSR or ESG and firm value it is most often used. The ratio is often used as a result of it comparing the market value of a firm expressed by market capitalization and comparing it with the underlying assets of companies. This is why it is greatly suited to measure firm value (Taylor et al., 2018).

4.3.2 Independent variables

The independent variables utilized in this study is the Environment Pillar Score and board gender diversity. The data for both of these variables is gathered from LSEG Workspace. These variables are next explained.

4.3.2.1 Environmental pillar score

The environmental pillar score (EPS) is a part of the ESG score provided by LSEG Workspace. The environmental pillar score from LSEG Workspace takes into consideration emissions, innovations and resource use. The emissions score assesses a company's effectiveness in reducing environmental emissions across its operations and production activities. The innovations score evaluates a company's ability to develop new technologies, processes and products that not only reduce environmental harm but also generate new market opportunities. The assessment of resource use examines a company's capability to utilize materials, energy and water in an environmentally sustainable manner, as well as its capacity to implement environmentally efficient initiatives through the enhancement of supply chain management (LSEG, 2024).

The environmental pillar score includes these previously mentioned three categories. The different categories are given weights from percentages ranging between 0 and 100. Environmental pillar score is a relative sum of the category weights, which vary depending on the industry of the firm. The pillar weights are then normalized to percentages between 0 to 100. The percentages are graded to letter grades ranging from D- to A+, similarly how the ESG scores are graded by LSEG as well. The D-grades consists of Environmental pillar scores that range from 0 to 25, which illustrates poor environmental performance and inadequate reporting of environmental matters. The C-grades range from 25 to 50. The C-grade signals that companies are able to perform in environmental matters in an adequate way, as well as report at least material environmental data publicly. The B-grade ranges from 50 to 75 and it demonstrates good environmental performance and above average transparency in reporting of

environmental data publicly. The A-grade ranges from 75 to 100, which indicates outstanding environmental performance and excellent reporting transparency of environmental data to the public (LSEG, 2024).

4.3.2.2 Board gender diversity

To examine the moderating factor of board gender diversity between environmental performance and firm value, the variable of board gender diversity (BGD) is utilized in the study. It is measured similarly to Vaihekoski and Yahya (2025) as the ratio of female board members to male board members. The data of board gender diversity is likewise gathered from LSEG.

4.3.3 Control variables

Four control variables have been commonly proposed in prior research to significantly impact firm value and should be accounted for in the study. These are Firm Size (FS), return on assets (ROA), Leverage (LEV) and Board Size (BS). These variables are next introduced more extensively.

4.3.3.1 Leverage

Leverage (LEV) is measured in the similar way as Vaihekoski and Yahya (2025) as the debt-to-equity ratio, which can be used as a proxy for unsystematic risk (Mikolajek-Cogejna, 2024). The debt-to-equity ratio goes as follows:

$$Debt/Equity = \frac{Total Liabilities}{Total Shareholders' Equity}$$

where *Total Liabilities* represents the total liabilities for a company in a year and *Total Shareholders' Equity* is calculated by subtracting the value of liabilities from total assets, which then provides shareholder equity.

4.3.3.2 Firm Size

Firm size (FS) is measured as the natural logarithm of total assets, according to the prior studies. In the studies regarding ESG and firm value firm size is mainly measured as the natural logarithm of total assets, which is why this manner is used in the regression analysis in this thesis (Vaihekoski & Yahya 2025, p. 7).

4.3.3.3 Board Size

Board size (BS) is measured as the natural logarithm of the total number of members on the board. This is according to the study of Vaihekoski and Yahya (2025), who used this method to measure board size.

4.3.3.4 ROA

Return on assets (ROA) is often used in studies regarding ESG and firm value as a proxy for profitability (Vaihekoski & Yahya, 2025). ROA measures firms profitability and efficiency comprehensively, thus it gives insight into how firms manages and applies their assets to gain value and generate profits (Bui, Nguyen & Pham, 2023, p. 3). ROA is most commonly calculated by dividing companies net income by its total assets (Jewell & Mankin, 2011, p. 81). The formula to calculate the ROA for a company goes as follows:

$$ROA_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Assets_{i,t}}$$

where $Net\ Income_{i,t}$ represents companies' net income in year t and $Total\ Assets_{i,t}$ represents the book value of the companies' total assets. ROA indicates how effectively firms can generate profits from certain resource allocations in the short-term. (Alfalih, 2023, p. 1517).

4.4 Data and sample

The research applies data from the LSEG Workspace database. The data for this thesis is retrieved from LSEG Workspace-database. This is due to LSEG providing ESG ratings, which are additionally disaggregated to individual environmental, social and governance pillar scores. As this research considers the effect of environmental pillar score to firm value, this database provides the individual environmental pillar score that is needed to conduct the research. In addition to this, the LSEG database provides comprehensive information about companies' ESG metrics, as it covers over 90% of the global market cap and information about more than 870 ESG metrics. The data is gathered from companies' ESG disclosure, annual reports, company websites, news sources, NGO websites and stock exchange filings. The database additionally includes the needed information in this study about companies' financial metrics, such as the needed information to calculate companies' Tobin's Q's, ROA's, Leverages and Firm size. Furthermore, the database contains information in relation to board size and board gender diversity, which are essential to conduct the study (LSEG, 2024). Thus, the data can be retrieved from the LSEG database.

Prior research on ESG and firm value have mainly focused on conducting studies regarding the subject from European or American evidence. Hence, this research has been conducted from publicly listed Nordic companies, as prior research from Nordic evidence is much fewer. The retrieved data is in a format of unbalanced panel data. The initial dataset for this thesis included all active publicly listed companies from the Nordic countries of Finland, Sweden, Norway, Denmark and Iceland from the years 1999-2024 and consists of 3788 companies. Firstly the companies that act in financial services are excluded from the sample, as these companies commonly have different structures than companies in other industries. Moreover, companies in the financial industries tend to focus on for example lending practices and operate with different reporting standards, thus the relationship between environmental performance and firm value could act differently with companies in these industries. Furthermore, this could result in the results from the research being affected and result to results being not valid. For instance,

Gholami et al. (2022) found the results on the relationship between environmental dimension and firm value to being positive among only financial industries, which indicates there to be differential results for companies among financial industries and other industries. Hence, companies in the financial industries are excluded from the sample. Additionally, the companies without environmental pillar scores or information about board gender diversity are excluded from the sample. Furthermore, duplicates are removed from the sample. The time period was additionally limited, as only a small number of companies had environmental pillar scores prior to the year 2019.

Following these controls of the dataset the final sample contains 239 companies. The time period was limited to the years 2019-2023, as only a small number of companies had environmental pillar scores prior to the year 2019. It should be taken into account that Covid-19 can have an impact on the study, as the data has been gathered after the pandemic. The sample additionally excluded companies from Iceland, as none of the Icelandic companies had environmental pillar scores for the entirety of the time period of 2019-2023. Table 1 introduces the summary of the data sample by industries and countries. The largest amount of firm in the sample operate in Sweden, as 127 of the 239 firms are listed in Sweden resulting in 53,14% portion of the sample. Finland has the fewest firms in the sample, with only 31 firms, which results to 12,97% portion of the sample. In Denmark there are 36 firms with a portion of 15,06% and in Norway there are 45 firms with a portion of 18,83% of the sample. Table 1 concludes that firms in the sample are operating in 33 different industries. The largest amount of firms operate in construction and materials with 9,21% of firms operating in this industry. Other industries that have a larger amount of firms are industrial engineering with 6,69%, pharmaceuticals and biotechnology with 6,69%, medical equipment and services with 6,28% and industrial transportation with 5,02%. Other industries are represented in the sample with 0,42% to 4,60% amount of firms operating in different industries among the 33 industries in the sample.

Table 1. Summary of the data sample by industries and countries.

Total number of firms by country

Country	Number of firms	percent %
Denmark	36	15,06
Finland	31	12,97
Norway	45	18,83
Sweden	127	53,14
Total	239	100

Total number of firms by industry

Industry	Number of firms	percent %
Aerospace and Defense	2	0,84
Alternative Energy	3	1,26
Automobiles and Parts	2	0,84
Beverages	4	1,67
Chemicals	5	2,09
Construction and Materials	22	9,21
Consumer Services	1	0,42
Electricity	5	2,09
Electronic and Electrical Equipment	6	2,51
Food Producers	11	4,60
General Industrials	11	4,60
Health Care Providers	3	1,26
Household Goods and Home Construction	6	2,51
Industrial Engineering	16	6,69
Industrial Materials	9	3,77
Industrial Metals and Mining	8	3,35
Industrial Support Services	8	3,35
Industrial Transportation	12	5,02
Leisure Goods	7	2,93
Media	3	1,26
Medical Equipment and Services	15	6,28
Oil, Gas and Coal	11	4,60
Personal Care, Drug and Grocery Stores	4	1,67
Personal Goods	3	1,26
Pharmaceuticals and Biotechnology	16	6,69
Retailers	10	4,18
Software and Computer Services	12	5,02
Technology Hardware and Equipment	6	2,51
Telecommunications Equipment	3	1,26
Telecommunications Service Providers	4	1,67
Tobacco	1	0,42
Travel and Leisure	9	3,77
Waste and Disposal Services	1	0,42

Total	239	100
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4.5 Descriptive statistics

In this chapter the descriptive statistics of the variables for the study are presented. Firstly the variable of Environmental Pillar score is analyzed in Figure 2. Figure 2 presents the means of the environmental pillar scores for the years 2019-2023. The means are seen for every country analyzed in the sample. For each of the years 2019-2023 firms in Finland has had the highest environmental performance, the lowest being in the year of 2019 with a score of 66,48 and the highest score for the year 2022 with 69,56. In contrast to this, firms in Sweden has performed environmentally the poorest for the time period of 2019-2023, firms in Sweden had the lowest mean value of environmental performance for the year 2019 with a score of 40,96, while the highest score was for the year 2022 with 50,65. When considering the mean values for these four countries all together, the same trend seems to be clear, as the year 2019 has had the lowest score and the highest score has been for the year 2022. The mean values for the environmental pillar scores from the years 2019 and 2020 for firms in all countries are in the C-grade, which indicates adequate environmental performance. For the years 2021, 2022 and 2023 the values are in the B-grade, which indicates good environmental performance. For every country the scores are among C-grades and B-grades for each year. This indicates that in the Nordics environmental performance for the whole period of 2019-2023 has been adequate or good. This further illustrates how firms in Nordic countries take environmental matters into their core strategies in order to gain better environmental performance.

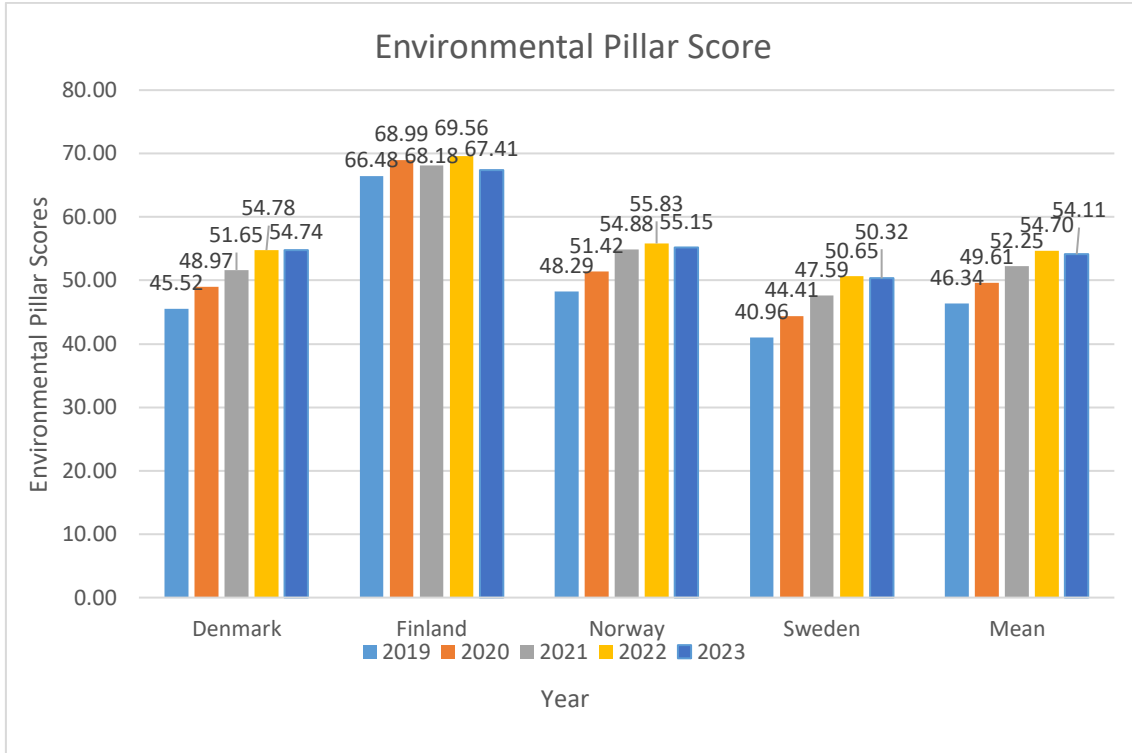


Figure 2. Environmental Pillar Scores.

Figure 3 below presents the mean values of Tobin's Q for the time period of 2019-2023 for all of the firms in the four countries of Denmark, Finland, Norway and Sweden. As the data has been gathered after the COVID-19 pandemic, the figure 3 shows that before the pandemic Tobin's Q exhibits an upward trend. The COVID-19 pandemic started in 2020, and it can be observed that from the year 2019-2020 the average of Tobin's Q increased, while after the year 2020 the average for Tobin's Q has decreased for every year. This trend could be affected by the effect of COVID-19, as the health crisis heavily affected the financial performance of firms through the worldwide economic conditions that affected earnings and stock returns (Yahya, 2023). The highest average 2,73 of Tobin's Q is for the year 2020. Although the trend from the year 2020 for the average of Tobin's Q has been downwards, the lowest average of 1,70 for the year 2023 still indicates the firms in the Nordics to be growth-oriented and having a relatively strong market valuation. The figure indicates that for the whole time period of 2019-2023 the average of Tobin's Q in the Nordic firms suggests strong firm value and growth-orientation.

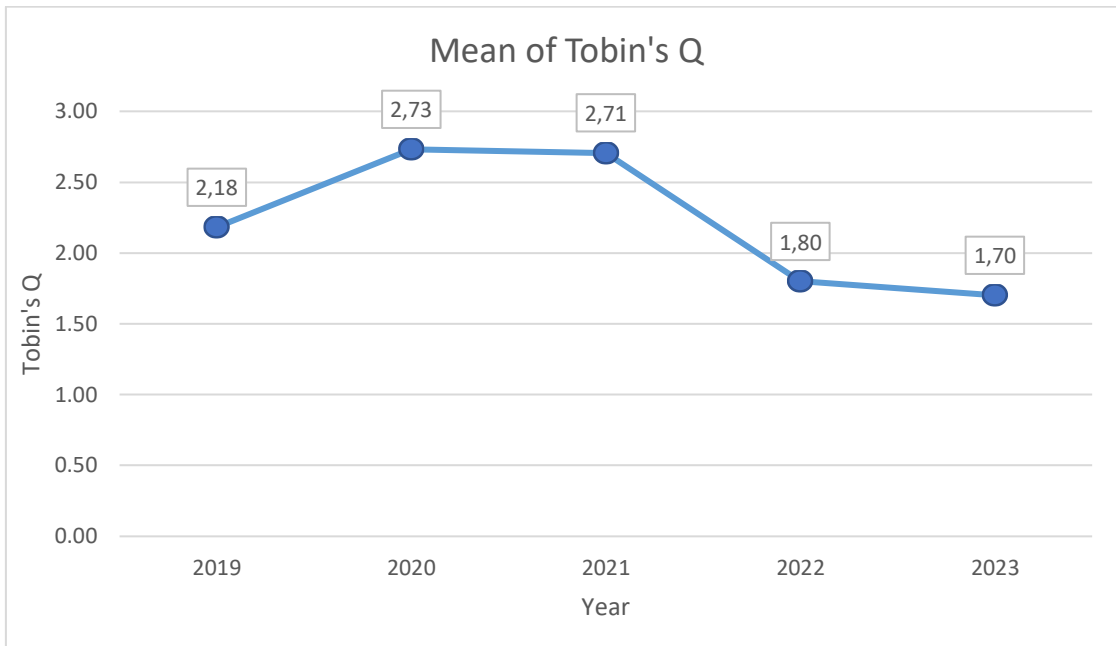


Figure 3. The Mean Tobin's Q for the time period.

Table 2 below presents the descriptive statistics for the data sample. The descriptive statistics are presented for the variables. The descriptive statistics indicate that the dependent variable of Tobin's Q varies from 0.02 to 42.56, with an average value of 2.22. This relatively high average suggests that firms in the Nordic region commonly have strong market valuations and are generally growth-oriented. The environmental pillar score has an average value of 51.40, which indicates that firms in the Nordic region perform environmentally at an adequate rate. The standard deviation for the environmental pillar score is 23.51, indicating a high degree of variability in environmental performance among the firms. The board size has an average value of 2.09, which corresponds to about 8 members. Furthermore, the board gender diversity has an average of 35%. The average of ROA is 0.04, indicating there to be moderate profitability among the firms. The average of leverage is 1.65, which is considered to be a moderate value of leverage. These descriptive statistics are relatively similar to prior research, indicating there to be reliability with the descriptive statistics (Mikolajek-Gocejna, 2024; Vaihekoski & Yahya, 2025).

Table 2. Descriptive statistics of variables.

	Observations	StdDev	Median	Mean	Max	Min
TQ	1195	3.65	1.01	2.22	42.56	0.02
EPS	1195	23.51	53.20	51.40	97.71	0.00
BGD	1195	0.12	0.36	0.35	0.75	0.00
LEV	1195	3.62	1.24	1.65	95.13	-22.64
FS	1195	1.74	16.16	16.14	21.10	11.23
BS	1195	0.29	2.08	2.09	3.37	1.10
ROA	1195	0.21	0.05	0.04	2.72	-3.26

4.6 Correlations

The following chapter presents the correlations between the different variables included in this study. Table 3 introduces the Pearson correlation matrix between the variables. The correlations are examined in order to firstly account if there occurs multicollinearity between the variables. Multicollinearity refers there to be a significant linear relationship between variables. Hence, if there occurs a stronger correlation than 0.7, it suggests there to be multicollinearity. The highest correlation between variables in the correlation matrix is 0.5210. Furthermore, the correlations between most of the variables are relatively low. Thus, it can be interpreted that there does not seem to be an issue of multicollinearity.

Environmental pillar score and Tobin's Q has a significant negative correlation in the correlation matrix, which is similar to prior studies (Mikolajek-Gocejna, 2024; Vaihekoski & Yahya, 2025). The negative correlation between environmental pillar score and Tobin's Q indicates how investing in environmental initiatives may generate short-time financial costs on firms, as well and potentially divert resources from more immediately profit-generating activities. Furthermore, from the perspective of stakeholder theory, certain stakeholders might prioritize short-term financial performance over environmental initiatives, perceiving the latter as less immediately beneficial to firm value. Although, the negative correlation does not necessarily indicate that strong environmental performance reduces firm value, rather it can reflect how different firm characteristics

and market expectations around financial performance can impact the relationship between environmental initiatives and valuation indicators (Vaihekoski & Yahya, 2025).

When further examining correlations of the dependent variable of Tobin's Q, the correlation between leverage and board size is significantly negative, while the correlation with board gender diversity is negative and nearly statistically significant. Additionally, the correlations with firm size and return on assets (ROA) seems to be significantly positive. These correlations are relatively similar to prior research. The negative correlation with board gender diversity is nearly statistically significant and suggests that as board gender diversity increases Tobin's Q slightly decreases. This is similar to prior research, as prior research have found that board gender diversity might not directly affect Tobin's Q (Adams & Ferreira, 2009; Isidro & Sobral, 2015). The positive correlation between firms suggests that larger companies are affiliated with higher firm value, while the negative correlation with board size in contrast suggests that larger firms are weakly associated with lower firm value. The positive correlation with ROA indicates that companies with higher profitability commonly have higher firm value, as the negative correlation with leverage indicates that firms with higher debts often have slightly lower firm values. This is similar to Vaihekoski and Yahya (2025) and Mikolajek-Gocejna (2024) as there is found to be a negative correlation with leverage and Tobin's Q. Although, differing with these results the negative correlation in this correlation matrix seems to be statistically significant.

The correlation matrix further present how the environmental pillar score strongly correlates with firm size (0.5210)* and board size (0.4567)***, indicating that companies with larger sizes as well as bigger boards tend to have higher environmental performance. Interestingly, board gender diversity positively correlates with environmental pillar score (0.242)*** that is statistically extremely significant. This indicates that firms with more board gender diversity commonly have slightly higher environmental performance scores. This could be due to the fact, that women board members commonly take environmental issues into consideration more than male members. Board gender

diversity additionally has a slight negative correlation with board size (-0.0527)*, which indicates that more diverse boards tend to be slightly smaller.

Table 3. Pearson correlation matrix.

Variable	TQ	EPS	BGD	LEV	FS	BS	ROA
TQ	1.0000						
EPS	-0.2202***	1.0000					
BGD	-0.0562*	0.1242***	1.0000				
LEV	-0.1186***	0.0037	0.0112	1.0000			
FS	0.3282***	0.5210***	0.1544***	0.0521*	1.0000		
BS	-0.1602***	0.4567***	-0.0527*	0.0175	0.5176***	1.0000	
ROA	0.1051***	0.1838***	0.0117	-0.0674*	0.1683***	0.0807**	1.0000

* The correlation is statistically significant at the 5% significance level. The correlation is nearly statistically significant.

** The correlation is statistically significant at the 1% significance level. The correlation is statistically significant

*** The correlation is statistically significant at the 0.1% significance level. The correlation is statistically extremely significant

Considering the data is in form of a panel data the Variance Inflation Factor (VIF) test should be further utilized to test multicollinearity. Table 4 below indicates the VIF test results for the other variables between the dependent variable of Tobin's Q. The test shows values below five for all variables, which further indicates there to be no risk of multicollinearity. Furthermore, it indicates that there should be no biases in the results of the study regarding issues of multicollinearity (Vaihekoski & Yahya, 2025).

Table 4. VIF test.

VIF	
Variable	TQ
EPS	1.49
BGD	1.06
LEV	1.01
FS	1.61
BS	1.46
ROA	1.05

5 Empirical analysis

The empirical analysis chapter introduces the empirical findings of the relationship between environmental performance and firm value, as well as the moderating factor of board gender diversity. The impact of environmental performance on firm value is firstly examined through utilizing a fixed effect regression model. Following this, the Pooled OLS model is introduced to examine the relationship. Furthermore, the relationship is further examined through taking the moderating factor of board gender diversity into account first in the fixed effect model and following this with the Pooled OLS model..

5.1 Regression results

Firstly, the aim is to inspect the regression results for the first regression model, which was constructed in order to answer to H1. The regression analyses were performed in STATA. The regression results presented in Table 5 indicate there being certain similarities to prior research on the subject. For instance, similarly to Vaihekoski and Yahya (2025) the relationship between environmental performance and Tobin's Q was found to be negative, while not statistically significant. Similar results were found with Taylor et al. (2018), who as well found the relationship being negative, but not significant. Contradicting results were found by Tahmid et al. (2022) and Dohrmann et al. (2024) who found environmental performance and firm value measured by Tobin's Q to have a positive and significant relationship. This differing result could be explained by the sample used in these studies. Both studies used a sample of European countries the prior with 22 different countries and latter with 17 countries. As Nordic firms have been known for their high ESG standards and high levels of stakeholder awareness as well as advanced sustainability regulations, firms are generally expected to meet higher ESG standards as a baseline. Furthermore, stakeholders might view strong environmental performance as a norm rather than a differentiator. Therefore, investors may not view higher environmental pillar scores as a value-generating factor, which could explain the contrary results and the absence of a significant impact on Tobin's Q in this study.

Similarly to the studies of Dohrmann et al. (2024), Vaihekoski and Yahya (2025), Tahmid et al. (2022), Alahdal et al. (2024) and Mikolajek-Gocejna (2024) the variable of firm size has a statistically significant relationship with firm value. The coefficient for firm size is -0.8605 (t-statistic -2.25), indicating that the effect is significant at a 5% level, meaning it is nearly statistically significant. The negative coefficient indicates that, a one-point increase in the firm size variable is associated with an average decrease of 0.8605 units in Tobin's Q. Thus, it can be concluded that larger firms commonly are found to have lower market valuation compared to the assets. Moreover, as the regression model includes both firm fixed effects and year fixed effect, the results of the regression model examines the variation within a firm over the time period, not variation among firms. Therefore, this concludes that, when an individual firm grows in size, its Tobin's Q decreases.

Table 5. Regression models 1 and 2.

	TQ (1)	TQ (2)
EPS	-0.0092 (-0.75)	-0.9163 (-0.67)
LEV	-0.0044 (0.644)	-0.0044 (-0.41)
FS	-0.8605** (-2.25)	-0.8604** (-2.01)
BS	1.2669 (1.37)	1.2669 (1.22)
ROA	1.2602* (1.93)	1.2602* (1.72)
Year fixed-effect	Yes	Yes
Firm-fixed effect	Yes	Yes
Constant	13.6488 (2.50)	15.1486** (1.99)
Observations	1195	1195
R-squared	0.1370	0.8088
F-statistic	6.92*** (df = 9;238)	N/A

*** p<0.01, ** p<0.05, * p<0.1.

Robust t-statistics in parentheses

Expectedly, regarding the findings of prior academic literature (Guenster et al., 2011; Tahmid et al., 2022; Vaihekoski & Yahya, 2025) return on assets (ROA) demonstrates a positive influence on Tobin's Q, at a 10% level (t-statistics 1.93), indicating a nearly statistical significance. This positive relationship is expected and consistent regarding prior research, as higher profitability signals financial health and the capacity for reinvestment in value generating activities, contributing to higher firm value. Hence, it is expected that firms utilizing their assets more efficiently to generate income are likely to exhibit stronger firm value. Additionally, similarly to prior research leverage commonly is found to negatively impact Tobin's Q, although not statistically significant (Deswanto & Siregar, 2018; Dohrmann et al., 2024; Vaihekoski & Yahya, 2025). This suggests that the level of debt in firms capital structure might not significantly influence the market values the firm, at least within the Nordic region. Therefore, it could be analyzed that in the Nordic region leverage may be perceived less risky as firms tend to be highly regulated and operate in mature industries (Vaihekoski & Yahya, 2025).

The regression results of model 1 further suggest a positive but not statistically significant relationship between board size and firm value similar to Alahdal et al. (2024) research. While the coefficient of 1.2669 suggests that larger board may be associated with higher firm value, it is not statistically significant and suggests that the effect is not robust in the context of this thesis. Significant positive relationship was found in Vaihekoski and Yahya (2025) research, while Dohrmann et al. (2024) found a negative and significant relationship. Vaihekoski and Yahya (2025) argued that larger boardrooms could bring a higher expertise to decision-making processes as well as to board monitoring, therefore possibly driving to higher valuations.

The R-squared value of regression model 1 is 0.1370, suggesting that approximately 13.7% of the variability in the dependent variable, Tobin's Q, can be accounted for by the independent variables included in the model. In the other fixed effect model (4) represented in Table 6, the R-squared is similar, as it is 0.1310, indicating a slightly

weaker explanatory power of the independent variable for the dependent variable within the model. The F-statistics for both models 1 and 4 are significant at the 1% level, suggesting that the independent variables together account for a substantial portion of the variation in firm value measured by Tobin's Q.

Table 5 additionally introduces the results of the Pooled OLS regression model 2 on the relationship between environmental pillar score and Tobin's Q. The different model is presented in order to gain broader knowledge and compare whether there would be significant differences to the results of the fixed effects model. Similarly to the fixed effects model the relationship between environmental performance and Tobin's Q was found to be negative, without being statistically significant. The findings further prove the findings from the fixed effects model. Although, the negative coefficient of -0.9163 is higher compared to the negative coefficient of -0.0092 in the fixed effect model.

The differences from models 1 and 2 are not significant, although changes in the values appear, these are not significant differences. One of the main differences between the results of the models of 1 and 2 is the value of R-squared. In the fixed effect model 1 R-squared was 0.1370 while in the Pooled OLS model 2 the value of R-squared was significantly higher with a value of 0.8088, indicating that approximately 80,88% variability in Tobin's Q can be explained by the independent variables.

One possible explanation behind the findings from the empirical analysis not finding a statistically significant relationship between environmental performance and firm value, could be the unclear results of the long time effects of ESG performance on firm value. Contradicting results were found by El Ghoul et al. (2011) and Gregory et al. (2014) on whether the positive effects of ESG performance on firm value can remain sustainable in a longer time period. In the perspective of stakeholder theory, the long-time effects might be explained to being only substantial as stakeholders could only value ESG initiatives when they contribute to financial gains. Thus, when the effects of ESG performance on firm value are not significant, stakeholders might not want companies

to further invest on ESG initiatives, if the benefits from these initiatives do not constitute clearly to firm value increasing (Brown & Forster, 2013). Therefore, the findings of this study can imply that if the effects of environmental performance on firm value are not clearly positive, stakeholders might not value environmental initiatives as highly, which could explain the not significant relationship between environmental performance and firm value found on this study.

Furthermore, through the absence of the statistically significant relationship between environmental performance and firm value found in this study could be explained through the perspective of legitimacy theory. As legitimacy theory suggest, that firms invest in environmental initiatives in order to promote their legitimacy in the perspective of their stakeholders, but not necessarily to enhance firm value (Chan et al., 2014, p. 61; Michelon et al., 2015, p. 60). In the Nordic context, where sustainability is already deeply embedded in stakeholder expectations, strong environmental performance may not be viewed as a source of competitive advantage. This could result to firms not being rewarded by the market for meeting and disclosing environmental standards, as it is already expected from the stakeholders (Vaihekoski & Yahya, 2025). The findings, could thus be explained by the perspective of legitimacy theory.

Hypothesis 1 proposed that the environmental performance of a firm is negatively related to firm value in Nordic companies. The empirical analysis revealed a negative coefficient of -0.0092 for environmental pillar score, however this relationship is not statistically significant at a 1% level (t-statistics -0.75) in the fixed effect model. In the pooled OLS regression model similarly found a negative relationship, with the coefficient of -0.9163. This model further indicated that the result is not statistically significant at a 1% level (t-statistics -0.67). This indicates that while the direction of the coefficient aligns with the hypothesized negative relationship in both models, the evidence is insufficient to confirm the hypothesis. Furthermore, it cannot be concluded there to be a meaningful and consistent negative relationship between environmental performance and firm value within the sampled Nordic public firms over the time period of 2019-2023 as it is

not statistically significant. Therefore, H1 cannot be supported by the findings of this study. This finding is not persistent with the hypothesis 1, but it is consistent with prior research indicating that environmental performance does not significantly impact firm value (Mikolajek-Gocejna, 2024; Taylor et al., 2018; Vaihekoski & Yahya, 2025).

Table 6 below introduces the moderating factor of board gender diversity into the regression model to address H2. The regression results of model 3 presents that the coefficient for the interaction term between environmental performance and gender diversity -5.7966. Although, the coefficient for the interaction term for environmental performance and board gender diversity is relatively large and negative, suggesting a potentially more pronounced effect of environmental performance on firm value in firms with less gender-diverse boards, the result is not statistically significant. Contradictory results were found by Dohrmann et al. (2024) who found there to be a positive and significant relationship for the moderating factor gender-diverse boardrooms, strengthening the already positive and significant relationship of environmental performance and firm value. Alahdal et al. (2024) further found that the moderating factor of board gender diversity further strengthens the impact of ESG performance on firm value. The findings of this regression model 3 having differing results might be explained further by the cultural and institutional context of the Nordic region, where as mentioned before higher ESG awareness and strong board governance standards may limit the variability in both gender diversity and environmental impact across firms.

The independent variable of environmental pillar score was not found to have significant differences in the model 3 presented in Table 6, which further proves the findings from the first two models. The variable of board gender diversity is introduced in the model 3 presented in Table 6. The coefficient of board gender diversity is -0.5029 (t-statistics -0.64). The findings present that the variable of board gender diversity and firm value does not have a statistically significant relationship. Prior research on the subject have found similar not significant findings (Alahdal et al., 2024; Vaihekoski & Yahya, 2025). According to the stakeholder perspective, female board members are able to take

stakeholders needs into account in the decision-making processes regarding ESG initiatives, which could lead to ESG performance improving. Subsequently, several previous research have identified a positive relationship between ESG performance and board gender diversity (Alahdal et al, 2024; Alodat & Hao, 2025; Ma et al., 2024). While the prior research have found positive effects, the results found in this study suggests that while ESG performance or environmental performance may improve by the effect of women board members, this does not indicate it moderating the relationship between environmental performance and firm value. Prior academic literature has similarly indicated that board gender diversity may influence ESG outcomes directly, but its impact on firm value is more complex and often indirect or mediated by other organizational or contextual factors (Isidro & Sobral, 2015; Marinova et al. 2016; Setó-Pamies, 2013).

While examining the model 3 in Table 6 compared to the results of model 1 and 2 in Table 5, where the moderating role of board gender diversity was not added in the model there does not seem to be significant changes in other variables. For instance, firm size remains negatively and significantly associated with firm value, with a coefficient of -0.8756, at a 5% level (t-statistics -2.22). Additionally, return on assets (ROA) continues to signal a positive and nearly statistically significant effect on Tobin's Q, consistent with prior academic research as the coefficient is 1.2862, at a 10% level (t-statistics 1.96) (Guenster et al., 2011; Tahmid et al., 2022; Vaihekoski & Yahya, 2025). These results adds confidence to the robustness of the main control variable effects, regardless of whether board gender diversity as a moderating factor is included.

Compared to the findings from the fixed effects model 1 the F-statistic has remained strong in the model 3. This indicates that the model including the moderator of board gender diversity prevails statistically significant overall. This indicates that, the variables used in this model together explain the variation in firm value, although the variable of environmental pillar score or the moderating effect of board gender diversity does not significantly on its own effect firm value.

Table 6. Regression models 3 and 4.

	TQ (3)	TQ (4)
EPS	-1.0019 (-0.83)	-1.0019 (-0.74)
BGD	-0.5029 (-0.64)	-0.5029 (-0.57)
EPS*BGD	-5.7966 (-1.22)	-5.7966 (-1.09)
LEV	0.0020 (0.17)	0.0020 (0.16)
FS	-0.8756** (-2.22)	-0.8756** (-1.98)
BS	1.1387 (1.33)	1.1387 (1.18)
ROA	1.2862* (1.96)	1.2862* (1.75)
Year fixed-effect	Yes	Yes
Firm-fixed effect	Yes	Yes
Constant	13.6840 (2.32)	15.1771 (1.87)
Observations	1195	1195
R-squared	0.1310	0.8094
F-statistic	6.15*** (df = 11,238)	N/A

*** p<0.01, ** p<0.05, * p<0.1. Robust t-statistics in parentheses

Table 6 additionally presents the Pooled OLS regression model 4, that examines the moderating effect of board gender diversity included in the model. This model was examined in order to find out, whether different results might arise compared to the fixed effect model 3. There is no changes between the model 3 and 4 regarding the coefficients as for each variable they do not differ from each other. The changes between these models regards the t-statistics presented in parentheses. Similarly to the differences in model 1 and 2 the most significant difference is in the R-squared comparing models 3 and 4. In model 3, the value of R-squared is 0.1310, while in model 4 the value R-squared is 0.8094, which is significantly higher.

From the fixed effect model 3 and Pooled OLS regression model 4 the conclusion could be that board gender diversity does not significantly moderate the relationship between environmental performance and Tobin's Q. Consequently, the regression results of these models do not provide empirical support for H2. While the coefficient term between environmental performance and board gender diversity is negative, it is not statistically significant. This suggests that board gender diversity does not have a significant moderating relationship between environmental performance and firm value in the Nordic region. Similarly, the lack of significance on the interaction term between environmental pillar score and board gender diversity indicates that the effect of environmental performance is not more pronounced in firms with more gender-diverse boards. Through the agency theory perspective, it could be analyzed that as Nordic companies already have relatively high board monitoring, due to the cultural and institutional prospects, the positive effect of female board members in the decision-making processes regarding ESG initiatives might not be as significant as it would be in other regions. Furthermore, in the Nordic context where stakeholder needs are taken widely into consideration, the effect of women leaders are expected to have regarding ESG implementation may not constitute significant difference. Thus, it could explain the relationship between environmental performance and firm value, not being moderated by board gender diversity in the Nordic region.

6 Summary and conclusion

Ongoing pressure from stakeholders to adopt socially responsible practices has compelled companies to adjust their business strategies to respond to the growing demands from stakeholders. The constantly growing demand will further demand companies to take ESG matters into consideration in their business strategies. Additionally, the regulations regarding ESG matters has similarly developed and will continue to progress. For instance, the CSRD directive has already demanded companies to invest in ESG and gain more knowledge about ESG.

As the pressure on firms to invest in ESG initiatives has increased, simultaneously the importance of ensuring that investments in ESG initiatives has an influence to the increase of firm value has increased. The subject of the relationship between ESG performance and firm value has thus risen among academic research, furthermore attention has risen among the different dimensions of ESG performance. The primary aim the thesis was to explore the relationship between environmental performance and firm value. The results suggests that environmental performance alone does not have a significant impact on firm value. In contrast, prior research has often found there to be a positive and significant relationship between overall ESG performance and firm value, indicating that firms should not focus solely on environmental factors, but additionally consider social and governance aspects. Stakeholders may view environmental initiatives with skepticism, particularly if they are viewed as greenwashing. Therefore, one of the conclusions for the thesis is that for environmental performance to positively and significantly influence firm value, it must be accompanied by strong social and governance performance.

Furthermore, to be able to answer to the changing market expectations and competition, firms are required to implement strategies that consider the different demands and expectations of stakeholders. Consequently, firms are expected to not only consider generating income to their shareholders, but moreover to conduct business in a more responsible way. Firms need to evaluate stakeholder needs and demands in order to gain

more market valuation. Thus, for instance the subject of board gender diversity has emerged for businesses to consider, as prior research has suggested women board members to consider the needs of stakeholders more prominently. Thus, the prediction of having more gender-diverse boards was made, as it was expected to contribute to the relationship between environmental performance and firm value more significantly.

The study was conducted from Nordic evidence, considering publicly listed firms that operate in Finland, Denmark, Norway and Sweden. The study was performed with a sample over the time period of 2019-2023. After controlling for firm size, leverage, board size and return on assets, the results from the study are similar with prior studies to a certain extent, although multiple differences were also present. The results did not confirm there to be a negative and significant relationship between environmental performance and firm value, but rather the relationship was concluded to not be statistically significant similarly to Vaihekoski and Yahya (2025). Furthermore, the moderating effect of board gender diversity was not found to have statistical significance on the relationship between environmental performance and firm value. Consequently, the two hypotheses could not be accepted. This could be explained by the cultural and institutional context of the Nordic region, as the degree of ESG is already very high and meeting the expectations of the stakeholder. Thus, the benefits from having higher environmental performance might not be perceived very highly by the stakeholders. Hence, the results of higher environmental performance or having more women on the board might not generate higher firm value.

6.1 Practical implications and limitations

Practical implications from the thesis could suggest, that in the Nordic region as the results between the relationship of environmental performance and firm value were not statistically significant, firms should not assume that including environmentally responsible initiatives automatically affects firm value positively. The findings could additionally contribute to how ESG and firm value relationships are likely affected by for

instance the region where the firm operates. Hence, in Nordic countries, where ESG performance is already relatively high, market differentiation based on environmental performance could be limited. Furthermore, as ROA was found to have a significant positive relationship with firm value, this suggests that in practice firms should continue to remember that when aiming to gain growth, profitability of the firm is a key factor.

This analysis revealed there to not be a significant moderating role of board gender diversity in the link between environmental performance and firm value. In a practical point of view, this may imply that board gender diversity alone does not yet indicate clear ESG related market outcomes. This could further imply that the influence of board gender diversity could have indirect or delayed effects on the relationship between environmental performance and firm value. Board gender diversity should still be taken into account, as it may have positive effects on a longer time period.

There are several possible limitations to this study, as there commonly are in empirical studies. As the thesis examines only the publicly listed Nordic companies over the time period of 2019-2023, this might limit the generalizability of the results on other regions or non-public firms. Limitations might additionally occur with the relationship between environmental performance and firm value being subject to endogeneity. Possible limitations might additionally regard omitted variable bias. Although, this bias was regarded by using variables commonly used in similar studies. Furthermore, the environmental scores were retrieved from LSEG database, and as there are multiple different ways of measuring the environmental performance of a firm, an environmental score from a different database could lead to differing results. Another possible limitation is the effect of COVID-19 on this study. As the data was gathered after the effect of COVID-19, while the time period of 2019-2023 was affected by the pandemic, it might disrupt long-term implications of this study.

6.2 Future research

This study indicates that further research regarding the subject is in order to gain more knowledge about the relationship between environmental performance and firm value. The study was conducted by examining whether Nordic companies with higher environmental performance affect the firm value of the company and whether board gender diversity affects this relationship more significantly. As the Nordic region is already a region, where companies tend to take environmental responsibility more into account in their strategies, future research could be conducted emerging markets. Furthermore, future research could concentrate on examining a different dimension of ESG on the same sample, such as the social performance of a firm. As the corporate social responsibility directive will further increase the amount of ESG reporting, further research could focus on whether results will differ after the CSRD has been in place for a longer time period.

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