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Sustainable Paths to Growth and Profitability

An Empirical Study of Norwegian
Manufacturing SMEs

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Thesis statement

Manufacturers are facing increasing demands from customers, governments and other stakeholders relating sustainability in their operations, and many are starting to see this as opportunities rather than as threats. The objective of this thesis is to investigate mechanisms that may contribute to turning sustainability performance into financial performance in Norwegian manufacturing small- and medium sized enterprises through a quantitative, cross-sectional approach.

Preface

This study is the author's master thesis in Innovation and Entrepreneurship at the Department of Industrial Economics and Technology Management at the Norwegian University of Science and Technology. The thesis has been written during the spring and summer of 2016.

The data material this thesis builds upon is gathered as a part of the work in an ongoing interdisciplinary research program at the Norwegian University of Science and Technology. The research program named *Sustainable Innovation and Shared Value Creation in Norwegian Industry* (SISVI) is a four-year competence project funded by industry partners and the Norwegian Research Council. The author of this thesis made the data collection.

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Abstract

Internationalized small and medium-sized manufacturers are facing increasing expectations regarding their accountability and performance on environmental and social sustainability in the globalized marketplace, at the same time as striving to stay competitive. Understanding how these requirements may be joined together to create shared value is of great importance for resource-constrained small and medium sized enterprises (SMEs), as well as for the society at whole.

The aim of this study is to increase our understanding of the mechanisms involved in the relationship between sustainability performance and financial performance on firm level, by investigating associations between sustainable practices in Norwegian internationalized SMEs, the managers' perceptions of value creation in three different dimensions, and firm financial performance.

The study employs a quantitative research strategy with cross-sectional data, making use of new survey data from 450 Norwegian internationalized manufacturing SMEs. The sample is representative for the entire population of Norwegian internationalized manufacturing SMEs. The data is analyzed through factor analysis and structural equation modeling to answer the research questions of the study.

Environmental and social practices in this sample of Norwegian manufacturing SMEs created value in three dimensions, namely through the manager's perception of reduced business risk, reduced operating costs and through increased ability to introduce new products and services. However, this value is hard to capture as increased financial performance, as the processes that leads to firm financial performance are complex. Firm performance in terms of sales growth is predominantly captured through the increased ability to introduce new products and services in this sample.

This study is a contribution to the ongoing research on the ways through which sustainability pays. The study bring new insights through analyzing possible pathways from sustainability performance to financial performance in Norwegian internationalized manufacturing SMEs. The insights gained from this study show that sustainable manufacturing is a strategy that is value increasing, especially through an increased ability to introduce new products and services. Sustainable practices may thus be valuable tools for managers to create value both for the company and for their stakeholders.

Sammendrag

Små- og mellomstore vareproduserende bedrifter som opererer internasjonalt møter stadig økende forventninger til deres miljømessige og sosiale ansvarlighet. Samtidig strever de for å opprettholde sin konkurransedyktighet. Å forstå hvordan disse kravene kan forenes til å skape delt verdi er av stor betydning både for de ressursbegrensede bedriftene og for samfunnet som helhet.

Målet med denne studien er å bidra til å øke vår forståelse av mekanismene som er involvert i forholdet mellom bærekraftighet og økonomiske resultater på bedriftsnivå gjennom å undersøke sammenhengene mellom bærekraftige praksiser i norske internasjonaliserte SMB, de daglige ledernes oppfatninger verdiskaping i tre ulike dimensjoner, og de faktiske økonomiske resultatene i bedriftene.

Studien anvender en kvantitativ forskningsstrategi, og benytter ny tverrsnittsdata fra 450 norske vareproduserende små- og mellomstore bedrifter (SMB) som opererer internasjonalt. Utvalget er representativt for hele populasjonen av norske internasjonaliserte vareproduserende SMB. Datamaterialet blir analysert gjennom faktoranalyse og strukturell ligningsmodellering.

Miljømessige og sosiale praksiser skaper verdi i tre dimensjoner: gjennom redusert risiko, reduserte operasjonskostnader, og gjennom en økt evne til å introdusere nye produkter og tjenester. Disse verdiene er det vanskelig å overføre til forbedrede økonomiske resultat, da prosessene som leder til økonomiske resultater er komplekse. Økonomisk resultat i form av økt salgsvekst er i hovedsak fanget gjennom den økte evnen til å introdusere nye produkter og tjenester.

Denne avhandlingen er et bidrag i det pågående forskningsarbeidet som undersøker hvordan bærekraft kan være en lønnsom strategi for bedrifter. Avhandlingen gir ny innsikt i mulige veier fra bærekraft til lønnsomhet i norske vareproduserende SMB som opererer internasjonalt. Ny innsikt fra denne studien viser at bærekraftig vareproduksjon er en strategi som er verdiøkende, særlig gjennom at det bidrar til en økt evne til å introdusere nye produkter og tjenester. Bærekraftige praksiser kan derfor være verdifulle verktøy for ledere for å skape verdi både for bedriften og for interessentene.

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1 Introduction

Industrial activity related to the manufacturing of products is of great importance to economic development. At the same time, the negative impacts on environment and society are major – through raw material use, energy consumption, waste generation, harmful emissions and working conditions (Garetti & Taisch, 2012). The ongoing globalization has opened for a growing number of small- and medium sized enterprises (SMEs) operating internationally – companies with limited resources to tackle environmental and social expectations.

In working toward the climate goals set by COP21 in Paris December 2015 the role of international ventures cannot be underestimated, as corporate sustainability may be seen as a major contributor to sustainable development and in the transition to a sustainable society (Moon, 2007). Most recently, the Paris Agreement was ratified by the US and China, hopefully indicating an important shift¹. Much of the attention is directed towards large multinational corporations, but also the pressure increases on SMEs. Small and medium-sized enterprises add up to over 99% of European enterprises, employing more than 60% of the European workforce (*Key Figures on European Business with a Special Feature on SMEs*, 2011).

Facing increasing pressure from both policymakers and stakeholders, many have viewed these demands as cost increasing for businesses (Christmann & Taylor, 2006). On the other hand, it may also be seen as opportunities for creating shared value and increasing competitiveness. Renowned theorists as Michael Porter (Porter & Kramer, 2006; Porter & Kramer, 2011) and Robert Eccles (Eccles, Ioannou, & Serafeim, 2014) have recently raised much attention to the notion that sustainability can be a profitable strategy for business.

Many have made efforts to investigate the relationship between business responsibility and business performance (Carroll & Shabana, 2010; Eccles et al., 2014; Goyal, Rahman, & Kazmi, 2013; Orlitzky, Schmidt, & Rynes, 2003). Still, the literature on the sustainability-performance relationship is not conclusive, as the mechanisms involved are not fully identified (Goyal et al., 2013), and the cause and effect relationships are not known (Gonzalez-Perez, 2013). On the research agenda now is the need to move the field beyond the question of whether sustainability is linked to financial performance, and toward establishing an understanding of *under what conditions and why* sustainability pays (Eccles et al., 2014; Margolis & Walsh, 2003).

Existing research has argued through institutional, resource-based and stakeholder rationales on under what conditions and why sustainability pays (Aspelund, Rødland, & Fjell, 2015; Goyal et al., 2013). Important arguments include reducing cost and risk, strengthening legitimacy and reputation, building competitive advantage and creating win-win situations through synergies (Carroll & Shabana, 2010; Goyal et al., 2013; Kurucz, Colbert, & Wheeler, 2008).

¹ <https://www.theguardian.com/environment/2016/sep/03/breakthrough-us-china-agree-ratify-paris-climate-change-deal>

In a recent study based upon the same data material as this study, Aspelund and Srai (2016, p. 8) conclude that the adoption of a sustainable manufacturing strategy is generally associated with higher levels of long-term financial performance in terms of sales growth and operational performance.

The objective of this study is to increase our understanding of the mechanisms involved in the relationship between sustainable practices on firm level and firm financial performance by investigating associations between sustainable practices, rationales for how value is created and firm financial performance. The hypothesized value creating mechanisms are those of reduced business risk, reduced operational costs and increased innovation ability. The study also provides insight into the status of Norwegian internationalized manufacturing SMEs, employing new survey data from a representative sample of the entire population of Norwegian internationalized manufacturing SMEs.

Thus, this study aims to address several gaps in current research. First, to explore the dynamics between sustainable practices and rationales for how value is created for the companies in terms of innovativeness, cost reduction and risk reduction. Second, to investigate how these different perceived benefits actually relate to financial performance. Third and overall, to contribute to opening the black box of the sustainability-performance relationship by exploring these different hypothesized pathways to financial performance. A study of Norwegian internationalized manufacturing SMEs investigating the ways through which sustainability influences company performance may give valuable insights for both theorists and practitioners.

1.1 Research question

This study will address the following research question:

What are the roles of business risk, operational cost and innovation in the relationship between sustainability performance and financial performance in terms on sales growth and profitability in Norwegian internationalized manufacturing SMEs?

The research question is developed into 12 hypotheses in the following chapter.

1.2 Structure of the thesis

The thesis is organized as follows: First, the theoretical background of the thesis is presented, to walk through the existing knowledge in the field of sustainability. Relevant theoretical frameworks are also presented here. Based on the reviewed literature it is developed a theoretical model of the sustainability-performance relationship. Second, the methodology of the study is presented. The study employs structural equation modeling to examine the obtained data, including both survey data from CEOs of Norwegian internationalized manufacturing SMEs and publicly available financial data about these enterprises. Third, the empirical results are presented, before a discussion of these findings takes place. Implications for both theory and practice are discussed. Lastly, concluding remarks are stated, together with important limitations and suggestions for further research.

2 Theoretical background and hypotheses development

This chapter presents the contextual and theoretical background of the study. First, it is given an introduction to the idea of corporate social responsibility, the concept of sustainability and what these concepts entail on the operational level. A presentation of the research on the sustainability-financial performance relationship is provided. Then follows a review of relevant previous research on the mechanisms in the relationship between sustainable practices and firm financial performance, together with the development of the research hypotheses of this study. Last, the overall research model is presented.

2.1 Corporate social responsibility and sustainability

Sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs (*Our Common Future*, 1987, p. 3.30)

In many ways, the aforementioned Brundtland report from 1987 represents a paradigm shift. The view of the responsibility of the company as more than profit maximization for shareholders has gained increased support, opposing the old view of fiduciary duty as impossible to reconcile with social responsibility as promoted by Milton Friedman (See e.g. Friedman, 1970). Through the last decades, different concepts such as corporate social responsibility (CSR), triple bottom line (3BL) among others have developed (Carroll, 1999). The notion of corporate social responsibility has moved forward from charity and stewardship, to a more integrated approach (Carroll & Shabana, 2010; Gonzalez-Perez, 2013). The body of CSR literature today consolidates business ethics theory, stakeholder theory and corporate citizenship (Gonzalez-Perez, 2013).

There is no clear definition of corporate social responsibility or the other highly related concepts, neither in the academic world nor among practitioners (Carroll, 1999). As a social construct, the social responsibility of companies is constantly evolving, as it is responsive to external demands. Facing globalization, the business context is changing rapidly as national legislations and stakeholders in both new and established markets pose new and increasing expectations (Dahlsrud, 2008). The responsiveness in the content of the construct CSR is highlighted in the definition put forward by Archie B. Carroll (1979, p. 500): “The social responsibility of businesses encompasses the economic, legal, ethical and discretionary expectations that society has of organizations at a given point in time”.

Most recent in this stream of literature are Porter and Kramer’s (2006; 2011) concept of shared value creation (SVC), focusing on the business case for CSR. Porter and Kramer (2011, p. 6) define shared value creation as “policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social

conditions in the communities in which it operates”. The business case for CSR, as SVC, is an instrumental view of CSR, where the social and environmental responsibility of a company are founded strategically as means for value creation for the company. Porter and Kramer underlines the importance of exactly this, encouraging companies both to address their own impacts in the value chain and the external social and environmental impacts on their own operations when looking for opportunities for creating shared value (Porter & Kramer, 2011). However, the concept of shared value creation has been criticized for not bringing any new insights (Crane, Palazzo, Spence, & Matten, 2014). The concept has beyond all doubt gained much attention beyond strategic management research. Such, it is a large contribution to the actual implementation of more sustainable practices.

The term sustainability in this context absorbs the Brundtland commission’s definition of sustainability as «development that meets the needs of the present without compromising the ability of future generations to meet their own needs» (*Our Common Future*, 1987, p. 2.1). Companies are expected to step forward as active actors in this development. Sustainability in the business context may therefore be seen as an adoption of business practices that supports sustainable development at whole, including environment, social and economic aspects (Goyal et al., 2013). It should be noted that one cannot, strictly speaking, speak about sustainable practices as something definite, but rather as steps in an iterative process towards more sustainable practices.

2.2 Assessing sustainability performance

Assessing the overall sustainability performance of companies is not a straightforward matter, and neither in research nor in practice is there one accepted framework (Carroll & Shabana, 2010; Goyal et al., 2013). There are indications that overall sustainability performance is increasing in industry, and especially in manufacturing (Garetti & Taisch, 2012).

In operations management research, the development has recently moved towards a holistic approach, including both environmental and social aspects of sustainability. Garetti and Taisch (2012) state that manufacturing is sustainable when it is able to satisfy environmental, social and economic objectives, and thus preserving the environment while continuing to improve the quality of human life. According to Jayal, Badurdeen, Dillon, and Jawahir (2010), sustainable manufacturing covers both product and process as well as system level. On the product level, sustainable manufacturing includes the six R’s of reducing, reusing, recovering, redesigning, remanufacturing and recycling, allowing transformation to a closed loop, multiple life-cycle paradigm of manufacturing. On the process level, sustainable manufacturing entails optimized technological improvements and process planning for reducing energy and resource consumption, waste and personnel hazards. On the system level, sustainable manufacturing considers the entire supply chains (Jayal et al., 2010). In their overview of trends and research challenges in sustainable manufacturing, Garetti and Taisch (2012) highlight the importance of new business models (including sustainable supply chains), product life cycle management,

resources and efficiency management (including re-manufacturing and resource recovery), and that of new enabling technology for sustainable manufacturing.

Jayal et al. (2010) conceptualize sustainable manufacturing as a concept which is built upon, and a development of, the older concepts of lean and green manufacturing in operations management. Thus, sustainable manufacturing may be seen as a production system, where a whole range of elements is adopted, and as a school of thought where the philosophy of sustainable manufacturing contributes to improvements in all parts of the organization and its supply chain. This is also suggested by Aspelund and Srai (2016), referring to Netland and Ferdows' (2016) study on the relationship between the implementation of production systems and plant performance. Netland and Ferdows (2016) reveal an S-curve of performance, and ask if the S-curve theory might explain the effect of other corporate programs as well – such as sustainability programs.

Sustainability assessment frameworks are of interest not only for research and internal performance assessment, but also as a mean for transparency, external reporting and benchmarking. Much used is the Global Reporting Initiative (GRI), including guidelines on labor practices and decent work, human rights, society and product responsibility (GRI, 2013). Another initiative is that of the integrated reporting movement, which put forward the idea of corporate reporting that includes information on how an organization's strategy, governance and prospects in the context of its external environment lead to the creation of value in both short and long term². In research, there is an array of proposed and applied frameworks (Labuschagne, Brent, & van Erck, 2005). Some apply secondary data such as data from the Dow Jones Sustainability Index (see López, García, & Rodríguez, 2007), while others have used the ratings by the firm Kinder, Lydenberg and Domini (KLD) (see e.g. Hull & Rothenberg, 2008; McWilliams & Siegel, 2000; Waddock & Graves, 1997). A critique of many of these is the lack of due considerations of social criteria (Labuschagne et al., 2005).

A recent contribution is the future fit business benchmark framework, still in development by the Future Fit Foundation, which is fronted by Bob Willard among others (Future-Fit, 2016). The framework is based upon a mapping of the overall global environmental and social challenges and a review of many of the existing frameworks for reporting and certification. The benchmarks cover environmental goals in terms of reducing pollution and environmental degradation, and social goals in terms of health and safety, transparency and justice. The framework also suggests potential business benefits linked to each goal, something that will be discussed further in the next sub-section.

² <http://integratedreporting.org/>

2.3 Linking sustainability performance and financial performance

Commercial activity is initiated for growth and profit, underlining the importance of a business case to be made to make changes happen (Carroll & Shabana, 2010; Goyal et al., 2013; Kurucz et al., 2008). Many argue that sustainability initiatives thus should contribute to the financial performance of the company – if not on short term, then by securing long-term survival and performance (see e.g. Porter & Kramer, 2006). Companies do not initiate environmental and social initiatives as philanthropists alone. Laudal (2011) finds evidence that it is to a large extent the financial performance that motivates leaders to adopt sustainability strategies. Thinking of sustainability as mere philanthropy does not hold, as this will not lead to the necessary development towards corporate sustainability (Carroll & Shabana, 2010; Goyal et al., 2013).

Both subjective measures and objective, financial information are used in research when measuring the financial performance of companies. Objective measures of profitability that are often used are return on assets (ROA), return on investments (ROI), return on equity (ROE), annual result and annual operational result (see e.g. Eccles et al., 2014). Company growth in the context of sustainability performance and company performance is often measured as revenue growth and growth in number of employees (Goyal et al., 2013; Orlitzky et al., 2003).

As noted in the introduction, there are mixed results in the efforts to establish a clear link between corporate social responsibility, sustainability and firm financial performance. In a meta-study, Orlitzky et al. (2003) suggest that this may be due to measurement differences, as there is neither any overall accepted framework nor an agreed upon definition of what the responsibility of the firm includes. Goyal et al. (2013) conclude in their recent literature review that there is a need to reach more reliable and conclusive results. Aspelund et al. (2015) present similar findings in their review.

A recent contribution to the understanding of the mechanisms involved in the sustainability – performance relationship is Eccles et al. (2014) study on 180 US companies followed from 1993 to 2009; companies identified as high-sustainability or low-sustainability companies. They find that annual abnormal performance is higher for the high-sustainability companies, and that they perform better in terms on ROE and ROA. An interesting finding is also that the outperformance is more pronounced in B2C companies.

Goyal et al. (2013, p. 372) underline in their conclusion that almost all studies have focused on the mere financial effect on sustainability through financial data, and that the inclusion of primary collected data based on subjective and behavioral parameters will add to the robustness of the measurement model. Similarly, Kurucz et al. (2008) argues for a more nuanced view on the topic linking sustainability and financial performance, but that the case can be conceptualized in more ways, as modes of value creation, than the direct link to financial performance. Carroll and Shabana (2010) introduce a broad and narrow view of the business case, where the narrow view justifies initiatives when it produces direct links to financial

performance. The broad view is more inclusive and opens for initiatives with indirect links to performance.

In the literature on sustainability and business performance in the broad perspective, several theoretical lenses have been used when arguing for how this comes about. These includes the resource based view, stakeholder theory and institutional theory among others (Aspelund et al., 2015; Carroll & Shabana, 2010). Both institutional theory and stakeholder theory are outside-in approaches towards explaining how and why companies can make their sustainability activities contribute to their financial performance, while the resource-based view is an inside-out perspective.

Most recent, in a conference paper, Aspelund and Srari (2016) establish a positive relationship between sustainable manufacturing and firm performance. Further, propose a likely rationale for how this increased performance actually happens through presenting different pathways managers perceive.

Much research on the relationship between sustainability and financial performance is directed towards MNCs, who are more sensitive to public scrutiny. The role of firm size has increasingly been put to debate (Hoivik & Melé, 2009; Laudal, 2011; Lepoutre & Heene, 2006). Laudal (2011) investigates how the corporate social responsibility of firms develops through different growth stages. He proposes that the larger the firm is, the more it may focus on and benefit from its sustainability efforts. Following a resource-based view of the firm, it is natural to assume that resource constraints may dictate sustainability capabilities and practices. Hoivik and Melé (2009) propose, through a case study, that also SMEs might become global corporate citizens.

Carroll and Shabana (2010), in a similar way as Kurucz et al. (2008), propose four general types of business cases for corporate social responsibility. These are cost and risk reduction, profit maximization and competitive advantage, reputation and legitimacy, and synergistic value creation.

In the following, this study will address some of the possible pathways from sustainability to value creation, through a brief review of relevant previous research. Taking an empirically driven approach, this study will investigate the possible business cases of sustainability as risk reducing, cost reducing, and that of increasing the ability to introduce new products and services – sustainability as a driver of innovation.

2.4 Sustainability as reducing business risk and costs

The trade-off hypothesis put forward by Milton Friedman (Friedman, 1970), embodies value creation as a form of trading interest between economic, social and environmental concerns (Kurucz et al., 2008). Securing an acceptable level of responsibility in their operations, businesses may thus avoid different kinds of risks, while still ensuring profit maximization. This trade-off view is also found in the slack resources theory; only when businesses financially perform well they may spare resources for CSR activities (Kurucz et al., 2008; Waddock & Graves, 1997). These perspectives focus mainly on the discretionary or philanthropic responsibilities.

The primary view has historically been that the demands of stakeholders such as government, customers and NGOs may be threats to the viability of the firm (Kurucz et al., 2008). More recently, business sustainability has been addressed through perspectives such as a stakeholder perspective, institutional theory and the resource-based view.

Through the stakeholder perspective, sustainability practices may reduce risks of not meeting stakeholder expectations. For smaller firms, this might be local stakeholders and customers, while for larger firms and corporations this may be corporate reputation and brand recognition (Laudal, 2011). Larger and internationalized firms are more often more mobile regarding production sites, and face other challenges than local manufacturers. The local presence are shown to be more important for small firms, as these to a larger extent have a local connection through fewer production sites, and thus are less mobile than MNCs. These firms are also more often family-owned businesses. Jenkins (2009) found that smaller firms with local ties understand their CSR as to support their local economy and community by ensuring economic stability and offer work.

An interesting finding by Eccles et al. (2014) is that business to consumer firms tend to show higher levels of focus on sustainable practices. The role of high brand reputation and consumer pressure might thus be of importance to the adoption of sustainable practices.

Adapting to regulations is of importance to the legitimacy and firm's license to operate. Government can such be a major driver of sustainable practices in industry (Moon, 2004). Firms may view regulations as threats to their autonomy, but it may also be seen as an inspiration. Proactive approaches to sustainable practices may ward off government regulations (Laudal, 2011), and thus avoiding risk of not being able to meet future regulations.

Through the perspective of institutional theory, companies may adopt to local practices and systems in their host countries. This isomorphism might strengthen legitimacy, and create conformity among companies in that location (Laudal, 2011). Through being more responsive to normative pressures, firms may reduce business risks in the forms of government sanctions and negative attention from other stakeholders (Bansal & Roth, 2000). Laudal (2011) holds that this might especially be the case for MNCs.

The role of risk as a business case for corporate social responsibility has also been investigated through taking a resource-based perspective on the role of internal organizational resources as enabling the strategic adoption to the external environment, as stakeholder pressures and regulations (Kurucz et al., 2008). Aragón-Correa and Sharma (2003) argue that through adopting a long-term consistent strategy regarding environmental concerns fosters outside-in learning, the development of managerial and organizational knowledge and the generation of continuous improvement and innovation. Further, these organizations will develop a dynamic capability that may give rewards during periods of uncertainty and complexity.

On the other hand, some have raised attention to that sustainable principles may be difficult to implement and such through raising stakeholder expectations the company increases the risk of public sanctions if these principles are not followed in practice (Laudal, 2011; Oppenheim, Bonini, Bielak, Kehm, & Lacy, 2007). Especially for larger firms and internationalized firms, which might have greater challenges in controlling all aspects in their value chains, marketing their operations as sustainable may actually increase business risk. A geographical spread, or a stakeholder multiplier effect, will make large and internationalized firms more exposed to sustainability challenges in their operations (Chapple & Moon, 2005).

Based on the reviewed literature, the following hypotheses are put forward:

H1a: Environmental practices are positively associated with the perception of reduced risk for the company

H1b: Social practices are positively associated with the perception of reduced risk for the company

Kurucz et al. (2008) present both cost and risk through a view of value creation as trading interests among social, environmental and economic concerns. Through this perspective of the business case for sustainability, the demands of stakeholders represent potential threats to the viability of the organization. The financial interests of the company are served by mitigating these threats by ensuring an acceptable level of sustainability. Costs and risks are in many cases hence inherently coupled. The degree of stakeholder commitment has also been shown to influence financial performance (Moneva, Rivera-Lirio, & Muñoz-Torres, 2007):

H1c: Perceived reduced risk for the company due to sustainable practices are positively associated with higher financial performance in terms of profitability

H1d: Perceived reduced risk for the company due to sustainable practices are positively associated with higher financial performance in terms of sales growth

Taking a different approach, sustainability in manufacturing firms may be seen as cost reducing in itself. As discussed previously, sustainable manufacturing may be seen as a development of production systems such as lean production. Production systems in general are associated with increased operational performance (Shah & Ward, 2003), and this may also be true for sustainable manufacturing, as proposed by Netland and Ferdows (2016).

Regarding social practices and cost reduction, previous research has investigated possible cost savings through the improvement of employee safety and working conditions, which is expected to achieve less absenteeism and fewer industrial accidents (Gimenez, Sierra, & Rodon, 2012). However, the existing empirical research show contradictory results in this regard.

The following hypotheses are put forward:

H2a: Environmental practices are positively associated with the perception of reduced costs for the company, and the association is stronger than for social practices

H2b: Social practices are positively associated with the perception of reduced costs for the company

Carroll and Shabana (2010) also put forward arguments in the direction of cost reduction through sustainability initiatives. Through a proactive approach towards sustainability, the firm can lower its costs of compliance to present and upcoming regulations through being up to speed and thus avoiding costly last minute improvements in production and possible sanctions by both government and other stakeholders such as consumers. Stakeholder punishment as boycotts by customers and increased taxes and fees from government may severely damage company growth and profitability.

Regarding the reduction of costs through more sustainable operations, the underlying rationale is that efficiency and improvements lead to increased operational performance, thus reducing costs. Reduced costs should then be visible on the bottom line, in the form of profitability. These reduced costs, and the superior sustainability practices assumed might increase the sales growth. The following hypotheses are stated:

H2c: Perceived reduced costs for the company due to sustainable practices are positively associated with higher financial performance in terms of profitability, and this association is stronger than with that of sales growth

H2d: Perceived reduced costs for the company due to sustainable practices are positively associated with higher financial performance in terms of sales growth

2.5 Sustainability driving innovation

«An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations» (OECD, 2005a, p. 46). Innovation is viewed as a critical part in achieving a sustainable development (Bos-Brouwers, 2010; Nidumolu, Prahalad, & Rangaswami, 2009). To reach the sustainable development goals, and the goals set in the Paris Agreement, there is a need for new products, production processes and business models (Eccles & Serafeim, 2013). This section will present existing research on the role of innovation in the sustainability performance – financial performance relationship.

What has been known as the Porter hypothesis was first presented two decades ago, by Michael Porter and Claas van der Linde (1995). The hypothesis proposes that strict environmental regulations when properly designed might actually enhance company competitive advantage against rivals. The argument is that pollution often is a waste of resources, and that the reduction of the pollution may lead to increased productivity. With superior productivity, competitiveness is created through either lowered costs or increased product value. Environmental regulation can thus «trigger innovation that may partially or more than fully offset the costs of complying with them» (Porter & van der Linde, 1995, p. 98). Porter and van der Linde use the term innovation in a broad sense here, including the design of a product or service, the segment it serves, how it is produced and how it is marketed and supported. Their argument broke with previous thought, where environmental regulations were seen as hindering the competitiveness of national industry (Ambec, Cohen, Elgie, & Lanoie, 2013).

As the rationale for how properly designed strict environmental regulations may trigger innovation and increase business performance, (Porter & van der Linde, 1995) holds that regulation may signal companies about likely resource inefficiencies and potential improvements. Further, it may raise company awareness by focusing on information gathering, it will reduce the uncertainty that investments to address the environment will be valuable and it will create pressure that motivates innovation and progress.

The Porter hypothesis has been developed and tested by many, and there has been distinguished between a weak, a narrow and a strong version of the hypothesis (Jaffe & Palmer, 1997). The weak and the strong version addresses the company level, where the weak version state that properly designed regulation might spur innovation, and the strong version state that environmental regulation can lead to an increase in firm competitiveness (Ambec et al., 2013).

According to Ambec et al. (2013), most empirical evidence suggests a negative relationship between stricter regulations and firm performance, thus rejecting the strong version of the hypothesis. A critique of these studies is that they generally are cross-sectional or two-period models. In a longitudinal study, Lanoie, Laurent-Lucchetti, Johnstone, and Ambec (2011) find evidence in support of the strong version of the Porter hypothesis. Previous research is thus inconclusive.

Seen differently, other types of external pressure and internal motivation for sustainability may also drive innovative orientation and ability. Company self-regulation through focus on their social responsibility and sustainability might follow a similar chain of argument. There might be other mechanisms as well as regulations, which may connect sustainability performance and innovation. Hypothesis 3a as presented below may be argued to test a variation of the weak version of the Porter hypothesis.

Costa, Lages, and Hortinha (2015) investigate CSR in export markets, and its impact on innovation and performance. The authors distinguishes between exploratory and exploitative innovation, where exploratory innovation is defined as moving into new product categories or development of new markets, opposing exploitative innovation, which is defined as product and market refinement (Costa et al., 2015, p. 751). They find that in certain circumstances CSR contributes to higher innovation levels, explained by an increased pressure to question old routines and to gain new knowledge. CSR contributes to a higher impact of technology orientation on exploratory innovation, and enhances the impact of exploratory innovation on export performance.

Based on the reviewed literature, the following hypotheses are made:

H3a: Environmental practices are positively associated with the perception of increased ability to introduce new products and services

H3b: Social practices are positively associated with the perception of increased ability to introduce new products and services

Innovation is found to be a significant driver of firm performance (Hall, Lotti, & Mairesse, 2009), and a major contributing factor to competitive advantage (Porter, 1985). The rationale is that successful product innovation leads to a period of increased sales and improved competitiveness (Freel, 2000). This again, combined with lower costs due to the innovation, may lead to a period of increased profits. However, as innovation activities are resource demanding, innovation may result in decreased profitability as profits for the company due to the investments in necessary research and development. Freel (2000) investigates the relative performance of small manufacturing firms by level of product innovation. He finds that innovators are likely to grow more than less innovative firms in terms of sales, but is inconclusive regarding differences between innovators and non-innovators in absolute profits and profit margins.

Wolff and Pett (2006) find that product improvement has a positive impact on company growth, and that a product improvement orientation is positively associated with growth and profit. Innovation contributes to customer value, both through improved products and services and new products and services. Process innovation may also increase customer value through more

green products and services, and contribute to the lowering of production costs as discussed before.

McWilliams and Siegel (2000) include investments in R&D as a factor when investigating the relationship between firm sustainability performance and financial performance, and find that the corporate social responsibility then has a neutral impact on financial performance.

Hull and Rothenberg (2008) suggest that the sustainability performance allows firms to differentiate, and thus increases the financial performance. Their findings include that innovation moderate this relationship, as innovation also drives differentiation. They further suggest that corporate social performance most strongly affects the performance in low-innovation firms and in industries with little differentiation.

Based on the reviewed literature, the following hypotheses are made:

H3c: Perceived increased ability to introduce new products and services due to sustainable practices are positively associated with higher financial performance in terms of profitability

H3d: Perceived increased ability to introduce new products and services due to sustainable practices are positively associated with higher financial performance in terms of sales growth, and the association with sales growth is stronger than with profitability

The hypotheses presented above, following the reasoning of the hypothesis 3a, may be said to test the strong version of the Porter Hypothesis.

2.6 Research model

Based on the derived research hypotheses, the overall research model shown in figure 1 below is established. In the model, environmental practices and social practices are measures of the sustainability performance of the company. The three elements of risk, costs and increased innovation are potential value creations of these sustainable practices. Thereafter, the value creations may also lead to financial performance for the company in terms of increased profitability and growth. Operational result and sales growth are as previously mentioned two distinct and commonly used measures of financial performance. In addition, it is controlled for firm size and age in the model, as firm size and age are shown to be determinants of both sustainability levels, and the ability to turn sustainability into financial performance (Laudal, 2011; Lepoutre & Heene, 2006).

Through this model, the identified black box of the sustainability-financial performance relationship is addressed, through investigating possible associations between practices,

perceived value creations and actual financial performance in terms of sales growth and operational result in internationalized Norwegian manufacturing SMEs.

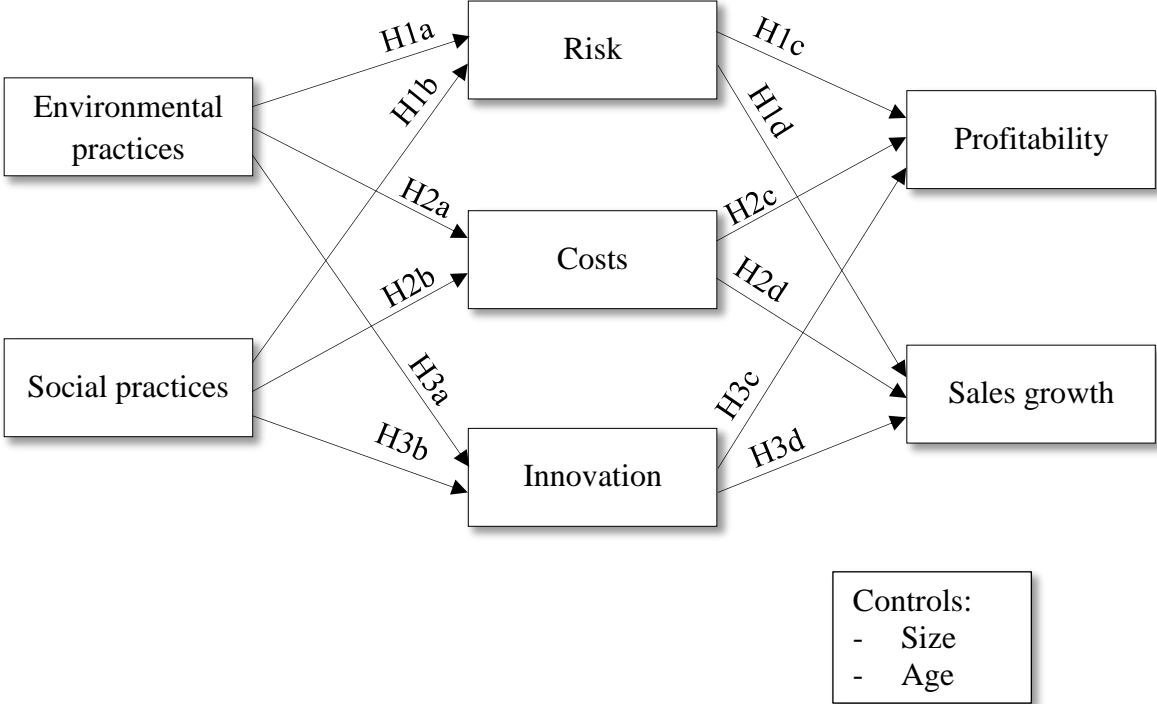


Figure 1 – Hypothesized research model

3 Methodology

This chapter presents the methodology of the thesis. First, the overall research design and methods employed are explained. Then follows a description of the data collection process and the sample targeted, before an assessment of the overall research quality is made. Thereafter, the key variables in the research model are described, including references to their theoretical founding. The process of screening the data material and preparing the data for analysis are then presented. The steps in the establishment of the measurement model are described together with a brief assessment of its quality. Then, following the two-step recommendation by (Anderson & Gerbing, 1988), the procedure of the main data analysis using structural equation modeling is presented. Ultimately, the final sample used in the analysis is described in terms of relevant parameters. This includes an overview of the industry sectors represented in the sample.

3.1 Research design and methods

This study employs a quantitative research strategy with cross-sectional data to address the stated research objectives of the study. As quantitative research, it is deductive in style and aims toward testing theory and hypotheses. The cross-sectional approach enables the researcher to investigate more than one case at a single point in time, and to reveal associations between the variables (Bryman, 2008). In this study on sustainability and performance in manufacturing SMEs, the objective is to be able to make inferences based on the research model and to generalize the findings to a larger group. With a representative sample, it is possible to generalize the research findings to a larger group than the sample investigated (Bryman, 2008).

The data collection is done through a survey questionnaire supplemented by financial information from official registers. These two data collection methods are chosen to best be able to obtain firm level information that is both extensive and complementary. Both objective and subjective data is obtained to get an as correct picture as possible of the included cases. Both data collection methods are effective ways to gather large amounts of data at a single point in time.

The data analysis techniques employed in this study include both descriptive and inferential statistics, where the main data analysis is done through the multivariate procedure structural equation modeling (SEM). Structural equation modeling is a statistical methodology that takes a confirmatory approach on analyzing a structural theory (Byrne, 2001). The approach is hypothesis-testing, and typically aims to address assumed causal processes (Bentler, 1988; Byrne, 2001). In SEM, the causal processes under study are represented by a series of regression equations, which can be modeled visually for a clearer conceptualization of the theory under study (Byrne, 2001). The structural equation modeling is performed using the tool SPSS Amos Graphics, version 21.

The quantitative research strategy enables the comparison of results to similar research. This is of great value in the setting of sustainability in business, where developments in the field accelerate. In the subsequent sections, the methodology and procedures of the thesis are further explained.

3.2 Sample and data collection

This study includes two data collection methods and two data sources. The data is gathered through a self-completion questionnaire and through obtaining objective information about the respondent firms through official registers accessed through the service *Proff Forvalt*. This section will further describe the data collection process and the type of data obtained.

Survey questionnaire

The survey questionnaire targeted top managers of approximately 2700 Norwegian manufacturers, representing the whole population of Norwegian manufacturers. The author did the main work of gathering of the data. The data collection process took approximately two months, reaching from November 2015 to January 2016.

Two conference papers based on the data material have already been presented (see Aspelund & Fredriksen, 2016; Aspelund & Srai, 2016).

The tool Select Survey was used to distribute the survey questionnaire and collect the responses. The self-completion questionnaires were distributed by e-mail only, as this was seen as both sufficient and most resource effective based on experiences from previous data gatherings from a similar population.

The list of companies was retrieved from the service *Proff Forvalt*³. The following selection criteria were employed: The companies had to be (1) registered in Norway, (2) listed as manufacturers by the statistical classification system of economy activities in the European community and have (3) five or more employees in 2014 (listed in the official Norwegian registers). The total number of companies in NACE group C with five or more employees at the time of the download was 4299. In addition, a convenience criterion of available contact information through official registers was set. About 40% of the companies had no contact information listed, and therefore the sample consisted of 2718 companies at the start of the data collection process. A comparison analysis between the chosen sample and the population revealed no significant differences on central parameters such as company size and age. Hence, the targeted sample is seen as a representative of the population of Norwegian manufacturers.

To increase the response rate, there were sent follow up e-mails to non-respondents and those with only partially completed responses in two rounds. About 100 randomly selected non-

³ www.forvalt.no

respondent companies were also given a call to increase the response rate. There were 682 responses by the end of the data collection process. The number of opt-outs were 36, 39 companies were non-reachable and five companies in the database had been discontinued. Of a possible 2718 of responses, 682 responses is a response rate of 25.1%.

86% of the respondents reported CEO or equivalent as their position in the company. Nearly all of the respondents reported to be part of the top management team in their company.

The survey on *Sustainability in Norwegian Industry* consisted of 86 items addressing sustainability perceptions, challenges, strategies, efforts, perceived outcomes and leadership in the targeted companies. International activities and growth strategies were also covered in the survey. The survey was divided in two main parts; the first was regarding firm level information as perceived by the top manager, and the second regarding the top managers' self-reported personal motivation and leadership style. The survey was pilot tested before it was distributed to the targeted sample.

The data material contains natural, ordinal and nominal scales. Items that seek to give indications through subjective opinions of the manager such as "We strive to reduce or eliminate impacts on local ecosystems" in the survey are measured on ordinal Likert-type scales ranging from 1 to 7, where 1 is strongly negative and 7 is strongly positive. All survey items used in this study is presented in Appendix 1.

Publicly available data

In addition to the self-reported information gathered through the survey, high quality secondary information on the targeted companies was gathered through the service *Proff Forvalt*, which offers firm level data from the official Norwegian *Brønnøysund Register*. The *Brønnøysund Register* is unique in an international setting, providing public access to detailed financial information on all companies registered in Norway. The data obtained for this study includes financial information on firm level for the period from the fiscal year of 2005 to the fiscal year of 2014, thus providing ten years of continuous and detailed financial information.

This annual financial information includes total revenue, total operating revenue, total operating profit, annual profit, profitability and solidity. The data include information such as company name, organizational number, address, general manager, and company age and industry sector belonging in addition to the annual information.

Data selection

The data selection criteria applied on the final sample used for analysis in this study are as following: (1) industry companies registered primarily in group C Industry by NACE (2008), (2) SMEs (5-249 employees), (3) international exposure in terms of international sales, suppliers or own production, and (4) registered in Norway. The size of the sample meeting these criteria is 503 cases.

3.3 Research quality

The methodology and procedures of this thesis are sought thoroughly explained to ensure replicability and limiting bias in the research (Bryman, 2008). Quantitative in nature, this research seeks to find generalizable results to the population of which the sample was drawn. As presented in the section on sample and data collection, satisfactory external validity of this research is assumed through a representative sample, systematic data gathering and an acceptable response rate.

To assess potential non-response bias, the first 25% of the respondents were compared with the last 25% of the respondents following the recommendations of Armstrong and Overton (1977). The independent samples t-test (equality of means) comparing the two groups of respondents returned no significant differences neither in terms of company size (number of employees) nor in company age (date of establishment).

Regarding the reliability of the research, the reliability are sought improved through using multiple sources of evidence. The use of objective information from secondary sources in the model strengthens the quality of the research model considerably. It is strived to maintain a chain of evidence in this study to strengthen the quality of the research (Wilson, 2014).

Regarding the quality of measurement, a pilot study was conducted to strengthen the validity of the indicators in the survey questionnaire. None of the included indicators in this study has been taken directly from previous research, and the generalizability of the indicators may be questionable when developed on small samples (Bryman, 2008). The quality of the indicators included will be further discussed in the section on measurement assessment.

To limit common-method bias, the recommendations of Podsakoff, MacKenzie, Lee, and Podsakoff (2003, pp. 898-899) has been followed. The measurement of predictor and criterion variables in the questionnaire were presented on separate pages, separating them psychologically. The confidentiality of the respondents were assured both in the e-mail to the respondents and in the information given in the survey program.

The Harman's single-factor test was performed in SPSS, as the items and factors in this study are not established in literature. Through extracting one factor, the one-factor solution explained 32% of the variance, and thus not indicating common method bias.

Further, it was taken a single-common-method-factor approach in the confirmatory factor analysis in SPSS Amos to control for common methods variance. A latent common factor was added in the confirmatory factor analysis to investigate potential differences between a constrained and an unconstrained model. There were no significant differences indicated (Podsakoff et al., 2003, p. 891).

Social desirability bias is a concern due to the possibly sensitive topics in the survey questionnaire (Podsakoff & Organ, 1986). An interesting finding was that several managers commented that the focus on sustainability was merely a trend and humbug. The number of these cases and the strength used in the language of the comments came as a surprise to the author. These respondents were obviously not subjected to bias toward glorifying their own company performance, rather the contrary.

3.4 Key variables

The exogenous variables in the model are the two factors named social initiatives and environmental initiatives. Environmental initiatives here include degree of implementation of resource saving measures, sustainable sourcing, active reduction of climate emissions and products and packaging designed to be recycled or reused. Social initiatives in the company covers the degree to which the company secures fair working conditions and salaries that provide a fair standard of living for everyone involved in their value chain, equal pay for equal work, and transparency towards stakeholders. The degree of sustainability initiatives is thus applied as measures of sustainability performance in the companies.

All items in these two latent factors are adopted from the Future Fit framework (Future-Fit, 2016) described in the theory chapter, and subjected to factor analysis as presented above. Regarding the conceptualization of environmental practices, similar concepts are found in the green supply chain management (GSCM) field (Zhu & Sarkis, 2004).

Aspelund and Srai (2016) use the same items as constitute the concepts of environmental and social initiatives to validate the results of their cluster analysis. They do this by comparing their high, medium and low sustainability company categorization with the reported sustainability initiatives.

The endogenous variables or dependent variables in the model are the “business case” variables consisting of reduced risk, reduced costs and increased innovativeness, together with the measures of firm performance, namely of growth and profitability.

The “business case variables” are the result of factor analysis, and these three rationales for increased value due to sustainable practices are discussed in previous literature as presented in the theory chapter. Three Likert-type scales, covering risk of reputation failure, decline in sales and risk of not being able to meet future regulatory requirements, measure perceived reduced business risk due to sustainable practices. Reduced costs due to sustainable practices are measured by one item on operating costs, and increased innovativeness due to sustainable practices is measured by one item on the ability to introduce new products or services. It is important to note that the concept of sustainable practices are used equal to sustainable performance in this study.

In line with previous research, two dimensions of firm financial performance is used; namely sales growth and operational result (Orlitzky et al., 2003). As the survey material does not cover when the reported sustainability activities were initiated, a shorter time span of three years' financial performance are used in the analysis. Profitability is measured as the average operational result the three last years (2012-2014), while growth is measured as sales growth rate for the last three years (2012-2014). Sales growth rate was calculated as:

$$\frac{\text{Revenue 2014} - \text{Revenue 2012}}{\text{Revenue 2012}}$$

Control variables are measures of company size and age, as these have been found to influence both the exogenous and the endogenous variables included in this analysis (Goyal et al., 2013). Size and age are much used controls in this type of research (see e.g. Laudal, 2011; Lepoutre & Heene, 2006). Company size is measured as number of employees in 2014, and company age is measured as number of years since founding in 2014.

All items used in the model is presented in appendix 1, while the latent factors are presented in appendix 3.

3.5 Screening the data

Statistical techniques have underlying assumptions regarding the data to be analyzed. In this subchapter, the assessment of the assumptions for factor analysis and structural equation modeling for the data set will be described, following the recommendations of Tabachnick and Fidell (2007). This includes dealing with missing values, assessing the normality of the data, univariate outliers, pairwise linearity and multivariate outliers.

Dealing with missing values

There exist missing data in the sample, posing challenges for the chosen analysis procedure. The author has decided to impute missing data where possible. Complete datasets are required for SPSS Amos to be able to suggest model adjustments (Olinsky, Chen, & Harlow, 2003). Data replacement should not be used on cases where all values used in the analyses are missing. 53 cases were therefore removed from the dataset due to completely missing relevant data on either financial information or in the survey questionnaire. This left 452 cases for further analysis.

An important precondition for most missing data replacement techniques is that the missing data are missing at random (Tabachnick & Fidell, 2007). When data is not missing completely at random, the options for data imputation are limited. Most frequently used options, such as listwise deletion and mean substitution, will likely bias a dataset when the missing data is not missing completely at random (Tabachnick & Fidell, 2007). To investigate this precondition Little's MCAR-test (missing completely at random) was performed using the SPSS missing

value analysis. The test returned significant results at the 0.05-level, thus rejecting the null-hypothesis that the data are probably missing completely at random (Chi-square = 886.957, DF = 816, Sig. = 0.042 for the set of included variables in the analyses).

The data imputation procedure expectation maximization is generally considered to be the better alternative for effectively handling missing data in SPSS (Tabachnick & Fidell, 2007). Therefore, missing data in the remaining cases were imputed through expectation maximization performed in SPSS. The average percentage of imputed values on the variables was 8%, with a range from 2% to 23%. Two variables were removed from further analysis due to an especially high percentage of missing data. These questions might be viewed as particularly sensitive in nature. See item 15 and 17 in appendix 1.

The sample size of 450 cases are regarded satisfactory for structural modeling (Byrne, 2001). In factor analysis, factoring adequacy of the data and its size are tested as an initial part of the analysis, and SPSS Amos provides indicators of sample size adequacy. These results are reported in the section describing the factor analysis.

Assessing multivariate analysis assumptions

Both factor analysis and structural equation modeling assume multivariate normality. Non-normal data are a challenge especially in combination with small sample sizes, as they may lead to that SEM analyses fail to converge or give improper solutions (Anderson & Gerbing, 1988; Byrne, 2001). With non-normal data, the CMIN value tends to become too large, and the TLI and CFI underestimated. The evaluation of these measures will be discussed further in the description of the data analyses in the following sub-chapters.

The data material was screened for skewness, kurtosis and outliers to assess the normality of the data. Skewness indicates the symmetry of distribution, while kurtosis indicates the “peakedness” of the distribution (Tabachnick & Fidell, 2007). According to Byrne (2001), especially excessive kurtosis is troublesome in SEM analyses. Both skewness and kurtosis values should be between 1 and -1, or maximum three times the standard error of the skewness or kurtosis value (Tabachnick & Fidell, 2007).

The inspection of the histograms of the variables to assess the shape of distribution revealed that most of the variables are negatively skewed; whereas visual inspection of normal probability (Q-Q) plots reveal varying results regarding variable linearity. A Shapiro-Wilk test of normality returns significant results, further indicating data non-normality. However, in social sciences non-normality is common and does not necessarily indicate a problem with the scale (Bryman, 2008).

As the continuous scales on financial performance, both in terms of growth and profitability, were excessively leptokurtic and negatively skewed, they were logarithmically transformed using the base-10 logarithm of the values. As there were negative values on both scales, a

constant was added in the transformation as to avoid returning the logarithm of negative values, following the recommendation of Tabachnick and Fidell (2007, p. 88).

Appendix 2 reports the normality statistics. Values are reported both before and after transformation was performed for the transformed measures. Please note that only the items kept in the following analyses are presented.

Univariate outliers were inspected through boxplots and 5% trimmed means. Most of the variables are Likert-type scales, where outliers do not exist as long as the data are in the correct range. For the measure of sales growth, there were no extreme outliers after the logarithmic transformation. For the measure of operational result, one outlier was recoded into a less extreme value after the transformation.

Multivariate outliers are unusual combinations of scores on two or more scales (Tabachnick & Fidell, 2007). Potential outliers and influential cases were investigated through Mahalanobis' distance generated through a linear regression including all measures included in the final SEM as independent variables (Tabachnick & Fidell, 2007, pp. 99-101).

For SEM, there must be absence of multicollinearity and singularity (Byrne, 2001). Multicollinearity is high correlations between variables or factors, and singularity is present when two or more variables or factors included are measuring the same concept (Tabachnick & Fidell, 2007). Possible multicollinearity and singularity issues are assessed as a part of the factor establishment.

3.6 Establishing the measurement model

The measures used in the hypothesized model are established through employing both exploratory and confirmatory factor analysis. Throughout this thesis, the recommendations of Anderson and Gerbing (1988) are followed, through first establishing and validating the measures, and then building the structural equations model. In this subchapter, the procedure that has been applied to develop the measurement model is presented. In SEM analysis, it is distinguished between exogenous and endogenous variables, as synonyms to independent and dependent variables. The exogenous and endogenous variables are presented together with the resulting measurement model, including an assessment of construct validity and reliability.

Factor analysis

Factor analysis investigates how and to what extent the factors in the analysis are made up by the underlying latent constructs (Tabachnick & Fidell, 2007). It can be distinguished between two types of factor analysis, namely exploratory (EFA) and confirmatory factor analysis (CFA).

First, an exploratory factor analysis was performed in SPSS. Factor extraction was done using maximum likelihood estimation as this is the technique used for CFA and SEM, and thus

recommended when further analysis are through these methods (Tabachnick & Fidell, 2007). Further, oblique rotation direct oblimin was used for interpretation of the factors. Bartlett's test of sphericity ($p < 0.05$) and Kaiser-Meyer-Olkin (KMO) measure (minimum 0.6) of sampling adequacy were performed to assess factorability: Bartlett returned significant result, Sig. 0.000, while KMO returned 0.880. Three factors with 14 items in total were kept in the EFA. Two single item measures were also kept for inclusion in the full SEM. Five items were discarded from further analyses due to low factor loadings. These were the items 8, 9, 14, 16 and 18 in appendix 1.

The confirmatory factor analysis on the hypothesized factor model was performed using SPSS Amos. In structural equation modeling the result of a confirmatory factor analysis is termed a measurement model, as it focuses on the link between the latent factors and their observed items (Byrne, 2001). The only adjustment in the measurement model made through the CFA was the inclusion of two error-terms co-variances between same level factors based on the modification indices given by SPSS Amos, increasing model fit slightly. Error terms co-variances indicates that these constructs share variation that is not explained by the predictors. There were no other alterations necessary in the confirmatory factor analysis.

Measurement assessment

Cronbach's alpha is a measure of the internal reliability of the factors created through factor analysis, and measures the internal consistency in the latent factor. A Cronbach's alpha of 0.7 is usually accepted, but values greater than 0.8 are preferred. As reported in appendix 1, all the factors returned Cronbach's alpha values above 0.8, which indicates a very good internal reliability of the factors. Factor loadings indicate the degree to which a variable is a pure measure of a factor. Loadings above 0.71, which is above 50% overlapping variance, are considered excellent (Comrey & Lee, 1992). Factor loadings greater than 0.5, with an average loading on their factor greater than 0.7, are much used rules of thumb (Tabachnick & Fidell, 2007). All factor loadings are above 0.6, with an average above 0.7. The table in appendix 3 reports the factor analysis results, with factor loadings for each variable and Cronbach's Alphas for each factor.

Table 1 below reports the factor correlations matrix, together with reliability and validity statistics. Composite reliability (CR) values are all higher than the recommended threshold of 0.7, and confirms the finding of satisfying Cronbach's Alphas as described above (Hancock & Mueller, 2001). Average shared variance (AVE) for each factor are all higher than 0.5, which is the recommended threshold (Tabachnick & Fidell, 2007). Maximum shared variance (MSV) is an evaluation measure of discriminant validity, and reveal no discriminant validity issues as MSV are smaller than AVE.

Correlations between predictor variables should not be above 0.7 (Tabachnick & Fidell, 2007), and the component correlation matrix shows no discriminant validity issues for the extracted factors. The bolded diagonal values in table 1 show the square root of the average variance extracted, which should be greater than the correlation between the constructs. These indicates

discriminant validity. Further, VIF (variance inflation factor) values are indicators of potential multicollinearity, where values close to 1 are preferred (Tabachnick & Fidell, 2007). The VIF values for the variables included in the model ranges from 1.094 to 1.450, thus not indicating any multicollinearity issues.

Table 1 – Factor correlation metrics, means, standard deviations, and reliability and validity statistics

Factor	Mean	S.D	CR	AVE	MSV	1	2	3
Environmental practices (1)	4.075	1.076	0.881	0.517	0.121	0.719		
Social practices (2)	5.045	0.668	0.805	0.511	0.048	0.254**	0.715	
Risk (3)	4.381	1.057	0.883	0.716	0.121	0.386**	0.215**	0.846

***p<0.001, **p<0.01, *p<0.05 (two-tailed)

Regarding the model fit of the measurement model, the CMIN value, which is a chi-square statistic, was 129.425, with 73 degrees of freedom (DF) and a probability level of .000. CMIN is the discrepancy between the unrestricted sample covariance matrix S and the restricted covariance matrix. The CMIN index, which is an absolute fit index, may give little guidance regarding model fit, as SEM is sensitive to sample size (Byrne, 2001, p. 152).

For fit statistics thresholds, the recommendations given by Byrne (2001) are followed. The CMIN/DF value were 1.773, indicating good model fit when CMIN/DF are below five. The relative fit index CFI shows 0.980, where the more tolerant threshold for CFI are >0.90, though some use the more strict threshold of >0.95. The Tucker-Lewis index (TLI), which shows 0.975, is similar to CFI, but moderately corrected for parsimony. The recommended threshold for the TLI is >0.90. The RMSEA index is a parsimony correction index, with a suggested value of 0.06 or below to indicate good fit (Hu & Bentler, 1999). The RMSEA shows 0.048. Table 2 below reports an overview of the measurement model fit statistics.

Table 2 – Measurement model fit statistics

Fit statistics	CMIN/DF	CFI	TLI	RMSEA
Values	1.773	0.980	0.975	0.048

Together with these goodness of fit statistics, residual covariance may guide in any model misspecification (Byrne, 2001, p. 88). Residuals should be small and centered on zero, and the frequency distribution of the residual covariance should be symmetrical (Tabachnick & Fidell, 2007). Standardized residual values larger than 2.58 are considered large (Byrne, 2001, p. 89). All standardized residual co-variances are well within this acceptable range.

3.7 Structural equation modeling

Structural equation modeling tests statistically the hypothesized model in a simultaneous analysis of the entire system of variables (Byrne, 2001). The full structural model is the second step in the two-step approach recommended by Anderson and Gerbing (1988). This section describes the process for obtaining model fit for the full structural model. The structural equation modeling was performed using SPSS AMOS.

Maximum likelihood estimation of parameters were used in the analysis of the structural equations model with imputed factor scores in a path model. When acceptable goodness of fit was reached, insignificant paths from controls were removed to keep degrees of freedom.

The full SEM model returned acceptable goodness of fit-statistics, with the values CMIN/DF = 3.730, CFI = 0.938, RMSEA= 0.078, and NFI = 0.922. Table 3 below reports an overview of the fit statistics for the final structural model. See the subchapter on the measurement assessment for an overview of goodness of fit-statistics thresholds.

Table 3 – Structural model fit statistics

Fit statistics	CMIN/DF	CFI	TLI	RMSEA
Values	3.730	0.938	0.922	0.078

3.8 Summary statistics

The sample consists of 450 Norwegian internationalized SMEs. In this setting, SMEs are defined after the EU standard, as companies with up to 250 employees (OECD, 2005b). All companies are industrial companies listed in the group 10 Industry in official registers after the Statistical classification of economic activities in the European Community (NACE), rev. 2, section C (NACE, 2008).

By 2014 statistics, the companies in the sample were distributed by size on a range from 5 to 241 employees, where the majority was on the lower part of the scale. This reflects the industrial sector in Norway, where most companies are small and medium sized (NHD, 2012). The companies were established between 1656 and 2014, which is a range from zero to 357 years since establishment. Most companies are between 10 to 40 years old. Total revenue in 2014 ranges from 6000 NOK to 4.34 billion NOK, and annual profit ranges from 208 million NOK loss to 241.6 million NOK profit.

Table 4 – Sample characteristics (n=450)

	Range	Min.	Max.	Mean	Median	S. D.
Year of Establishment	357	1656	2014	1975	1986	36.9
No. of Employees	236	5	241	40	23	42.6
Revenue in 2014	4342938	6	4342944	113224.5	33751.5	284675.3
Annual Profit in 2014	449876	-208285	241591	4318	678	19227.3
% Sales Growth 3 yrs	951.8	-47.11	904.77	13.6	5.5	65.0

Financial numbers stated in ‘1000 NOK

58.7% of the companies reported international sales, 92.9% reported international purchase, and 10.4% reported that they had own production abroad.

The 450 SMEs belong to 20 different industries as shown in the table below (NACE, 2008). The categories that are most represented in the sample are manufacture of machinery and equipment, manufacture of fabricated metal products and manufacture of rubber and plastic products. The distribution between high-technology and low-technology companies are 33% high-tech and 67% low-tech when grouped by Eurostat (2016) definitions. Table 5 below presents a full overview of the industries represented in the sample.

Table 5 – Industries represented in the sample

Industry	Frequency	Percent
Manufacture of food products	42	9.3
Manufacture of beverages	4	0.9
Manufacture of textiles	16	3.6
Manufacture of wearing apparel	4	0.9
Manufacture of wood and products of wood and cork	41	9.1
Manufacture of paper and paper products	1	0.2
Printing and reproduction of recorded media	15	3.3
Manufacture of chemicals and chemical products	14	3.1
Manufacture of basic pharmaceutical products and pharmaceutical preparations	7	1.6
Manufacture of rubber and plastic products	30	6.7
Manufacture of other non-metallic mineral products	29	6.4
Manufacture of basic metals	9	2.0
Manufacture of fabricated metal products, except machinery and equipment	72	16.0
Manufacture of computer, electronic and optical products	23	5.1
Manufacture of electrical equipment	21	4.7
Manufacture of machinery and equipment n.e.c.	59	13.1
Manufacture of motor vehicles, trailers and semi-trailers	5	1.1
Manufacture of other transport equipment, including ships and boats	21	4.7
Manufacture of furniture	19	4.2
Other manufacturing	18	4.0
Total	450	100.0
Low-tech	300	66.7
High-tech	150	30.3

4 Results

In this chapter, the structural equation modeling results are presented, and the hypotheses of this study are evaluated. As table 6 shows, five of the hypotheses are supported, while seven hypotheses are rejected.

Environmental practices are found to be positively associated with reduced operating costs, increased ability to introduce new products and services, and reduced business risk among managers. All the hypotheses regarding the environmental practices are hence supported.

Social practices are found only to reduce business risk. There are not significant findings regarding neither the increased ability introduce new products and services, nor reduced operational cost due to social practices.

There are no significant findings regarding financial performance in terms of profitability. Only the increased ability to introduce new products and services due to sustainable practices are found to be associated with growth in terms of sales growth.

The ability to introduce new products and services are the only element in the model bridging sustainability performance into increased financial performance. More precise, innovation is a mediator of the environmental performance – sales growth relationship.

The variance explained for the exogenous variables in the model are indicated by the R^2 (squared multiple correlations), which is 14.8% for costs, 7.7% for risk, 7.7% for innovation, 24.7% for profitability and 4.3% for sales growth.

The hypothesized model includes the two control variables company age (as years since founding in 2014), and size (as number of employees in 2014). Company age are found to have a negative association with the ability to introduce new products and services ($\beta = -0.101$, $p < 0.05$), and sales growth rate ($\beta = -0.177$, $p < 0.001$). Company size are associated with reduced business risk ($\beta = 0.156$, $p < 0.001$), and company performance in terms of operational result ($\beta = 0.497$, $p < 0.001$).

Table 6 – Structural model parameter estimates

Model Parameters		SRW	CR	Hypothesis evaluation
H1a	Environmental practices → Risk	0.256***	5.919	Supported
H1b	Social practices → Risk	0.105*	2.523	Supported
H1c	Risk → Profitability	-0.006	-0.141	Rejected
H1d	Risk → Sales growth	0.014	0.271	Rejected
H2a	Environmental practices → Cost	0.118**	2.550	Supported
H2b	Social practices → Cost	-0.037	-0.821	Rejected
H2c	Cost → Profitability	0.026	0.599	Rejected
H2d	Cost → Sales growth	-0.004	-0.090	Rejected
H3a	Environmental practices → Innovation	0.244***	5.170	Supported
H3b	Social practices → Innovation	0.069	1.462	Rejected
H3c	Innovation → Profitability	-0.009	-0.190	Rejected
H3d	Innovation → Sales growth	0.097*	1.819	Supported

***p<0.001, **p<0.01, *p<0.05 (two-tailed)

Model fit statistics:

CMIN/DF = 3.730, CFI = 0.938, RMSEA = 0.078, NFI = 0.922

Figure 2 below shows the final model with all the significant associations. The hypothesized paths that did not prove statistically significant during the structural equation modeling are not included in the figure below to increase its clarity.

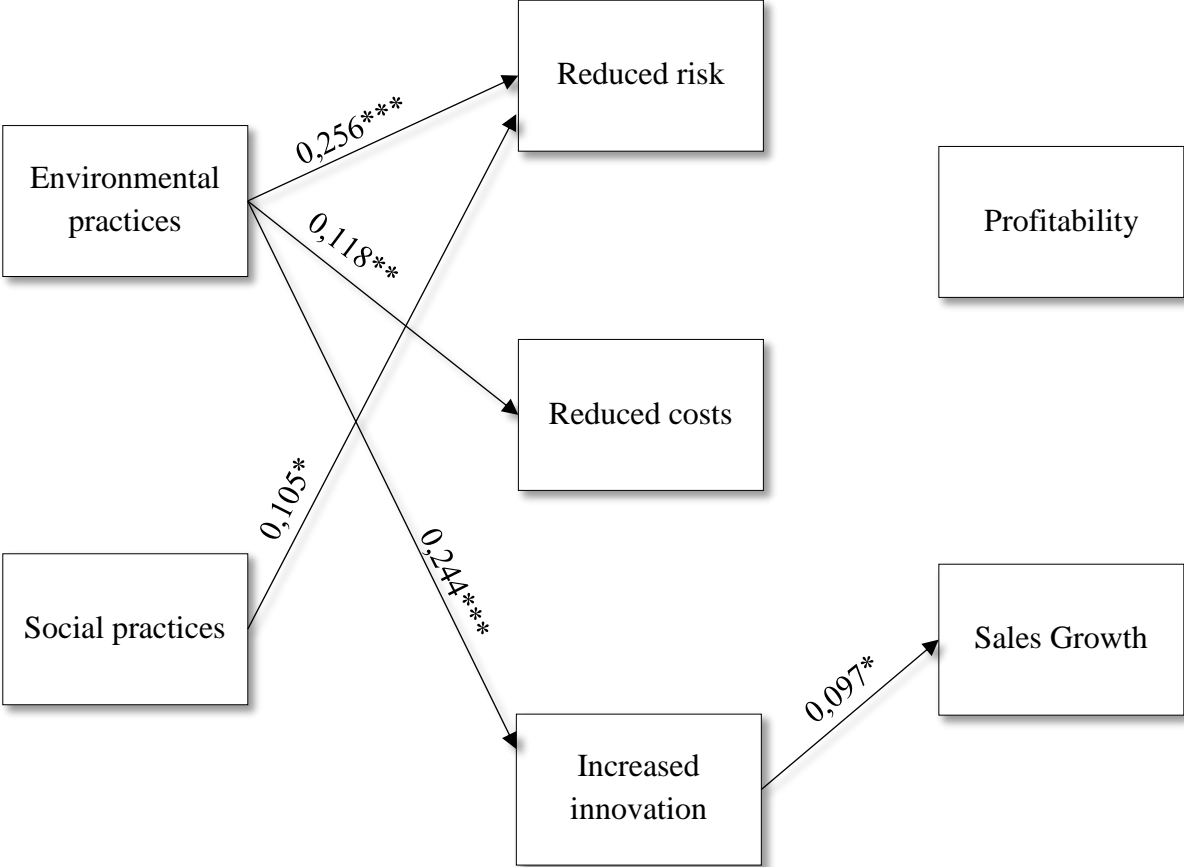


Figure 2 – Structural equation model

5 Discussion

This study seeks to increase the understanding of the mechanisms involved in the relationship between firm sustainability performance and financial performance on the firm level. The study aims toward contributing to investigate in the ways through which sustainable practices may increase financial performance (Eccles et al., 2014; Goyal et al., 2013).

By analyzing the proposed model through utilizing structural equation modeling, the study reveals associations between sustainable practices, possible value increasing mechanisms, and firm financial performance. The hypothesized value creating mechanisms are reduced business risk, reduced operating costs and the increased ability to introduce new products and services through sustainable practices – both social and environmental.

The main finding is a positive association between environmental practices and the increased ability to introduce new products and services, and company sales growth. The findings further suggest that environmental practices may reduce business risk, reduce operating cost. Social practices may reduce business risk, but it is not found statistically significant support for the hypothesized linkages to reduced operating costs or increased ability to introduce new products and services. None of the hypothesized paths from possible value creating mechanisms to financial performance in terms of higher operational result was statistically significant.

Recalling previous research utilizing the same data material as this study, Aspelund and Srari (2016) found a positive relationship between the adoption of sustainable manufacturing and financial performance. Further, the study found that the manager's motivations for implementing such a strategy were performance seeking in terms of increased value creation and reduced costs and business risk.

This study builds upon these findings and investigates which of these motivations that actually are associated with higher financial performance in terms of sales growth and operational results.

In this chapter, the findings presented in the former chapter are addressed, and its similarities and differences with previous research are discussed. The chapter is structured as follows: first the main finding of this study is addressed, which is the positive association between environmental practices and the increased ability to introduce new products and services, and further a positive association with sales growth. Then, the findings of positive associations between environmental practices and the perception of reduced business risk and operational costs are discussed. None of the hypothesized value creating dimensions were significantly associated with higher financial performance in terms of operational result. The possible reasons for this are discussed. The finding of a positive relationship between social practices and perceived reduced business risk is discussed, together the non-significant findings regarding a reduction of costs or increased innovative ability. Then, the managerial implications derived from the findings of this study is presented.

5.1 Increased ability to innovate associated with higher sales growth rate

The objective of this study has been to investigate possible mechanisms that may contribute to turning sustainability performance into financial performance in manufacturing SMEs. Through the analysis of the proposed model, this study has found a positive association between environmental practices and the increased ability to introduce new products and services, and further a positive association with sales growth. This finding suggest that the increased ability to introduce new products and services is an important element in the sustainability performance – financial performance relationship, and are a path for how sustainability performance may give increased financial performance in terms of higher sales growth.

Both the hypothesis 3a regarding environmental practices and increased ability to introduce new products and services, and hypothesis 3d regarding the positive association between the increased ability to introduce new products and services and sales growth rate, are supported. In the following, the support for hypothesis 3a is discussed, before the support of hypothesis 3d is discussed.

The support found for hypothesis 3a indicates that there is a positive association between the degree of environmental practices and the managers' perceived increased ability to introduce new products and services. This corresponds with some of the findings of Costa et al. (2015), where they found that in certain circumstances, CSR contributes to higher exploratory innovation levels. The rationale here is, partly, that a focus on CSR implies an increased pressure to question old routines and to gain new knowledge. This may also be the case here.

The hypothesis 3a is partly, as argued, a test of weak version of the Porter hypothesis. Through the findings, this implies a partly confirmation of the weak version of the Porter hypothesis – or more precise a confirmation of the assumption that firm self-regulation regarding sustainable practices might contribute to higher innovation levels. As Porter and van der Linde (1995) proposed when they first introduced the Porter hypothesis, properly designed strict environmental regulations might trigger innovation through different mechanisms. These mechanisms might also be likely through firm self-regulation, not only through governmental regulations.

Further, this study finds a positive association between the increased ability to introduce new products and services due to environmental practices and financial performance in terms of sales growth. The hypothesized link from ability to introduce new products and services to performance were not supported. The support for the hypothesized increased performance of sales growth is in line with the perception of innovation as a major contributor to competitive advantage (Porter, 1985). This finding corresponds well with previous research revealing a positive link between innovation and firm performance, as Freel (2000) and Wolff and Pett (2006). Also Freel (2000) finds that innovators are more likely to grow more in terms of sales, but does not find any support for increased profits. The process of introducing new products and services is resource demanding, and may therefore not significantly affect the profitability.

The hypotheses 3c and 3d test the strong version of the Porter hypothesis. The findings partly lend support for the strong version, as hypothesis 3d is supported while 3c is not. Still, the precondition is that it is the firm self-regulation through more sustainable environmental practices, which also increases their ability to introduce new products and services. The support for the strong version of the Porter hypothesis is rarely found in previous research, as noted by (Ambec et al., 2013), and may therefore be an interesting one. A partly support for the strong version of the Porter hypothesis is especially interesting in the setting of Norway, as the regulatory demands towards manufacturers already are relatively high in an international setting. Norwegian manufacturers, already governed by strict regulations, regard their environmental performance as value increasing, and it is also positively associated with actual financial performance in terms of firm sales growth rate.

The support for the positive association between environmental practices and the ability to introduce new products and services may be an explanation for the finding by Hull and Rothenberg (2008). The found R&D expenditure as a moderator of the relationship between sustainability performance and financial performance. It is possible to argue, through the findings of this study, that sustainable performance is inherently coupled with innovation. This may be explained through different theoretical approaches. As described in the theory chapter, sustainability and the implementation of environmental practices has been studied through par example the theoretical lenses of the resource-based view. The adoption of such a strategy foster outside-in learning and the development of dynamic capabilities that may boost continuous improvement and innovation (Aragón-Correa & Sharma, 2003). Again, the increased pressure to question old routines and to gain new knowledge as proposed by Costa et al. (2015) is relevant.

5.2 Environmental practices associated with reduced risk and costs

In the previous subchapter, the positive association between environmental practices and the increased ability to introduce new products and services was discussed. This study also find support for the hypotheses suggesting that environmental practices are associated with both reduced business risk and costs. These two findings are in line with the research on the business cases for CSR (Carroll & Shabana, 2010; Kurucz et al., 2008).

Business risk are in this study defined through the three items, namely risk of reputation failure, risk of decline in sales and risk of not being able to meet future requirements (see appendix 3). Through the reviewed literature, different perspectives of how sustainable practices may reduce business risk has been presented, and these are well established in the literature. The findings of a strong relationship between environmental practices and managers' perception of reduced business risk corresponds well with previous research.

From early concepts in this area of research, such as the trade-off hypothesis (Friedman, 1970), ensuring an acceptable level of responsibility has been seen as important to secure license to

operate. Further, through the developments of more demanding stakeholders, these risks may be said to be increasing. Business approaches to the increasing demands are both passive and more proactive. (Laudal, 2011) found that proactive approaches to sustainable practices may ward off government regulations, thus avoiding risk of not being able to meet future regulations.

The ways through which business risk may be reduced through environmental practices were also reputational. Eccles et al. (2014) found that B2C companies in general showed higher levels of sustainable practices. The increasing consumer pressure may such raise the business risk for those companies that lag behind, and potentially reward those that show high sustainability performance. Not in the scope of this thesis, but an interesting path to explore further, is the role of marketing. This will be discussed briefly below.

However, some have argued that fronting sustainability efforts towards stakeholders may actually increase business risks (Laudal, 2011; Oppenheim et al., 2007). Through raising the expectations, the potential downside is larger in case of incidents or errors. This is found by others to be more relevant for larger and highly internationalized companies (Chapple & Moon, 2005; Laudal, 2011). The results of this study indicates that this potentially increased risk is not that relevant for the sample investigated in this study – at least not compared to the risk reduction by ensuring more sustainable practices.

This study also finds support for the hypothesized positive association between environmental practices and managers' perception of reduced operational costs. As discussed initially, sustainable manufacturing may be seen as a development from previous concepts such as lean production and green production (Jayal et al., 2010). The nature of production systems are to increase productivity (Shah & Ward, 2003), and it may be argued that this also is the case for sustainable manufacturing. Through reducing unnecessary waste and bi-products, one may also save costs. This study confirms that there is a positive association between environmental practices and the perception of this as a cost reducing strategy.

However, this study does not find significant support for the hypothesized paths from perceived reduced business risk and operational costs to financial performance in terms of sales growth or operational result. This means that there is no statistically significant association between perceived reduced business risk and cost, and actual financial performance neither in terms of profitability nor in terms of sales growth.

Previous research has given different results regarding actual financial outcome of sustainability performance. In the meta study by Orlitzky et al. (2003), only a modest positive relationship between sustainability performance and financial performance was found, whereas the studies reviewed proved various results. They Orlitzky et al. (2003) suggested that the reason for the largely differing results were due to how financial performance was measured in the different studies. Using high quality historical data, the present study may be one of the more robust in this regard.

Another reason for the varying results might be that this value is hard to capture in the form of increased financial performance. These efforts may be preventive rather than actively creating financial value for the company (Bansal & Roth, 2000).

Again giving attention to the potential role of marketing in making sustainability pay, many good efforts might not make any difference for the customers. Increasing stakeholder demands, including those of the customers, might be potential opportunities for increased sales and profitability when addressed strategically (Porter & Kramer, 2006; Porter & Kramer, 2011).

5.3 Social practices associated with reduced risk

The last significant finding in this study is the positive association between social practices and managers' perception of reduced business risk. The concept of sustainability in business includes not only environmental factors, but also social concerns. These concerns are those of fair working conditions for everyone in the value chain, equal pay for equal work and transparency among others.

This side of the sustainability concept has been given less attention in operation management research, and the topic has predominantly been discussed in the setting of business ethics, not strategic management. Few studies have included both environmental and social initiatives in the same study (Gimenez et al., 2012).

Reduced business risk through social initiatives touches many of the same arguments as the case of environmental initiatives discussed above. For internationalized companies operating in low-cost countries, business risk due to social conditions might be a pressing concern. The reduction of business risk is an important factor, regarding both the environmental and the social aspects of the sustainability concept.

This study did not reveal any statistically significant associations between social practices and reduced costs or increased ability to introduce new products and services. Partially, this was to be expected through the findings of previous research (Gimenez et al., 2012). Again, the reduction of risk may be preventive measures rather than actively seeking possibilities for increased financial performance.

This study demonstrates that it is relevant to separate social and environmental practices in researching the impacts of sustainable practices and performance, rather than investigating an overarching measure of sustainability, as sometimes has been the case (Orlitzky et al., 2003). This opens for more nuanced findings, as they are not found to have the same effects. Still, it is important to investigate both environmental and social aspects of the sustainability concept in business. As mentioned, few studies have included the social aspects of the sustainability concept in business. There might be valuable insights to gain from future research on this topic.

5.5 Managerial implications

This study provides valuable insights for managers in small and medium sized manufacturing companies. Through investigating possible pathways for how sustainability practices and performance may influence financial performance in terms of sales growth and profitability, the study may provide relevant indications of overall valuable paths to pursue when aiming to turn sustainability performance into financial performance.

Primarily, this study shows that sustainable manufacturing through environmental and social practices generally are perceived as value increasing among managers in Norwegian manufacturing SMEs. This challenges the perception of increasing pressure from policymakers and stakeholders as solely cost increasing for business (Christmann & Taylor, 2006).

The most important and valuable insight from this study regards the role of innovation in the sustainability performance – financial performance relationship. This study shows that increased ability to introduce new products and services are a valid path to increased sales growth. The ability to innovate, and to introduce new products and services that deliver more value to the customer, are achievable through an increased focus on environmentally sustainable practices in the value chain.

This study also shows that turning sustainability initiatives into increased financial performance in terms of sales growth and profitability is not a straightforward matter. Especially value through more sustainable social practices is difficult to capture.

6 Conclusion

As stated by the Brundtland Commission (*Our Common Future*, 1987), sustainable development is not a fixed state of harmony, but rather a process of change – in many areas. In addition, there are many processes active at the same time driving the development of business sustainability. Stakeholder pressures, governmental regulations and sanctions, learning and knowledge processes all drive the field forward. All this may influence if and how sustainable business practices may give opportunities for increased financial performance. This again may further drive the shareholder and manager push for finding and adopting more sustainable practices. The picture is complex, and current research has not fully unveiled the ways through which sustainable performance may lead to higher financial performance in internationalized manufacturing firms.

This study has taken a firm level perspective on the relationship between sustainability performance and financial performance. Through analyzing new survey data from 450 Norwegian manufacturing SMEs, utilizing structural equation modeling, this study contributes to a clearer understanding of the mechanisms involved in this relationship on the firm level.

Environmental and social practices in this sample of Norwegian manufacturing SMEs created value in three dimensions, namely through the manager's perception of reduced business risk, reduced operating costs and through increased ability to introduce new products and services. However, this value is hard to capture as increased financial performance, as the processes that leads to firm financial performance are complex. Firm performance in terms of sales growth is predominantly captured through the increased ability to introduce new products and services in this sample.

The primary contributions of this study are the findings of positive associations between sustainable practices and managers' perception of the increased ability to introduce new products and services, which again is associated with higher sales growth rate.

The insights gained from this study show that sustainable manufacturing is a strategy that is value increasing, especially through an increased ability to introduce new products and services. Sustainable practices may thus be valuable tools for managers to create value both for the company and for their stakeholders.

6.1 Limitations and future research

In research striving to make inferences, bi-directional relationships (cause and effect) are a common methodological issue. What comes first is difficult to reveal. This may also be said of the relationships between performance, and both sustainability and innovation. On the one hand, in this case, high performing companies may use more resources both on sustainability

practices, and on efforts to increase innovative ability and focus. On the other hand, increased focus on sustainable practices and innovation efforts might also improve company performance. The utilization of structural equation modeling, combined with the manner of which the questions are asked in the survey data used, may partly remedy the issue of potential bi-directional relationships. Theoretically, there are justified grounds to imply both directions in the relationships investigated in this study. The focus has not been to falsify this, but rather to investigate if one of the directions are present.

Regarding external validity, the findings of this study may be generalized to the population of Norwegian small- and medium sized internationalized manufacturers. Norway is a country with strict environmental and social regulations, and with sustainability high on the political and public agenda. One must assume, based on existing knowledge, that other regulatory frameworks may influence how shared value might be created. This study is one of many in a developed country setting. As stated by Goyal et al. (2013), studies set in less developed countries are lacking, and these may provide different results and insights.

This study utilizes cross-sectional data, and a weakness of this type of data is that it hardly is possible to address changes and developments over time. It provides only a snapshot of information. Longitudinal studies in this field are few (see e.g. Eccles et al., 2014). A follow up study on the same sample as the one in this study might provide more insights that are informative.

An interesting path to follow is the possible variances between different industries. The regulatory and competitive setting may be different in various industries, together with the industry-specific sustainability challenges, and may therefore provide valuable insights in how these variables may influence the sustainability performance – financial performance relationship.

Further, one may investigate other possible mechanisms beyond the ones investigated in this study. The mechanisms through which value are created is far from known. An interesting lead found through the reviewing of relevant literature is the role of marketing and awareness in the relationship between sustainability performance and firm performance.

As the key finding of this study is the positive association from environmental practices to managers' perceived increased ability to introduce new products and services, and then a higher sales growth rate, this should be of further interest for researchers. As these positive relationships are found, research can investigate this further through case studies to reveal the possible rationales for these findings. The importance of innovation in the sustainability performance – financial performance relationship is an important lead for further research on in the ways through which sustainability performance might pay.

References

- Ambec, S., Cohen, M. A., Elgie, S., & Lanoie, P. (2013). The Porter Hypothesis at 20: Can Environmental Regulation Enhance Innovation and Competitiveness? *Review of Environmental Economics and Policy*, 7(1), 2-22.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3), 12.
- Aragón-Correa, J. A., & Sharma, S. (2003). A Contingent Resource-Based View of Proactive Corporate Environmental Strategy. *Academy of Management Review*, 28(1), 71-88.
- Armstrong, J. S., & Overton, T. S. (1977). Estimating Nonresponse Bias in Mail Surveys. *Journal of Marketing Research*, 14(3), 396-402.
- Aspelund, A., & Fredriksen, K. B. (2016). *Green Planet Strategy - The Managerial Role for Creating Shared Value in Manufacturing Companies*. Paper presented at the 23rd EurOMA Conference, Trondheim, Norway.
- Aspelund, A., Rødland, S. E., & Fjell, L. (2015). *Doing Good and Doing Well? On the Relationship Between Internationalization and Social Responsibility*. Paper presented at the McGill International Entrepreneurship Conference, Al-Ain, United Arab Emirates.
- Aspelund, A., & Srari, J. S. (2016). *Sustainability and Competitiveness Among International Manufacturers*. Paper presented at the 23rd EurOMA Conference, Trondheim, Norway.
- Bansal, P., & Roth, K. (2000). Why companies go green: a model of ecological responsiveness. *Academy of Management Journal*, 43(4), 19.
- Bentler, P. M. (1988). Causal Modeling via Structural Equation Systems. In J. R. Nesselroade & R. B. Cattell (Eds.), *Handbook of Multivariate Experimental Psychology* (pp. 317-335). Boston, MA: Springer US.
- Bos-Brouwers, H. E. J. (2010). Corporate sustainability and innovation in SMEs: Evidence of themes and activities in practice. *Business Strategy and the Environment*, 19(7), 417-435.
- Bryman, A. (2008). *Social Research Methods* (Third ed.). New York: Oxford University Press Inc.
- Byrne, B. M. (2001). *Structural Equation Modeling with AMOS: Basic Concepts, Applications and Programming*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.
- Carroll, A. B. (1979). A Three-Dimensional Conceptual Model of Corporate Performance. *The Academy of Management Review*, 4(4), 9.
- Carroll, A. B. (1999). Corporate Social Responsibility. Evolution of a Definitional Construct. *Business and Society*, 38(3), 27.

- Carroll, A. B., & Shabana, K. M. (2010). The Business Case for Corporate Responsibility: A Review of Concepts, Research and Practice. *International Journal of Management Reviews*.
- Chapple, W., & Moon, J. (2005). Corporate Social Responsibility (CSR) in Asia A Seven-Country Study of CSR Web Site Reporting. *Business and Society*, 44(4), 415-441.
- Christmann, P., & Taylor, G. (2006). Firm Self-Regulation Through International Certifiable Standards: Determinants of Symbolic Versus Substantive Implementation. *Journal of International Business Studies*, 37, 15.
- Comrey, A. L., & Lee, H. B. (1992). *A First Course in Factor Analysis* (2 ed.). Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Costa, C., Lages, L. F., & Hortinha, P. (2015). The bright and dark side of CSR in export markets: Its impact on innovation and performance. *International Business Review*, 24(5), 749-757.
- Crane, A., Palazzo, G., Spence, L. J., & Matten, D. (2014). Contesting the Value of "Creating Shared Value". *California Management Review*, 56(2), 23.
- Dahlsrud, A. (2008). How corporate social responsibility is defined: an analysis of 37 definitions. *Corporate Social Responsibility and Environmental Management*, 15(1), 1-13.
- Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, 60(11), 2835-2857.
- Eccles, R. G., & Serafeim, G. (2013). The Performance Frontier: Innovating for a Sustainable Strategy. *Harvard Business Review*.
- Eurostat. (2016). Eurostat indicators on High-tech industry and Knowledge-intensive services. Retrieved from http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf
- Freel, M. S. (2000). Do Small Innovating Firms Outperform Non-Innovators? *Small Business Economics*, 14(3), 195-210.
- Friedman, M. (1970, September 13). The Social Responsibility of Business is to Increase its Profits. *The New York Times Magazine*.
- Future-Fit. (2016). Future-fit Business Benchmark. Retrieved from <http://futurefitbusiness.org/resources/downloads/>
- Garetti, M., & Taisch, M. (2012). Sustainable manufacturing: trends and research challenges. *Production Planning & Control*, 23(2-3), 83-104.
- Gimenez, C., Sierra, V., & Rodon, J. (2012). Sustainable operations: Their impact on the triple bottom line. *International Journal of Production Economics*, 140(1), 149-159.
- Gonzalez-Perez, M. A. (2013). Corporate Social Responsibility and International Business: A Conceptual Overview. In M. A. Gonzalez-Perez & L. Leonard (Eds.), *International*

- Business, Sustainability and Corporate Social Responsibility* (pp. 1-35). Bingley, UK: Emerald Group Publishing Limited.
- Goyal, P., Rahman, Z., & Kazmi, A. A. (2013). Corporate sustainability performance and firm performance research: Literature review and future research agenda. *Management Decision*, 51(2), 361-379.
- GRI. (2013). G4 Sustainability Reporting Guidelines. Amsterdam: Global Reporting Initiative.
- Hall, B. H., Lotti, F., & Mairesse, J. (2009). Innovation and productivity in SMEs: Empirical evidence for Italy. *Small Business Economics*, 33, 20.
- Hancock, G. R., & Mueller, R. O. (2001). Rethinking construct reliability within latent variable systems. In C. R. e. al (Ed.), *Structural Equation Modeling: Present and Future*: SSI Scientific Software.
- Hoivik, H. v., & Melé, D. (2009). Can an SME Become a Global Corporate Citizen? Evidence from a Case Study. *Journal of Business Ethics*(88), 12.
- Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hull, C. E., & Rothenberg, S. (2008). Firm performance: the interactions of corporate social performance with innovation and industry differentiation. *Strategic Management Journal*, 29(7), 781-789.
- Jaffe, A. B., & Palmer, K. (1997). Environmental Regulation and Innovation: A Panel Data Study. *The Review of Economics and Statistics*, 79(4), 610-619.
- Jayal, A. D., Badurdeen, F., Dillon, O. W., & Jawahir, I. S. (2010). Sustainable manufacturing: Modeling and optimization challenges at the product, process and system levels. *CIRP Journal of Manufacturing Science and Technology*, 2(3), 144-152.
- Jenkins, H. (2009). A 'business opportunity' model of corporate social responsibility for small and medium-sized enterprises. *Business Ethics: A European Review*, 18(1), 21.
- Key Figures on European Business with a Special Feature on SMEs*. (2011). (A. Stawinska Ed.). Luxembourg: Publication Office of the European Union.
- Kurucz, E. C., Colbert, B. A., & Wheeler, D. (2008). The business case for corporate social responsibility. In A. Crane, A. McWilliams, D. Matten, J. Moon, & D. Siegel (Eds.), *The Oxford Handbook on Corporate Social Responsibility* (pp. 83-112). Oxford: Oxford University Press.
- Labuschagne, C., Brent, A. C., & van Erck, R. P. G. (2005). Assessing the sustainability performances of industries. *Journal of Cleaner Production*, 13(4), 373-385.

- Lanoie, P., Laurent-Lucchetti, J., Johnstone, N., & Ambec, S. (2011). Environmental Policy, Innovation and Performance: New Insights on the Porter Hypothesis. *Journal of Economics & Management Strategy*, 20(3), 803-842.
- Laudal, T. (2011). Drivers and barriers of CSR and the size and internationalization of firms. *Social Responsibility Journal*, 7(2), 234-256.
- Lepoutre, J., & Heene, A. (2006). Investigating the Impact of Firm Size on Small Business Social Responsibility: A Critical Review. *Journal of Business Ethics*, 67(3), 257-273.
- López, M. V., Garcia, A., & Rodriguez, L. (2007). Sustainable Development and Corporate Performance: A Study Based on the Dow Jones Sustainability Index. *Journal of Business Ethics*, 75(3), 285-300.
- Margolis, J. D., & Walsh, J. P. (2003). Misery Loves Companies: Rethinking Social Initiatives by Business. *Administrative Science Quarterly*, 48(2), 37.
- McWilliams, A., & Siegel, D. (2000). Corporate social responsibility and financial performance: correlation or misspecification? *Strategic Management Journal*, 21(5), 603-609.
- Moneva, J. M., Rivera-Lirio, J. M., & Muñoz-Torres, M. J. (2007). The corporate stakeholder commitment and social and financial performance. *Industrial Management & Data Systems*, 107(1), 84-102.
- Moon, J. (2004). *Government as a driver of corporate social responsibility*. Nottingham: Nottingham University Business School.
- Moon, J. (2007). The Contribution of Corporate Social Responsibility to Sustainable Development. *Sustainable Development*(15), 10.
- NACE. (2008). *NACE Rev. 2: Statistical Classification of Economic Activities in the European Community*. Luxembourg: Office for Official Publications of the European Communities.
- Netland, T. H., & Ferdows, K. (2016). The S-Curve Effect of Lean Implementation. *Production and Operations Management*, n/a-n/a.
- NHD. (2012). *Små bedrifter - store verdier*. Oslo, Norway: Nærings- og handelsdepartementet.
- Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009). Why sustainability is now the key driver of innovation. *Harvard Business Review*, 87(9).
- OECD. (2005a). *Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data*. Paris: OECD Publishing Retrieved from <http://dx.doi.org/10.1787/9789264013100-en>.
- OECD. (2005b). *SME and Entrepreneurship Outlook*. Paris, France: Organisation for Economic Co-operation and Development.

- Olinsky, A., Chen, S., & Harlow, L. (2003). The comparative efficacy of imputation methods for missing data in structural equation modeling. *European Journal of Operational Research*, 151(1), 53-79.
- Oppenheim, J., Bonini, S., Bielik, D., Kehm, T., & Lacy, P. (2007). *Shaping the New Rules of Competition: UN Global Compact Participant Mirror*. New York: McKinsey & Company.
- Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate Social and Financial Performance: A Meta-analysis. *Organization Studies*, 24(3), 38.
- Our Common Future*. (1987). World Commission on Environment and Development.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-Reports in Organizational Research: Problems and Prospects. *Journal of Management*, 12(4), 531-544.
- Porter, M. E. (1985). *The Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press.
- Porter, M. E., & Kramer, M. R. (2006). Strategy and Society: The link between Competitive Advantage and Corporate Social Responsibility. *Harvard Business Review*, 89(1/2), 15.
- Porter, M. E., & Kramer, M. R. (2011). Creating Shared Value. *Harvard Business Review*, 94(1/2), 17.
- Porter, M. E., & van der Linde, C. (1995). Toward a New Conception of the Environment-Competitiveness Relationship. *The Journal of Economic Perspectives*, 9(4), 97-118.
- Shah, R., & Ward, P. T. (2003). Lean manufacturing: Context, practice bundles, and performance. *Journal of Operations Management*, 21(2), 129-149.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (Fifth ed.). Boston: Pearson Education Inc.
- Waddock, S. A., & Graves, S. B. (1997). The Corporate Social Performance-Financial Performance Link. *Strategic Management Journal*, 18(4), 303-319.
- Wilson, J. (2014). *Essentials of Business Research* (Second ed.). London: Sage Publications.
- Wolff, J. A., & Pett, T. L. (2006). Small-Firm Performance: Modeling the Role of Product and Process Improvements*. *Journal of Small Business Management*, 44(2), 268-284.
- Zhu, Q., & Sarkis, J. (2004). Relationships Between Operational Practices and Performance Among Early Adopters of Green Supply Chain Management Practices in Chinese Manufacturing Enterprises. *Journal of Operations Management*, 22(3), 24.

Appendix 1 – Survey items

No.	Item
1	We strive to implement energy saving measures and / or the exclusive use of renewable energy
2	We strive to implement water-saving measures and / or responsible use of water resources
3	We strive to have increased or take sole use of materials from sustainable sources
4	We strive to reduce or eliminate impacts on local ecosystems
5	We strive to reduce or eliminate emissions of potentially harmful substances
6	We strive to reduce or eliminate emissions of greenhouse gases
7	We strive to have all products and packaging designed to be recycled or reused
8	We strive to provide customers with access to recycling and / or reuse services for all our products and packaging
9	We promote employee health
10	Everyone who contributes in our value chain is paid in such a way that it provides them an adequate standard of living
11	All of our employees receive equal pay for equal work
12	Everyone who contributes to our value chain have fair working conditions
13	Everyone's concerns is actively solicited, impartially judged and transparently addressed
14	Our products have no negative impact on human health when used as intended
15	Our customers are informed in case the use of our product could harm people or the environment
16	Our taxes are paid to the right place at the right time
17	All lobbying is for sustainable and responsible outcomes
18	We ensure environmental and social responsibility at our suppliers

How does the company's commitment to sustainability (both environment and society) affect the company's ...

- 19 ability to introduce new products and services
- 20 operating costs
- 21 risk of reputation failure
- 22 risk of a decline in sales
- 23 risk of not being able to meet future regulatory requirements

-
- The items from 1 to 18 were answered on a 1-7 Likert-type scale from 1 «Not at all» to 7 «to a large extent»
 - The items from 19 to 23 were answered on a 1-7 Likert-type scale from 1 «Very negative», 4 «No effect» to 7 «Very positive»

Appendix 2 – Tests of normality

No	Item	Mean	Skewness	S.D.	Kurtosis	S.D.	Shapiro-Wilk
1	We strive to implement energy saving measures and/or the exclusive use of renewable energy	4.8	-0.624	0.115	-0.424	0.230	0.917***
2	We strive to implement water saving measures and/or responsible use of water resources	3.89	-0.089		-0.996		0.942***
3	We strive to have increased or take sole use of materials from sustainable sources	4.20	-0.254		-0.935		0.938***
4	We strive to reduce or eliminate impacts on local ecosystems	4.52	-0.466		-0.662		0.929***
5	We strive to reduce or eliminate emissions of potentially harmful substances	5.64	-1.269		1.110		0.835***
6	We strive to reduce or eliminate emissions of greenhouse gases	4.59	-0.553		-0.611		0.925***
7	We strive to have all products and packaging designed to be recycled or reused	4.90	-0.645		-0.473		0.909***
10	Everyone who contributes in our value chain is paid in such a way that it provides them an adequate standard of living	6.10	-1.981	0.115	4.384	0.230	0.721***
11	All our employees receive equal pay for equal work	6.26	-2.289		6.369		0.674***
12	Everyone who contributes in our value chain has fair working conditions	6.48	-2.643		9.498		0.625***
13	Everyone's concerns are actively solicited, impartially judged and transparently addressed	5.97	-2.425		2.645		0.816***
19	Ability to introduce new products and services	4.46	-0.308	0.115	0.566	0.230	0.928***

20	Operating costs	3.90	-0.226	0.115	0.484	0.230	0.919***
21	Risk of reputation failure	4.53	-0.453	0.115	0.816	0.230	0.910***
22	Risk of a decline in sales	4.27	-0.383		1.105		0.898***
23	Risk of not being able to meet future regulatory requirements	4.42	-0.396		0.726		0.910***
	Sales growth rate 3 years		17.880		341.083		0.984***
	Sales growth rate 3 years ¹	0.453	4.969	0.115	24.925	0.230	0.302***
	Average operational result 3 years		8.596		100.168		0.979***
	Average operational result 3 years ¹	4.733	2.920	0.115	21.728	0.230	0.628***
	Age	38.8	3.288	0.115	21.172	0.320	0.755***
	No. Employees	39.52	2.066	0.115	4.337	0.230	0.742***

***p<0.001, **p<0.01, *p<0.05 (two-tailed)

¹Logarithmically transformed

Appendix 3 – Factor analysis results

No.	Items	Loadings	Cronbach's Alpha
Environmental practices			0.880
1	We strive to implement energy saving measures and/or the exclusive use of renewable energy	0.653	
2	We strive to implement water saving measures and/or responsible use of water resources	0.626	
3	We strive to have increased or take sole use of materials from sustainable sources	0.697	
4	We strive to reduce or eliminate impacts on local ecosystems	0.789	
5	We strive to reduce or eliminate emissions of potentially harmful substances	0.767	
6	We strive to reduce or eliminate emissions of greenhouse gases	0.826	
7	We strive to provide customers with access to recycling and/or reuse services for all our products and packaging	0.656	
Social practices			0.800
10	Everyone who contributes in our value chain is paid in such a way that it provides them an adequate standard of living	0.742	
11	All our employees receive equal pay for equal work	0.603	
12	Everyone who contributes in our value chain has fair working conditions	0.831	
13	Everyone's concerns are actively solicited, impartially judged and transparently addressed	0.661	
Reduced risk			0.881
21	Risk of reputation failure	0.882	
22	Risk of a decline in sales	0.875	
23	Risk of not being able to meet future regulatory requirements	0.780	