Aalto University
School of Business

The Impact of Sustainability in Manufacturing Companies Globally

MSc program in Information and Service Management

Master's thesis

Lotta Penttilä

2016

Department of Information and Service Economy
Aalto University
School of Business

Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

Abstract of master's thesis

Author Lotta Penttilä

Title of thesis The Impact of Sustainability in Manufacturing Companies Globally

Degree Master of Science in Economics and Business Administration

Degree programme Master's Programme in Information and Service Management

Thesis advisor(s) Markku Kuula and Katri Kauppi

Year of approval 2016 **Number of pages** 112 **Language** English

Abstract

Research objectives: This study aims at discovering 1) at what stage manufacturing companies are in their sustainability implementation on a global level, 2) whether these companies can benefit financially from sustainability implementation, and 3) are there differences both in the level of sustainability implementation and its financial implications between large and medium-sized manufacturing companies.

Academic background and methodology: The study consists of a literature review and a data analysis. The dataset used in the analyses was obtained from the sixth International Manufacturing Strategy Survey (IMSS VI) conducted in fall 2013. The international dataset originally consisted of 931 responses from 22 countries and involved manufacturing companies belonging to ISIC codes 25 to 30. The main methods of analysis used in this thesis are structural equation modeling and Mann-Whitney U test.

Main findings and conclusions:

1) Most of the studied manufacturing companies had started their sustainability journey, yet only a minority had reached a high level of implementation
2) There is a significant positive relationship between overall sustainability performance and financial performance of manufacturing companies, yet
3) the dataset did not allow to test whether this relationship is similar for both large and medium-sized manufacturing companies.
4) In addition, medium-sized manufacturing companies seem to receive less external sustainability related pressure and their implementation level of sustainability management systems and programs is lower than that of larger manufacturing companies. Yet, there was no significant difference between medium-sized and large manufacturing companies when it came to the level of operational sustainability performance.

Keywords sustainability, manufacturing, IMSS VI, sustainability pressure, sustainability management performance, operational sustainability performance, financial performance

Aalto-yliopisto
Kauppakorkeakoulu

Aalto-yliopisto, PL 11000, 00076 AALTO
www.aalto.fi

Maisterintutkinnon tutkielman tiivistelmä

Tekijä Lotta Penttilä

Työn nimi The Impact of Sustainability in Manufacturing Companies Globally

Tutkinto Kauppatieteiden maisteri

Koulutusohjelma Master's Programme in Information and Service Management

Työn ohjaaja(t) Markku Kuula ja Katri Kauppi

Hyväksymisvuosi 2016 **Sivumäärä** 112 **Kieli** Englanti

Tiivistelmä

Tutkimuksen tavoitteet: Tämän tutkimuksen tavoitteena on selvittää 1) millä tasolla kansainväliset tuotantoyritykset ovat ottaneet kestävään kehitykseen liittyviä asioita huomioon ja sisällyttäneet nämä asiat omiin toimintoihinsa, 2) onko näille yrityksille ollut tästä taloudellista hyötyä sekä 3) onko keskikokoisten ja suurten tuotantoyritysten välillä eroja sekä kestävän kehityksen toimintoihin sisällyttämisen että näiden aiheuttamien taloudellisten vaikutusten osalta.

Kirjallisuuskatsaus ja metodologia: Tämä tutkimus koostuu kirjallisuuskatsauksesta ja data-analyysi-osuudesta. Analyyseissä käytetty data on peräisin kansainvälisestä tuotantostrategia tutkimuksesta (International Manufacturing Strategy Survey , IMSS VI) vuodelta 2013. Kyseiseen kyselyyn osallistui yhteensä 931 tuotantolaitosta 22 eri maasta. Kyselyyn osallistuneet yritykset toimivat ISIC-koodien 25-30 mukaisilla toimialoilla. Analyysimetodeina tässä tutkimuksessa käytettiin ensisijaisesti rakenneyhtälömallinnusta sekä Mann-Whitney U –testiä.

Tulokset ja päätelmät:

1) Suurin osa tutkituista tuotantoyrityksistä sisällytti kestävään kehitykseen liittyviä asioita toimintoihinsa, joskin vain murto-osa yrityksistä oli saavuttanut niiden käyttöönotossa korkean tason.
2) Tutkimustulokset osoittivat, että tutkittujen tuotantoyritysten keskuudessa kestävän kehityksen ja taloudellisen menestymisen välillä on tilastollisesti merkittävä positiivinen yhteys.
3) Dataan liittyvät puutteet kuitenkin estivät tutkimasta sitä, onko isojen ja keskikokoisten tuotantoyritysten välillä eroja kestävän kehityksen ja taloudellisen menestymisen väliseen suhteeseen liittyen.
4) Lisäksi tutkimus osoitti, että keskikokoiset tuotantoyritykset kokevat vähemmän ulkopuolista, kestävään kehitykseen liittyvää painetta ja ovat sisällyttäneet kestävään kehitykseen liittyviä asioita omiin toimintoihinsa pienemmässä mittakaavassa kuin suuremmat tuotantoyritykset. Toisaalta tutkimuksessa ei löydetty merkittävää eroa keskikokoisten ja suurten yritysten välillä kun kyseessä oli saavutettu operationaalinen ympäristö- ja sosiaalinen tehokkuus.

Avainsanat kestävä kehitys, valmistus, IMSS VI, ulkoinen paine, taloudellinen menestys

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

ADF	Asymptotic Distribution-Free
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Construct Reliability
CSR	Corporate Social Responsibility
DFD	Design for Disassembly
DFE	Design for the Environment
EM	Expectation Maximization
EMAS	Eco-Management and Audit Scheme
EMP	Environmental Management Performance
EMS	Environmental Management System
EOP	Environmental Operational Performance
IMSS	International Manufacturing Strategy Survey
ISO 14001	Environmental certificate
LCA	Life Cycle Analysis
M.I.	Modification Index
MCAR	Missing Completely At Random
ML	Maximum Likelihood
OHSAS 18001	Social certificate
OSP	Operational Sustainability Performance
RBV	Resource-Based View
RMSEA	Root Mean Square Error of Approximation
ROS	Return on Sales
SA 8000	Social certificate
SEM	Structural Equation Modeling
SME	Small and Medium-Sized Enterprise

SMP	Sustainability Management Performance
SRMR	Standardized Root Mean Square Residual

1. INTRODUCTION

The aim of this thesis is to find out how important manufacturing companies see sustainability and sustainability related issues, and how does it show in their behavior. In other words, the intention is to reveal whether there exists differences between companies who engage in sustainable behavior and those who do not (or at least do less so than others). More precisely, companies will be compared in terms of their size and financial performance against their sustainability related activities to find out whether there is a relationship between these variables. I chose this particular topic for my thesis for two reasons. First, sustainability in general is a current and important topic and, second, I am also personally interested in this subject and hope to find a job related to this area of business in the future.

Environmental and social problems, including issues such as climate change, rapid population growth, poverty, inequality, extinction of species, drought, and ozone depletion, are currently threatening the future of planet Earth. Companies are often perceived to bear the main responsibility of solving these problems. Even though it can be argued, that ethics, as well as social and environmental responsibility should automatically be integrated into business activities per se, this is more likely to happen if companies can also gain financial advantage in addition to moral benefits from this integration (Molina-Azorín et al., 2009). In addition, other researchers vouch for the importance of evidence showing a positive linkage between sustainable behavior and profitability in order to ensure the adoption of sustainable practices amongst companies (Orlitzky et al., 2003; Rao and Holt, 2005).

Even if sustainability would not offer financial benefits companies need to take these issues into consideration as various stakeholders are pressuring companies to become more sustainable (Molina-Azorín et al., 2009). Kleindorfer et al. (2005) identified four factors that create the need for companies to engage in sustainable behavior, no matter what their own moral view on the topic is. These factors include (1) the expected increase in the costs of materials and energy, (2) high probability for stricter regulations and international agreements due to sustainability related public pressure, (3) increased consumer awareness that may result in higher demand for

sustainable products, and (4) growing interest from NGOs in ensuring that global companies behave sustainably.

Although, sustainability has been studied a lot, there is still room for more research. First of all, according to Crowe and Brennan (2007, p.270), "there are conflicting conclusions in the literature on the relationship of manufacturing operations with environmental performance". Similarly, research related to the linkage between sustainability and financial performance has received mixed results (Orlitzky et al., 2003; Molina-Azorín et al., 2009). In addition, it has been suggested that more research is needed considering the link between environmental management systems and environmental performance (Hertin et al., 2008). According to Molina-Azorín et al. (2009), previous research related to the relationship between environmental performance and financial performance has most often focused on US companies. A lot of the research has also focused only on the environmental or on the social aspect at a time, while the environmental aspect has received more attention (Gimenez et al. 2012).

The results of this thesis will improve the understanding of how sustainability affects manufacturing companies and how important it is seen by them. These results will also give companies a chance to see how other companies within the same industry are engaging in sustainability and compare their own level of sustainability implementation to that of others.

1.1.1. Research questions and methodology

As mentioned above, my intention is to form a picture of sustainability in global manufacturing industry. Consequently, this thesis focuses on the following research questions:

1. How widely has sustainability adoption spread in manufacturing companies?
2. How does external pressure influence the adoption of sustainability programs and management systems, and do these programs and systems and/or increased sustainability performance improve the financial performance of manufacturing companies?

3. Does company size affect the adoption rate of sustainability programs and management systems, the improvement of sustainability performance achieved, or the impact that sustainability has on a company's financial performance?

In order to find out answers to these questions, selected parts of the data collected for the sixth International Manufacturing Strategy Survey (IMSS VI) will be analyzed. The data was collected in fall 2013. This thesis consists of a literature review and a statistical analysis. More precisely, both Mann-Whitney U test and structural equation modeling (SEM) are used as the methods of analysis in this thesis.

1.1.2. Sustainability is a complex topic

Integrating sustainability into a company is a complex task especially if both social and environmental aspects are considered simultaneously (Golini et al. 2014). The complexity of sustainability shows in the research too as many researchers choose to focus only on one aspect at a time (see for example Yang et al., 2011; Schrettle et al., 2013). The facts that social issues have received less attention in OM literature (Cagliano et al., 2010 in Gimenez et al., 2012; Kleindorfer et al., 2005), that environmental and social issues are somewhat interlinked and affect each other (Schrettle et al., 2013), and that several aspects of sustainability related research has received differing results (see for instance Molina-Azorín et al., 2009; Trump et al., 2015), indicate the difficulty of the topic as a whole. Etzion (2007, p. 655) notes that similar problems occur even when environmental issues are studied separately, claiming that "research on environmental issues has failed to yield simple generalizable "truths" ". He believes that this is explained by the fact that researchers from many different fields are studying the topic with varying approaches.

This thesis will continue as follows: chapter 2 consists of a literature review on topics related to the research questions. More precisely, sustainability in general and its linkage to manufacturing are discussed, as well as the relationship between sustainability and financial performance, and the impact that company size brings to the picture. In addition, hypotheses and a structural equation model will be formed based on the literature. Chapter 3 presents the IMSS, its

background, and the questionnaire used, as well as the actual data collection phase. Chapter 4 consists of the data analysis and results. Discussions and conclusions are offered respectively in chapters 5 and 6.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In this chapter, sustainability related literature is reviewed in order to form the hypotheses, which are later tested in chapter 5. First, sustainability is discussed on a general level, after which different sustainability drivers, ways to improve companies' sustainability performance and sustainability's impact on financial performance are examined. Finally, the topic is extended by including the influence that company size has on these issues.

2.1. Sustainability and business

Perhaps the best-known definition of sustainable development is the one made by the Brundtland Commission in 1987 (p.39), which is coined around the idea that current generations should live their lives and use global resources at a rate that does not limit the chances of future generations. Perhaps a more comprehendible and useful way to define sustainability can be derived from the concept of triple-bottom-line, first introduced by Elkington in the mid-1990's (Slaper and Hall, 2011). The triple-bottom-line symbolizes the idea that the three dimensions of sustainability, namely social, environmental, and economic, combined form the basis of sustainable business. The three dimensions are seen to support each other and all three of them are needed to ensure the success of companies in the long run (Gimenez et al., 2012). However, sustainability is not philanthropy, as it aims to integrate social and environmental concerns into companies' operations and strategy in a way that ensures economic vitality (Kleindorfer et al., 2005; Etzion, 2007). Yet, companies cannot afford to disregard social and environmental issues either, as various stakeholders are demanding companies to pay attention to these issues. Lazlo and Zhexembayeva (2011, p.45) point out that sustainable value can only be created by simultaneously addressing the needs of both shareholders and other stakeholders, suggesting that shareholders seek for profitability while stakeholders are more concerned about the environmental and social impacts caused by companies. Of course, this allocation of concerns is not as straightforward and limited in reality.

The economic dimension of sustainability is rather self-explanatory, yet the other two dimensions may need some explaining. The social dimension focuses especially to the well-being of both employees and the community in which the company operates, while the environmental dimension refers to the impacts that companies' actions cause to the environment (Gimenez et al., 2012). As already mentioned, all three dimensions of sustainability are important for business, yet the role of the economic aspect is often seen superior when compared to the other aspects (see for instance Schrettle et al., 2013). This is not surprising as, like Schrettle et al. (2013) put it, the main purpose of companies in general is still to create profits and expand their businesses. In addition, the environmental and social aspects are not always treated equally either. A lot of the research reviewed for this thesis focuses only on one of these two dimensions at a time (see for instance Yang et al., 2011 and Schrettle et al., 2013) or perceives one of them as more important (see Orlitzky et al., 2003). Until recently, the social aspect of sustainability has received a lot less attention in Operations Management literature compared to environmental issues (Cagliano et al., 2010 in Gimenez 2012).

For instance, Schrettle et al. (2013) justify their sole focus on the environmental dimension of sustainability in their article by claiming that the environmental dimension creates also a social impact while the social dimension does not create an environmental impact in the same extent. Additional reasons for this may derive from the fact that environmental issues are currently seen more urgent due to the global debate considering climate change and diminishing resources, or simply because social and environmental aspects combined create a vast array of issues and it is perhaps easier and more useful to analyze sustainability related issues only from one angle at a time.

According to the same logic, which Schrettle et al. (2013) and Golini et al. (2014) emphasize, the economic dimension is considered as a self-evident aspect of business and thus the focus in this thesis is mainly on the effects of the social and environmental dimensions. When these two aspects are considered together in this thesis, they are referred to as *sustainability*. Although, the impacts of social and environmental issues are studied mainly together they are also examined separately to see whether they have a different kind of influence on the profitability of companies.

In the literature reviewed in this thesis, sustainability related issues were studied also under different concepts such as Corporate Social Responsibility (CSR). As the definition of CSR used in these studies is reasonably close to the definition of sustainability used in this thesis (see for instance Orlitzky et al., 2003 or Baumann-Pauly et al., 2013), CSR will be treated as a synonym to sustainability in this thesis, even though these two concepts do differ from each other slightly. To increase the readability of the thesis, the term CSR will not be used in the rest of this thesis, as it will be replaced with the term sustainability.

2.1.1. The current importance of sustainability

Sarkis (2001, p.666) believes that the era of seeing companies only as "a single-minded profit seeking entity" is over for good. Even though many of the environmental and social considerations related to sustainability have existed for longer than fifty years (Laszlo and Zhexembayeva 2011, p.37), it has been only recently that the public and a majority of companies have started to take these issues seriously.

Sustainability related pressure towards companies has been increasing since the 1980's (Kleindorfer et al., 2005) but the scholarly interest in environmental issues started to grow only after the Rio de Janeiro Earth Summit in 1992 and has since expanded to consider environmental issues as a part of a larger concept, that of sustainability (Etzion, 2007). In the early 1990's, there was a common belief that engaging in environmental activities would only be an excess cost to companies (Melnyk et al., 2003). However, during the 1990's the debate related to the link between sustainability and profits grew silent, as the public started to demand for sustainability improvements, despite the costs it might cause to companies (Kleindorfer et al., 2005). The public sustainability related concern and perception that companies are the ones who need to act seems valid as there appears to be a lot of room for improvement. For instance, only about 1% of the materials needed in the products sold in the United States are still in use six months after the product is sold (Lovins et al., 2007). It is no longer about whether problems like global warming and the extinction of species are happening but when, how fast, and at what scale will these issues transpire and thus companies do not need to ponder whether to participate in sustainability but instead how to do it efficiently (Kleindorfer et al., 2005).

Laszlo and Zhexembayeva (2011, p.6) offer three reasons what makes it so important for companies to engage in sustainability in today's world. They call these as the three trends of *Declining Resources, Radical Transparency and Increasing Expectations*. With *Declining Resources*, they refer to the fact that our globe is finite, and the humankind is currently using the resources at a rate, which does not allow for their renewal (Laszlo and Zhexembayeva, 2011, p.7-10). Examples of the consequences of this overuse include the extinction of species, diminishing amount of arable land, and clean water shortages amongst other issues. The second trend, *Radical Transparency* originates from the increased acceptance of the importance of both social and environmental issues amongst the public, the advances in technology and increased use of social media, as well as from the easy access to information and ability to spread it globally in a matter of seconds (Laszlo and Zhexembayeva, 2011, p.10-15). In other words, it is a lot more difficult for companies to make unsustainable decisions because they can be revealed to the public both quickly and easily and the consequences can be dreadful considering the company's corporate image and future sales. Thirdly, *Increasing Expectations* imply that customers and other stakeholder groups are more aware of the various sustainability related issues and expect companies to do their part in preventing these problems from becoming unavoidable (Laszlo and Zhexembayeva, 2011, p.15-24).

2.1.2. Manufacturing's role in sustainability

The manufacturing function has an especially important role when it comes to engaging in sustainability. In the beginning of the 21st century, Sarkis (2001) noted the key role of manufacturing and operations in establishing especially environmental sustainability within a company. In addition, he pointed out that manufacturing companies could not afford not to respond to the increasing amount of environmental concerns and pressures around them. A decade later, Schrettle et al. (2013, p.76) claim that sustainability still is "a major challenge" for manufacturing. The research results of Laugen et al. (2005), according to which environmental compatibility was one of the four best practices recognized in manufacturing companies, support this viewpoint as well. It is no surprise that manufacturing companies are the ones to most likely use environmental practices (Handfield et al., 1997), as the manufacturing industry has a bigger

environmental impact than companies operating in the service sector (Stead and Stead, 1992 in Darnall et al., 2008). The intense use of resources, energy, and water and the simultaneous creation of pollution and waste related to manufacturing activities are the main reason why especially the manufacturing function is required to take sustainability issues into consideration (Schrettle et al., 2013). Sustainability related regulation and policies, such as the Directive on Waste Electrical and Electronic Equipment and the Kyoto Protocol, can also have a straight impact on manufacturing (Crowe and Brennan, 2007).

Because many of the sustainability problems are created within the manufacturing function, manufacturing can also be a part of the solution. Indeed, multinational manufacturing companies are seen to have an important role in advancing sustainability at a global scale (Albino et al., 2009). The United States Environmental Protection Agency (EPA, 2015a, 18.10.2015) defines sustainable manufacturing as follows "*Sustainable manufacturing is the creation of manufactured products through economically-sound processes that minimize negative environmental impacts while conserving energy and natural resources. Sustainable manufacturing also enhances employee, community, and product safety.*" However, companies cannot focus only on the sustainability of the manufacturing process itself. Instead, they need to see the bigger picture and consider the total sustainability impact caused by a product during its complete product life cycle starting from the raw material extraction and ending to the product's disposal. (Bogue, 2014)

2.1.1. How companies see sustainability

As noted earlier, the importance of sustainability has increased and companies have started to take these issues more seriously. Yet, there still exists multiple ways how companies perceive sustainability and its importance and how they choose to act. In addition, even if two companies see sustainability equally important, it does not mean they would necessarily take the same action (Molina-Azorín et al., 2009) or receive similar results, due to differences both on industry and company level (Kleindorfer et al., 2005). Several authors have paid attention to these different ways to react to sustainability, and suggest that sustainability adoption happens in

stages, both on a general level (see for instance Jabbour and Santos, 2006; Baumann-Pauly et al., 2013) and within the manufacturing function (see for instance Kleindorfer et al., 2005).

To give an example, Baumann-Pauly et al. (2013) developed a framework in order to be better able to compare sustainability adoption in small and large companies. In addition, the framework indicates different reactions that companies may have towards sustainability. The framework identifies five stages, namely denial, compliance, managerial, strategic, and civil, which companies usually go through while adopting sustainability. According to the authors, each of these stages is linked to a certain level of commitment to and both internal and external integration of sustainability. Baumann-Pauly et al.'s (2013) research results show that companies may be on different stages on these three dimensions.

Companies at the denial stage do not see themselves as responsible for different sustainability related problems (Baumann-Pauly et al., 2013). One reason for this kind of reaction might be trade-off thinking. Compliance stage refers to doing the minimum that is required by laws and regulations (Baumann-Pauly et al., 2013). Realization and willingness to avoid potential liabilities related to environmental accidents, for instance, may encourage companies to move to the second stage in sustainability adoption (Kleindorfer et al., 2005). On the other hand, also managers' views related to trade-off thinking have evolved since the 1990's (Melnyk et al., 2003), suggesting that many companies have likely moved on from the stage one. In the managerial stage, companies are doing more than what is legally required from them (Baumann-Pauly et al., 2013). Companies at this stage might not yet comprehend the full potential sustainability has to offer, but they have likely started to understand the importance of sustainability and are perhaps already preparing themselves for upcoming legal restrictions. Companies that have reached the strategic stage have likely started to realize that sustainability can offer them also benefits in terms of cost savings and competitive advantage and have therefore included sustainability in their strategy (Baumann-Pauly et al., 2013). Environmental mission statements, environmental reporting, and inclusion of environmental specialists in boards and top management indicate that many organizations take environmental issues seriously and include them in their strategic decision-making (Sarkis, 2001). Companies on the final so-called civil stage are fully engaged in sustainability and collaborate with others in order to

achieve their sustainability targets (Baumann-Pauly et al., 2013). Companies such as Body Shop and Patagonia could be named as examples of companies that have reached this stage (Mirvis, 1994).

Theyel and Hofmann (2012) found that most of the firms included in their study had passed the first stage as they had adopted at least some sustainability practices. On the other hand, Crowe and Brennan (2007) found that only a minority of the studied companies were environmentally oriented. They created an environmental index and allocated the companies included in the study into three groups and found that 22 % of the companies belonged to the positive group, which indicated their environmental focus in terms of competitive priorities, action programs, performance improvement and improvement objectives. Twenty-six percent of the companies belonged to the neutral group while 53% were allocated to the negative group. Overall, it seems that companies' sustainability related perceptions and approaches vary a lot from one company to another, and although Bogue (2014) suggests that sustainable practices have become a routine to many of the global leaders such as Walmart, many companies still seem to be on the early stages of sustainability adoption.

2.2. What motivates companies to engage in sustainability

Previous research suggests that there are both internal and external reasons why companies decide to adopt sustainable practices (Darnall et al., 2008; Schrettle et al., 2013). Schrettle et al. (2013, p.76) state that outside pressure and internal realization of the possibilities, which sustainability can offer are the two main drivers that push companies towards sustainability. According to them, different stakeholder groups cause the external pressure, which is concretized via "regulation, societal values and norms, and market drivers". The internal pressure on the other hand comes from within the company and consists of the company's "strategy, culture, and resource base". Darnall et al. (2008) note, that previous research has used two different theories to explain why companies decide to adopt environmental management systems namely the *institutional theory* and the *resource-based view* of the firm. The former of these has similarities with Schrettle et al.'s (2013) external pressure while the latter is close to Schrettle et al.'s (2013)

definition of internal realization. Molina-Azorín et al. (2009, p. 1083) claim that also *stakeholder theory* has some similarities with *institutional theory* as they both see companies as "being embedded within a wider social system that shapes their behavior".

2.2.1. External motivation

According to multiple authors, institutional theory sees companies being "motivated to increase their internal efficiency and external legitimacy" (Darnall et al., 2008, p. 365). The theory contradicts the idea that companies' only objective is to create profits, as in addition they also need to ensure that they have the acceptance of their stakeholders in order to maintain their so-called "license to operate" (Suchman, 1995).

Stakeholder theory shares similarities with institutional theory, as it also suggests that social and financial objectives of companies are not at odds but instead both influence the survival of companies (Lee, 2008). Stakeholder theory is perhaps the most commonly used approach in sustainability management research (Montiel and Delgado-Ceballos, 2014) and it is also the main theory focused in this thesis in order to explain why companies adopt sustainable practices. The theory proposes that companies are embedded within the society and depend on it (Hörisch et al., 2014). It is also assumed that the success of companies depends a lot on the ties they form with different institutions and stakeholders (Donaldson and Preston, 1995). Stakeholder theory simultaneously considers a range of issues, including the financial and political aspects as well as social, environmental and ethical issues (Freeman et al., 2010 in Hörisch et al., 2014). Most importantly, it sees ethics as an important part of doing business (Hörisch et al., 2014) and assumes that companies should aim to create value not just to shareholders but also to its other stakeholders (Freeman et al., 2010 in Hörisch et al., 2014). Even though the focus of stakeholder theory is on the long-term value maximization for all stakeholders, it does not prevent profit making (Hörisch et al., 2014). Philanthropy for instance is not considered a sustainable response to stakeholder demands, as it redistributes value instead of creating new sustainable value to stakeholders (Hörisch et al., 2014). Instead, the best way to create value for stakeholders is to integrate sustainability into the company's core business (Freeman et al., 2010 in Hörisch et al., 2014).

2.2.2. Internal motivation

As opposed to the reasoning above, companies may also engage in sustainability activities out of their own interests (Wolf, 2014) if they believe they can benefit from these activities. The *resource-based view* (RBV) of the firm implies that having relevant resources and capabilities is what drives companies to adopt environmental practices (Darnall and Edwards, 2006). The resource-based view of the firm is often used to explain how companies create competitive advantage (Crowe and Brennan, 2007). Whereas institutional theory expects that all facilities respond to external pressures in the same manner (Darnall et al., 2008), the resource-based view of the firm suggests that because companies have different kinds of resources and complementary capabilities, their responses to the external pressures differ too (Oliver, 1997).

The resource-based view of the firm suggests that resources, which competitors cannot easily copy, support certain capabilities that enable a company to create a lasting competitive advantage (Rumelt 1984, in Sroufe, 2003). The potential of a competitive advantage depends on the uniqueness and usefulness of the resources and capabilities on which it is built on (Barney, 1995). A cumulative, ongoing process is what enables a company to create an inimitable competitive advantage based on its environmental performance (Etzion, 2007). Good environmental strategies often require a long time to develop (McGee, 1998).

According to Crowe and Brennan (2007), innovation and organizational capabilities are important enablers of environmentally friendly manufacturing. On the other hand, environmentally proactive attitude is likely to support the development of new resources and capabilities (Russo and Fouts, 1997). Capabilities and resources are complementary for instance to an environmental management systems (EMS) if they make its adoption easier (Darnall and Edwards, 2006). Examples of complementary capabilities and resources that might help companies to adopt an EMS for instance include previous implementation of quality management tools and health and safety management systems, as well as employee and managerial support, and investments in sustainability related research and development (Johnstone and Labonne, 2009; Darnall et al., 2008; King et al., 2005).

To sum up, these two viewpoints related to external pressures and internal willingness are not totally opposing each other but perhaps complement one another and together guide companies towards more sustainable behavior. However, only one of these approaches, the impact of stakeholder pressures will be examined more thoroughly in this thesis.

2.2.3. The role of stakeholders

As mentioned above, stakeholder expectations are one of the main drivers of sustainability adoption amongst companies. Stakeholders have become more interested in the manner in which manufacturing companies operate due to global, sustainability related problems (Schrettle et al., 2013). Stakeholders can be defined as individuals or groups who are linked to a company and are being either affected by its actions or able to influence those actions (Freeman, 1984 in Hörisch et al., 2014). The pressure caused by different stakeholders pushes companies to improve their sustainability performance more than what is required by laws and regulations (Paloviita and Luoma-Aho, 2010). Examples of stakeholder groups include customers, employees, governments, media, NGOs, shareholders, investors and competitors. Consumers and regulators are often seen as the most important of these different groups when it comes to sustainability (Etzion, 2007; Bogue, 2014). Below are examples related to regulators, consumers, and business-to-business customers, in order to show how different stakeholders influence companies' sustainability behavior.

Regulation is one of the most powerful ways to improve companies' environmental performance (Kleindorfer, 2005). Examples of how regulation can affect companies include technology requirements, environmental targets, and policies that redistribute environmental costs and benefits (Etzion, 2007). Regulation usually focuses on those industries that have big environmental footprints (Etzion, 2007). Regulation increasingly links innovation and environment (Crowe and Brennan, 2007) and especially process-focused regulation tends to promote environmentally friendly innovation (Foster & Green, 2000). Many companies are doing more than what is required by regulation because regulatory scrutiny is expensive (Kleindorfer, 2005). At times companies may even lobby for stricter regulations if they believe that it could offer them a competitive advantage (Kleindorfer, 2005).

Consumers are especially concerned about product performance and safety, as well as the caused environmental impact (Porter, 1990). As companies' economic performance depends heavily on consumers, companies are vulnerable to the way their customers perceive them (Jiang & Bansal, 2003). Consumers have both direct and indirect opportunities to restrain organizational activities that are perceived harmful (Frooman, 1999).

It can be assumed that consumers do not have much knowledge related to environmental issues (Foster & Green, 2000), which implies that green marketing might not be a good strategy (Etzion, 2007). Although some authors question the very existence of "green consumers" (Pedersen & Neergaard, 2006), Cohen (2007) claims that LOHAS-consumers (Lifestyle of Health and Sustainability) create even 30% of the end-consumer market in the US, which suggests both significant pressure towards companies as well as huge market potential for sustainable products and services. However, it is still worth to note that consumers often do not want to pay more for sustainable goods (Laszlo and Zhexembayeva, 2011, p.15).

In addition to consumers, also business-to-business customers can promote sustainability amongst their suppliers. Large, multinational companies support sustainability not only via their own operations but also by demanding sustainable activities from their suppliers (Bogue, 2014). In order to ensure the environmental friendliness of their own products, companies are participating in their suppliers' environmental performance management (Rao and Holt, 2005). However, even if the importance of environmental issues has increased, it seems that other product attributes are still more important than environmentally sound products to B2B customers (Crowe and Brennan, 2007).

Yet, Paloviita and Luoma-Aho (2010) note that related to environmental issues, the importance of different stakeholder groups has changed and nowadays customers, suppliers and the community have a more important role than earlier.

2.2.4. Stakeholder problems

Different stakeholders may have different expectations, which can sometimes make it difficult to address them (Wolf, 2014). Especially when concerning sustainability related issues, the various

stakeholders can have very different interests, knowledge, demands, and worldviews, which in some cases may conflict with one another (Etzion, 2007; Hörisch et al., 2014). For example, environmental organizations may support building a new power plant that produces renewable energy but community members may be against the plan because they want to preserve the natural environment (Hindmarsh, 2010). Wolf (2014) suggests that stakeholder pressure is potentially higher for polluting industries. According to the same logic, it is expected that manufacturing companies feel more external pressure than companies operating in other sectors do.

In addition to mismatching stakeholder demands, companies can also have a very different view on environmental issues when compared to its stakeholders, which can make it difficult to create functioning communication channels and develop mutual interests between a company and its external stakeholders (Etzion, 2007). Thus, it is no surprise that balancing between these different demands and hopes is one of the major challenges of sustainability management (Hörisch et al., 2014). In addition, environmental pressures can be difficult to predict and they often are not as direct as could be expected (Etzion, 2007).

It is good to keep in mind that all stakeholders do not need to be treated equally (Phillips et al., 2003). According to the research conducted by Buysse and Verbeke (2003), the importance of different stakeholder groups depends on what kind of environmental strategy a company has adopted. Thus it is important that managers identify those stakeholders who are involved in a certain business activity and focus on generating mutual interests between them instead of concentrating on possible trade-offs Hörisch et al., 2014). To ensure the company's long-term success, managers need to actively balance the various stakeholder interests in order to prevent more powerful stakeholders from maximizing their benefits on the costs of others (Hörisch et al., 2014).

2.3. How companies can improve their sustainability performance

Sustainability offers several possibilities for companies in general and manufacturing in particular to become more acceptable both socially and environmentally. From the environmental point of view, companies need to concentrate on minimizing resource use as well as waste and pollution creation (Bogue, 2014), while the social side of sustainability demands for ensuring product safety as well as the safety and equal treatment of employees (Gimenez et al., 2012), for instance. According to Melnyk et al. (2003), companies have a variety of options to improve their environmental performance, with which they may attempt to either reduce the problem, or prevent it from happening. According to Schrettle et al. (2013), the decisions companies make and the actions they take concerning sustainability issues can be either ad-hoc or strategic. By ad-hoc, they mean initiatives that improve, for instance, the current processes while strategic decisions often require a more radical change.

Schrettle et al. (2013) identified switching to a new, more sustainable manufacturing technology, developing more sustainable products, and implementing green practices throughout the supply chain as examples of how companies can become more sustainable. Rao and Holt (2005), on the other hand, list cleaner production, design for environment, remanufacturing and lean production as examples of how the production function can be made more environmentally friendly. In his article, Sarkis (2001) offers examples of how these different aspects can be made more environmentally friendly. First of all, products can be made more sustainable by considering the concepts of design for the environment (DFE), life cycle analysis (LCA), product stewardship, design for disassembly (DFD), and packaging considerations (Sarkis, 2001). Simply put, these concepts allow companies to consider the impacts their products have on the environment all the way from raw material sourcing until their final disposal. In order for the products to be sustainable, the total negative impact caused to both the environment and society needs to be minimized. Secondly, in order to make the manufacturing process more environmentally friendly, the potential developments include initiatives related to reduction, reuse, and recycling of materials and remanufacturing of goods, which often simultaneously lead to minimization of waste (Sarkis, 2001). A closed-loop manufacturing system in which for instance waste water is

reused is an example of how both costs and the amount of waste created are reduced at the same time (Sarkis, 2001). Thirdly, also the practices used within the company should support the company's environmental performance and it needs to be ensured that all employees are aware of the importance of these issues to the company (Sarkis, 2001).

As there are various ways that companies can use to improve sustainability, it is essential that companies compare different sustainability initiatives and decide which best suit their particular needs (Schrettle et al., 2013). In addition, if a company wishes to truly excel with the help of sustainability it is not enough that sustainability is integrated in the company's current business strategy, but instead sustainability should be used in a way that lifts the current strategy to the next level and offers the company new possibilities (Stubblefield Loucks et al., 2010).

Even though it can be argued that companies are responsible of the impact to the environment all the way from raw material extraction, via transportation, production, and use until the final disposal (Hertin et al., 2008), this thesis focuses on what happens inside the manufacturing unit. Of course, the decisions related to sourcing for instance are made by the company owning the manufacturing unit yet sustainable supply chain management is excluded from the analysis.

According to Gimenez et al. (2012), companies adopt different programs in order to improve their social and environmental performance. In addition to minimizing their environmental impact, companies need to include health and safety metrics in their processes and measure their sustainability performance in order to obtain sustainability (Kleindorfer et al., 2005). The adoption of environmental and social management systems might be the easiest way for companies to achieve this target.

2.3.1. Environmental and social management systems

The use of management systems is a common approach used by companies in order to improve their performance. Both social and environmental management systems (EMS) and standards exist in order to allow companies to minimize their total sustainability impact. However, there exists a lot less literature related to the use of social management systems in manufacturing when

compared to the literature considering EMSs. For instance, a search done on the *EBSCOhost Academic Search Elite* –database using the search words "social management system" resulted only two articles and "sustainability management system" received six results, while "environmental management system" received multiple hits compared to the other two, totaling in 409 articles. Quite similar results were received by using the names of both social and environmental certificates as the search words. Both environmental and social management practices and standards can, however, be distinguished from the IMSS questionnaire. As it is assumed that both social and environmental management systems function in a similar manner and due to scarcity of literature related to social management systems, mainly environmental management systems will be discussed more thoroughly in this chapter.

Environmental management consists of a range of initiatives and programs that aim to minimize the environmental effects caused by a company, at the same time reducing both costs and risks related to non-compliance and improving corporate image (Rao and Holt, 2005). United States Environmental Protection Agency defines EMSs as systems that include processes and practices that allow companies to improve their operational and environmental performance simultaneously (EPA, 2015b, 29.10.2015). Melnyk et al. (2003, p.332) are more precise in their definition of EMS as a "formal system and database which integrates procedures and processes for the training of personnel, monitoring, summarizing, and reporting of specialized environmental performance information to internal and external stakeholders of the firm". The internal information is used mainly in order to improve the company's environmental performance while the main goal of external reporting is to enhance the image of the firm (Melnyk et al., 2003). According to Darnall et al. (2008), EMSs can be used as a response to external pressures and improve the legitimacy and business performance of the company.

An EMS can be nonexistent, informal, formal, or certified (Melnyk et al., 2003). Examples of certified EMSs include ISO 14001 and EMAS, while social standards OHSAS 18001 is related to health and safety management (King et al., 2005) and SA 8000 focuses mainly on worker and human rights (Social Accountability International, 2014). It is evident that environmental certifications have received more attention from companies, as the number of SA 8000 certified facilities was 3 727 (4/16) (Social Accountability International, 26.5.2016) while those having

EMAS totaled 9 271 (5/2016) (EMAS 26.5.2016) and around 250 000 facilities had acquired ISO 14001 by the end of year 2015 (ISO, 25.6.2016). The current number of facilities with OHSAS 18001 certificate remains unclear, yet in 2005 there were around 16 000 companies with OHSAS 18001 certification (BSI Group 26.5.2016).

EMS implementation necessitates the development of internal environmental objectives and policies, arrangement of training for employees, establishment of documentation practices and measurement of company's environmental performance (Jiang & Bansal, 2003). Due to differences between companies as well as standard requirements, there are a variety of environmental activities that can be included in an EMS (Coglianese and Nash, 2001 in Darnall et al., 2008). The aim of EMS certificates is to help companies to create systematic approaches to improving their environmental performance (Hillary, 2003). It is generally assumed that EMS adoption is necessary in order to achieve waste and pollution reductions and that their use positively influences also companies overall performance (Melnyk et al., 2003).The purpose of EMSs is to modify operations, processes, and products in a way that prevents environmental impacts from happening (Darnall et al., 2008). In addition, EMSs aim to achieve a continuing environmental improvement (Kitazawa and Sarkis, 2000). While EMSs focus largely on the products and processes, health and safety management systems focus more on employees and aim to reduce injury rates and number of accidents, and to improve emergency response (Darnall et al., 2008).

According to Sroufe (2003), manufacturing managers have noticed the importance of EMSs in managing environmental practices yet they have faced difficulties in their attempts to develop such EMSs that are able to tackle the various environmental problems. Furthermore, the implementation process of sustainability programs can be rather difficult, as it usually requires redesign of organizations based on existing organizational capabilities (Mohrman and Worley, 2010). In addition, many companies face problems in their attempts to spread sustainability programs into their manufacturing networks globally (Dyllick and Hockerts, 2002).

2.3.2. Difference between certified and non-certified management systems

There seems to be some important differences between certified and non-certified management systems. Therefore, it is purposeful to briefly go through some of these differences related to environmental management systems. Certified management standards offer a standard set of practices to be implemented and a system to inform external parties of the use of these practices. However, they do not set any specific limits for business outputs such as certain pollution levels for example. (King et al., 2005)

Environmental certification requires an EMS adoption, yet a company can have an EMS in place even if it does not have a certification (King et al., 2005). However, according to the results received by Johnstone and Labonne (2009), facilities that have a certified EMS in place are more likely to have also other environmental management tools. This implies that, companies who have acquired a certification also aim at improving their environmental performance. However, the reasons behind EMS adoption can differ from the decision to certify it as the first one is more of an internal act while the motivation for the latter may be external (Johnstone and Labonne, 2009), since as opposed to the act of certification, EMS implementation does not necessarily show outside of the company (King et al., 2005). The results obtained by King et al. (2005) confirm that companies have different reasons for adopting an EMS and for certifying it. Facilities may adopt an EMS in order to improve their environmental management and environmental performance. Yet, often neither the existence of an EMS nor its quality is observable to external parties. Via certification, companies can alleviate this issue by being able to inform outsiders about the presence of an EMS. (Johnstone and Labonne, 2009)

Asymmetric information between sellers and buyers causes selection and monitoring problems, which companies may try to solve by acquiring certification (King et al., 2005). Information asymmetries are likely to increase as physical, social, cultural, and institutional distances increase (Caves, 1982 in King et al., 2005). It is commonly assumed that the use of EMSs signals of a superior environmental performance and therefore certifying it can be a way to inform others of this superior performance (Johnstone and Labonne, 2009). Therefore, certification can be a useful way for a company to communicate to both buyers and regulators of the existence of

their environmental management practices (Johnstone and Labonne, 2009). Due to lack of information, buyers may prefer suppliers with a certificate even if in reality their environmental performance might be worse than those without a certificate (Johnstone & Labonne, 2009).

The results obtained by Johnstone and Labonne (2009) confirm that facilities adopt EMSs and certify them in order to both improve their environmental performance and to signal this performance improvement to others in the market. The importance of signaling is high especially for larger facilities (Johnstone and Labonne, 2009). On the other hand, King et al.'s (2005) research indicates that while regulators increased the likelihood of a functioning EMS they did not increase the likelihood of certification whereas supply chain partners increased the likelihood of ISO 14001 certification but did not influence the probability of having an EMS.

However, also other reasons may be behind the decision to certify. It has been suggested, for instance, that certification may also be used to share information and increase the credibility in internal communication (King et al., 2005; Johnstone and Labonne, 2009). In addition, it seems that ownership structure may influence the decision to certify (King et al., 2005). An interesting notion was made by King et al. (2005), as according to their research results it seems that companies with lower environmental performance are more likely to certify than companies with higher performance, which implies that certification does not serve as a signal of higher environmental performance. Instead, certification seems to confirm the existence of a functioning EMS and refers to continuous performance improvement efforts (King et al., 2005).

All in all, it seems that the reason to adopt an EMS is usually related to the willingness to improve environmental performance, while a set of other reasons including at least both external and internal communication are behind the decision to certify an EMS. Therefore, it may be reasonable to study the impacts of sustainability certificates and sustainability programs on companies' financial performance separately.

2.3.3. Sustainability performance

Sustainability performance can be thought to combine environmental and social performance. According to Trump et al. (2015), researchers have different opinions how environmental performance should be defined and measured. In their article, they came into the conclusion, that the best definition for environmental performance is the one provided by the International Organization for Standardization (ISO standard 14031, 1999, in Trump et al., 2015, p.188) which states that environmental performance is "the results of an organization's management of its environmental aspects". Similarly, sustainability performance is defined here as the results of an organization's management of its environmental and social aspects.

In addition, Trump et al.'s (2015) research suggests that environmental performance actually consists of two dimensions, environmental management performance (EMP) and environmental operational performance (EOP). The former of these is close to the activities included in an EMS while the latter equals the outcomes caused by these activities (Trump et al., 2015). Moreover, these two dimensions should not be combined together as according to Trump et al.'s (2015) findings their relationship seems weak. Instead, the dimensions are interrelated, as EMP allows the improvement of EOP while EOP captures the firm's EMP outcomes and therefore these two dimensions should not be studied separately either (Trump et al., 2015).

Although there exists previous research based on the same or at least similar ideology (see for instance Yang et al., 2011), the majority of earlier studies consider this linkage differently or at least has not included both of these dimensions in their analysis in the same way as Trump et al. (2015) propose. Molina-Azorín et al. (2009) analyzed the results of different quantitative studies related to the impact of environmental management on financial performance and found that out of the 32 studies only six (18.8%) had included both EMP and EOP variables in their study. In their literature review Trump et al. (2015) found even larger difference as while 34% of the studies used both EMP and EOP variables a majority of them combined all these variables together instead of considering them as interlinked sub-dimensions, resulting that only around 2.4% of studies applied Trump et al.'s (2015) logic. Also other authors have stepped out and offered their view on how sustainability performance should be measured. For instance, Orlitzky

et al. (2003) claimed that only social and environmental performance outcomes should be included in sustainability performance.

Although Trump et al.'s (2015) view on how the different dimensions of environmental performance should be dealt with is not the most used amongst previous research it seems to be more justified than many of the others. After all, Trump et al. (2015) argue that different researchers have used different ways to measure environmental performance and in addition many of them have failed to test the content and construct validities of these measures. As it is fairly reasonable to assume that also social performance consists of similar dimensions as environmental performance and therefore a similar view is adopted in this thesis considering the linkage between sustainability management activities and the outcomes achieved through them.

Inconsistent and inconclusive findings seem to be more of a rule than exception when it comes to sustainability related research. For instance, Hertin et al. (2008, p.259) state in their research that "there is currently no evidence that [certified] EMS have a consistent and significant positive impact on environmental performance" whereas King et al. (2005, p.1103) concluded that "we did not find, however, any evidence that the certification process itself leads to improvement or that certification is a signal of superior performance". On the other hand, Johnstone and Labonne (2009) noted that several studies had found a positive linkage between EMS use (both certified and uncertified) and environmental performance and Yang et al. (2011) found a positive linkage between environmental management practices and environmental performance. Both Orlitzky et al. (2003) and Molina-Azorín et al. (2009) claim that there exist both positive and negative results related to the link between environmental issues/sustainability and profits.

While Trump et al. (2015) doubt the results received by previous research due to the various different measures used for environmental performance, Hertin et al. (2008) criticize previous studies related to the link between EMSs and environmental performance from making conclusions based on analysis conducted with insufficient environmental performance data. Yet, they acknowledge the fact that especially comparable quantitative data related to the actual environmental outcomes is often very difficult to obtain. Hertin et al. (2008) also point out that despite the attempts, there does not exist a standard approach to measuring environmental

performance. Trump et al. (2015) note that environmental performance can only be observed via different indicators and that while the sub-dimensions of environmental management performance are more or less universal, the most important environmental operational performance indicators are not the same for every company. In addition, according to Trump et al.'s (2015) results, the EOP dimension seems to be multidimensional. These issues explain at least partially why it is so difficult to collect easily comparable data on sustainable performance. However, at least companies themselves need to be able to measure and collect data related to their operational sustainability performance internally, in order to ensure the effective implementation of both social and environmental management (Yang et al., 2011).

In addition to the data related problems, both the complexity of sustainability issues and the fact that companies can be very different from each other in terms of ownership and organization structures, for example, can make it difficult to interpret the internal linkages between the two dimensions of sustainability performance. Also, contextual factors, such as company size or regional differences, may influence companies' overall sustainability performance by affecting either one or both of the dimensions (Yang et al., 2011).

What matters as well, is how companies decide to engage in sustainability and how they implement it. For instance, including employees in the adoption process of environmental practices is very important (Florida, 1996) as is the quality of the EMS (Coglianese and Nash, 2001 in Hertin et al., 2012). What is perhaps even more important, however, is that the environmental strategy fits well to the overall strategy of the company (Etzion, 2007). The realization of the potential value of environmental performance supports the adoption of environmental management practices (Yang et al., 2011) while the commitment to EMS increases its chance to succeed in obtaining this value (Sroufe, 2003). For environmental programs to succeed, it is also essential that companies learn to cooperate both internally across different departments and externally with actors outside their own organization (Sarkis, 2001). All these factors are important to ensure that a company achieves the best possible sustainability performance. However, it can be a rather difficult task to come up with a way to measure them comparably and in large scale, and that can make it complicated to include these factors in quantitative studies.

The complexity of sustainability related issues shows for instance via the results obtained by Gimenez et al. (2012). Their research concluded that internal environmental management programs did not influence only environmental performance but also social performance. Similar results were obtained considering internal social management programs and in all cases, the impact was positive.

These various examples indicate that the linkages within the dimensions of sustainability performance are both intertwined and complicated, yet intriguing. Companies implement environmental management practices in order to improve their environmental performance (Yang et al., 2011) and the same can be assumed from social management practices (Gimenez et al., 2012), even if there might also exist additional reasons for this kind of behavior related for example to image improvement attempts. As the main purpose of EMSs and SMSs is to improve companies' environmental and social operational performance, it is justified to assume this also happens despite the somewhat mixed previous results. Even though there are some differences between certified and uncertified management systems, they are both expected to improve companies' environmental and social operational performance.

2.4. The financial impact of sustainability

Many of the above-mentioned issues that influence the link between sustainability management performance and operational sustainability performance also impact the potential financial gains that can be made by improving one's sustainability performance.

Due to sustainability's potential to solve a magnitude of urgent, global problems, it is important to prove that adopting sustainability is profitable in order to ensure its acceptance amongst companies. However, it is understandable that there often needs to exist a concrete business case for sustainability before a company will decide to engage in it. Even though sustainability is, or at least should be, an important concept as such, evidence of how companies can benefit from it financially is also required in order for companies to decide to adopt environmental practices (Molina-Azorín et al., 2009). Similarly, Rao and Holt (2005) claim that the link between green

supply chain management practices and economic benefits needs to be proved in order for companies to adopt these practices. Orlitzky et al. (2003) believe that evidence of the link between sustainability performance and financial performance might increase managers' interest in sustainability as a tool to improve their profitability. On the other hand, managers will need to consider the environmental and social aspects related to their business in any case as otherwise they might jeopardise the company's future success (Molina-Azorín et al., 2009).

Especially the relationship between environmental and financial performance has received a huge interest amongst researchers (Smith, 2003). Yet, it seems that more research related to this topic is still needed as even though a majority of previous research seems to support a positive correlation between sustainability and financial outcomes, opposite results have been obtained too (see for instance Molina-Azorín et al., 2009 and Orlitzky et al., 2003).

It has been long debated whether sustainability is simply an extra cost or a potential creator of competitive advantage, business value, and profits. Laszlo and Zhexembayeva present in their book *Embedded Sustainability* (2011, pp. 60-68) eight different viewpoints of how sustainability can be seen as either destroying or creating value for companies. According to them, companies can treat sustainability as a mere cost, as a potential risk to be managed, or as a way to reduce costs via eco-efficient solutions. More advanced viewpoints include using sustainability as a way to differentiate products, as a source of innovating new products that help customers to become more sustainable, or as a chance to improve their corporate image. In addition, companies that excel in sustainability can make it harder for less sustainable competitors to compete if they succeed to influence a stricter environmental legislation, for instance. The last viewpoint sees sustainability as a source of radical innovation, which can lead to a total restructuring of the current business. Orlitzky et al. (2003) claim that decades' worth of empirical data shows that sustainability should no longer be considered just as a cost. Yet, many still seem to hold on to this view (Molina-Azorín et al., 2009). It is important to understand how environmental management, for instance, influences companies' performance in order to alleviate this trade-off view (Russo and Fouts, 1997).

According to the instrumental stakeholder theory, which is one of the three versions of stakeholder theories, the satisfaction of different stakeholder groups leads to a positive relationship between sustainability performance and financial performance (Donaldson and Preston, 1995). Stakeholders are satisfied when companies create sustainability-based value both for themselves and to their stakeholders (Hörisch et al., 2013). Hörisch et al. (2013) offer an example of how sustainable value can be delivered to various stakeholders at the same time. According to them, when a company produces organic goods, it simultaneously creates value for customers who are looking for sustainable products at a decent price, allow employees to be proud of their work, enables the company to find and retain qualified employees, while the local community can enjoy from a less polluted environment, and employees, investors and suppliers all get their share of the profits the organic goods provide.

Although stakeholder pressure is one of the reasons why companies engage in sustainability, the same stakeholders do not always reward companies for their sustainable behavior in a way that one could have expected. According to Stubblefield Loucks et al. (2010), it might not be easy to use sustainability to attract profitable customers. Even though some product categories, such as organic milk for instance, allow for premium pricing (Anstine, 2007), it is not something companies can count on. For instance, in certain product categories customers are not willing to pay more for sustainable goods than for similar, but less sustainable goods (Anstine, 2000), while in others they might even prefer to buy less sustainable goods over sustainable goods (Luchs et al., 2010). Instead, consumers are increasingly expecting to receive smart, sustainable products for decent prices (Laszlo and Zhexembayeva, 2011, p.15).

Therefore, companies need to find other ways to benefit from sustainability than premium charging. Overall, sustainability adoption usually creates new costs as well as decreases them. However, it also has the potential to bring financial benefits in various ways. As mentioned earlier, both the adoption of sustainability programs and the level of sustainability performance can influence the financial performance of a company. These two aspects and their affects are in many ways related to each other, yet their impacts can also be distinguished at least to a certain extent.

2.4.1. The influence of sustainability management performance on financial performance

Determining the influence that sustainability management performance has on companies' profitability is a complex issue. Even though it is acknowledged that sustainability management performance does not consist of the use of management systems alone, in order to both simplify the issue and due to data restrictions, from now on the focus will only be on that part of sustainability management performance.

In addition to consisting of two kinds of management systems, environmental and social, they can be either uncertified or certified management systems. As pointed out earlier, there has not been a consensus amongst the researchers how the concepts of environmental management and environmental outcomes, for instance, should be treated (Trump et al., 2015). As previous literature has addressed the linkage between all of these issues and profitability both separately and combined in a variety of ways without always being clear about which constructs they actually study, it is not always easy to compare the previous findings against each other.

In the light of previous research, it seems that even though mixed results exist, sustainability as whole has a positive influence on companies' financial performance (Orlitzky et al., 2003; Molina-Azorín et al., 2009). Molina-Azorín et al. (2009) conducted a literature review on previous quantitative studies concerning the environmental management and the financial performance of companies. They found that many researchers have studied this particular relationship but reached differing results. Yet, a majority of the studies (21/32) included in the literature review indicated the existence of a positive linkage between environmental management and/or environmental performance and economic performance. The results of the meta-analysis conducted by Orlitzky et al. (2003) indicate that there is a positive correlation between sustainability performance and financial performance.

However, the role of sustainability management performance in guaranteeing companies' success is less clear. Darnall et al. (2008) claim that only little is known of EMSs ability to create value for companies, yet evidence of potential financial benefits exists. Yang et al. (2011)

studied the influences of environmental management and environmental performance on companies' market growth and profitability and found that environmental management had a direct negative impact on market growth and profitability but an indirect positive influence via improving companies' environmental performance. The results obtained by Darnall et al. (2008) indicate that facilities with more comprehensive EMSs have a positive business performance. Similarly Golini et al. (2014) noticed in their research a positive correlation between the sustainability investments made by companies and their business performance. Gimenez et al. (2012) studied how the use of internal environmental and social programs influence the environmental, social, and financial performance of companies and found that environmental programs result in a positive impact on all three performance levels while social programs had a positive impact only on social and environmental performance.

Sustainability related management systems and especially EMSs are expected to have a direct impact on companies' financial performance in terms of implementation and operating costs (Johnstone & Labonne, 2009). According to Melnyk et al. (2003), the implementation of an EMS as well as its certification can be expensive and require a lot of time. It has been estimated that the implementation and auditing of an EMS for one facility alone can cost between $25,000 and $100,000 (Kolk, 2000 in Potoski and Prakash, 2005). It can be assumed that the implementation of an uncertified EMS will be less expensive than a certified EMS as they both require the implementation of an EMS while the certification is likely to cost extra. Although, there exists evidence suggesting that companies with better environmental performance have to pay less for obtaining an EMS and ISO 14001 certification (King et al., 2005) the costs can still be expected to be considerable. In addition to the monetary costs of implementation, environmental management practices require time in order to design work and train employees (Yang et al., 2011).

As the implementation of these sustainability management systems can be quite expensive, it is likely (at least in the short term) that the costs are bigger than the gains, resulting in a negative change in the economic performance of a company (Yang et al., 2011). In addition to implementation and operating costs, EMS adoption can also create unexpected costs if major changes are required in the company's technology for instance (Hertin et al., 2008). It has also

been suggested that engaging in environmental management practices ties down resources thus preventing companies from pursuing other important projects (Walley and Whitehead, 1994).

If the views of Yang et al. (2011) and Trump et al. (2015) are combined, it can be considered, that sustainability management performance has an indirect impact on company's financial performance through the changes it has created in the company's operational sustainability performance. On the other hand, sustainability management performance can also influence companies' financial performance via reputational and image improvements. Orlitzky et al. (2003) for instance recommend managers to use sustainability performance as a "reputational lever" as their research results indicate that reputation improvement is the main source of sustainability related benefits.

As mentioned earlier, uncertified management systems do not tend to show to those outside of the company while certified management systems do (King et al., 2005). The fact that a company has an environmental or social management system in place can have a positive impact on its reputation if it is communicated to stakeholder groups. Therefore, certified management systems can improve a company's reputation leading to potential improvements in financial performance as well, whereas uncertified assumedly cannot achieve the same benefits (unless these companies have another way to inform their stakeholders about their sustainability performance). Communicating one's sustainability performance to stakeholders can enhance the company's image in the eyes of suppliers, customers, and investors (Fombrun and Shanley 1990). As the use of EMSs for instance can be interpreted as a commitment to minimizing environmental footprint, certification may benefit companies financially via image improvements, regardless of how much the use of that EMS actually improves the company's environmental performance. Improved reputation can result for instance in a growth in sales or enable premium pricing (Rivera, 2002).

Overall, only implementation and operating costs and reputational benefits are assumed to have a direct impact on financial performance, while the rest of costs and benefits are assumed to be caused by operational sustainability performance.

2.4.2. The influence of operational sustainability performance on financial performance

Operational sustainability performance includes both environmental operational performance and social operational performance. Improvements in environmental outcomes are usually related to products and processes while improvements in social outcomes are more focused on the well-being of the employees and the surrounding community. Operational sustainability performance improvements can influence companies' financial performance in multiple ways.

According to Yang et al.'s (2011) results, environmental (operational) performance improvements have a positive influence on companies' financial performance. Examples of how environmental performance improvements affect a company's financial performance include reduced resource consumption, which simultaneously improves efficiency and reduces operating costs and the amount of emissions and waste generated (Sarkis, 2001; Rao and Holt, 2005; Yang et al., 2011). Also social initiatives can create cost savings. According to Gimenez et al. (2012), social initiatives can reduce costs via reduced absenteeism and reduced amount of industrial accidents. In addition, employees whose well-being is improved are likely to be more motivated which can increase their productivity and commitment, and thus reduce costs. On the other hand, Gimenez et al. (2012) note that improved social performance can also increase manufacturing costs if it slows down work.

In addition to cost savings, operational sustainability performance can lead to other financial benefits too. Yang et al. (2011) found that improved environmental performance had a positive impact to manufacturing companies' sales and market growth and suggest that it may be caused by the positive impact of environmental performance on the companies' brand equity. Orlitzky et al. (2003) claim that improved sustainability performance increases companies' reputation which in turn has a positive impact on companies' financial performance. Sustainability reputation can for instance attract better employees (Turban and Greening 1997

) or environmentally conscious consumers (Elkington, 1994). According to Rao and Holt (2005), good environmental performance can lead to both increased sales and revenue and in addition, it can create new market opportunities for the company. Increased reputation can also help

companies to keep their so-called “license to operate” due to increased acceptance amongst stakeholders.

It seems that social and environmental issues affect financial performance in different ways. One of the most common ways to benefit from environmental programs is via reduced costs related to resource, energy, and water consumption and waste reduction. Even though social programs can also reduce costs (Gimenez et al. (2012), it seems that in general, environmental programs have a larger potential to reduce costs than social programs do. Orlitzky et al. (2003) found in their research that reputational improvement is the main source of sustainability related financial benefits. In addition, they found differences in the impacts of environmental and social issues, suggesting that the impact of environmental performance is smaller than that of social performance when it comes to influencing a company’s financial performance. Perhaps then, the positive impacts of improvements in social operational performance are more related to reputation and image.

All in all, both environmental and social operational performances and, therefore, operational sustainability performance as a whole, are expected to have a positive impact on companies’ financial performance. Yet, it might be a good idea to also investigate the individual impacts of these two sustainability aspects as their influence methods seem to be somewhat different. In addition, the research results obtained by Gimenez et al. (2012) support this idea too, since these results indicated differences in the financial impacts of social and environmental programs. According to the results, environmental programs had a positive financial impact while the impact of social programs was negative.

2.5. Hypotheses formation and the hypothesized structural equation model

In the light of the reviewed literature, the relationship between sustainability and financial performance is rather complex. The following hypotheses related to this relationship were made

based on the literature. These hypotheses form a structural equation model, which is also shown below.

As stakeholder pressure is considered to push companies towards more sustainable behavior and the use of environmental and social management systems and programs are perceived as a method to obtain improved operational sustainability performance it is hypothesized, that

> **H_1**: Sustainability management systems and programs mediate the positive relationship between external sustainability pressure and operational sustainability performance.

In addition, companies with improved sustainability performance are expected to increase their financial performance due to better-fulfilled stakeholder expectations, improved environmental efficiency and more motivated workforce. The financial benefits can be realized for instance in terms of increased market share, reduced costs, and increased efficiencies. Thus it is hypothesized, that

> **H_2**: Improved operational sustainability performance mediates the positive relationship between the adoption of sustainability management systems and programs and a company's financial performance.

These two hypotheses lead to a third hypothesis that combines H_1 and H_2:

> **H_3**: Improved sustainability management performance combined with improved operational sustainability performance mediate the positive relationship between external sustainability pressure and a company's financial performance.

2.5.1. Hypothesized structural equation model

The hypothesized model can be seen below in figure 1. The arrows depict the individual hypotheses introduced above. The hypothesized model is analyzed further in section 4.3.

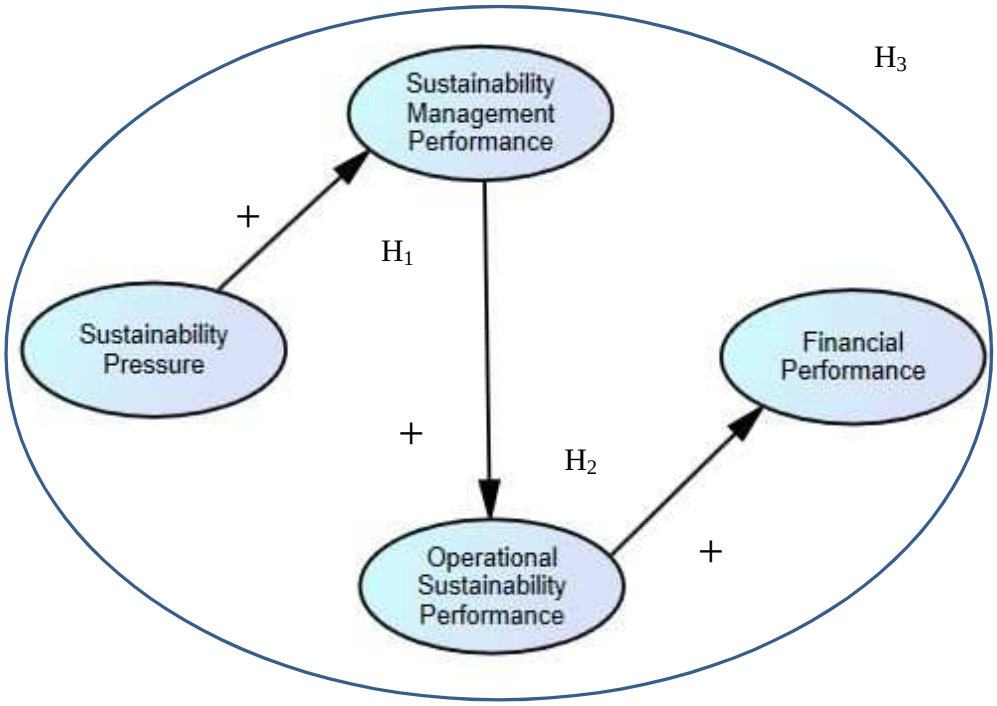


Figure 1 The hypothesized model

2.6. Sustainability and size

It has been commonly acknowledged that firm size influences companies' sustainability behavior (Murillo and Lozano, 2006; Etzion, 2007). The general impression is that large companies are both better equipped to adopt sustainable practices (Baumann-Pauly et al., 2013) and more responsible for advancing sustainability, yet especially since the beginning of the 21st century the importance of engaging also SMEs in sustainability has been noted both by the public and governments (Murillo and Lozano, 2006).

The European Commission (13.10.2015) defines Small and Medium sized companies (SMEs) as companies with less than 250 employees (< 50 for small companies) and with a turnover of €50M or less (≤ €10M) or the balance sheet total of maximum of €43M (≤ €10M). Even though it has been largely ignored in the past, the sheer amount of SMEs makes them an important factor when considering sustainability (Stubblefield Loucks et al., 2010). Compared to larger companies, an SME's individual sustainability impact can be relatively small, yet combined their impact becomes remarkable. In Finland, there were around 354 000 companies in 2013, of which

99.1% employed less than 50 people and only 0.2% had more than 250 employees (Statistics Finland 13.10.2015). On the other hand, nearly two-thirds (65.9%) of the workforce in Finland was employed by small and medium sized organizations in 2013 (Statistics Finland 13.10.2015). On the EU level, 99% of companies are classified as SMEs (European Commission 13.10.2015). Therefore, it is important to engage also SMEs in sustainability.

SMEs' sustainability practices have been studied less than those of larger companies (Baumann-Pauly et al., 2013). Stubblefield Loucks et al. (2010) note that SMEs in general still need more proof of the benefits of sustainability in order to adopt it. Therefore, it is justified to study whether SMEs and large companies gain similar financial benefits from adopting sustainability. Also Yang et al. (2011) suggest that future study could focus on the differences between small and large companies related to the adoption of environmental practices and consequent performance outcomes and the reasons why these differences exist.

Even though the literature reviewed here focuses on SMEs, this thesis actually studies the difference between medium sized and large companies because small companies were excluded from the IMSS VI. Yet, it is perhaps more purposeful to focus on the differences between medium sized and large companies, as small and medium sized companies can be very different from each other. After all, SMEs form a very heterogeneous group of companies including firms with just one employee up to entities with 249 employees, which makes it difficult to estimate their impacts on the environment or create common solutions to decrease these impacts (Murillo and Lozano 2006; Hillary, 2003).

2.6.1. Main differences between small and large companies when it comes to sustainability

Small and large companies differ in a variety of ways when it comes to sustainability behavior. Differences can be found in motivational factors, implementation as well as benefits. In the following paragraphs, the biggest differences are explained briefly.

Motivation

First issue that separates small companies from large ones is the amount of sustainability related pressure they receive from different stakeholders. Even though smaller companies also experience remarkable environmental pressures (Johansson and Winroth, 2010) and new environmental and social legislation at least in Europe tends to also include SMEs into its domain (Esty and Winston, 2006 in Stubblefield Loucks et al. 2010), they seem to experience less pressure from stakeholders when compared to larger companies (Holt and Ghobadian, 2009; Jiang and Bansal, 2003). Similar conclusions have also been made related to the social aspect of sustainability: large companies face more pressure to increase their social performance from the public than smaller companies do (Theyel and Hofmann, 2012). It seems that the lack of stakeholder pressure on SMEs limits SMEs sustainability actions, or at least does not promote them to the same extend as it does for larger companies. Hillary (2003) names the lack of pressure from customers and the low awareness of environmental issues as reasons why many SMEs do not invest in environmental improvements. Visibility can be named as the second factor and it is closely related to experienced pressure. Larger companies tend to have more visibility, which usually results in greater sustainability pressures (Jiang and Bansal, 2003).

A third factor related to the differences in experienced sustainability drivers are the values of owner-managers. According the results obtained by Baumann-Pauly et al. (2013), three factors influence SMEs decision to adopt sustainable practices in the first place. These factors are the industry, within which the company operates the personal motivation of the owner-manager of the company, and the potential involvement in global supply chains. Murillo and Lozano (2006) also vouch for the importance of owner-managers personal motivation. They studied the sustainability practices of four Spanish SMEs that are well known for their sustainability activities, and found that the founder's values and perceptions were one of the main drivers of the sustainability related behavior of these companies. In addition to moral reasons, a number of other factors such as concern for employee welfare and competitivity considerations influenced SMEs sustainability related decision making process (Murillo and Lozano, 2006).

Resources & competencies

In addition to the motivational differences, there are a number of issues that are seen preventing SMEs from reacting to different sustainability drivers. Perhaps the most often mentioned barrier in the literature is the (perceived) lack of resources (see for example Stubblefield Loucks et al., 2010; Schrettle et al., 2013). According to Schrettle et al. (2013), engaging in sustainability can be quite expensive and require a high amount of human resources. This is one of the reasons, which may limit small companies' abilities to adopt more sustainable processes. They also claim that large companies can pursue several sustainability initiatives simultaneously, which often is not possible for smaller companies due to limited resources. Compared to larger companies, SMEs simply do not have as much available resources that could be allocated to becoming sustainable and therefore SMEs seem to be in an inferior position. For instance, extensive external sustainability reporting is something SMEs often cannot afford to do (Baumann-Pauly et al., 2013). Yet, Baumann-Pauly et al. (2013) made an interesting observation while studying sustainability oriented SMEs; the companies themselves did not see their size or lack of resources as something that would prevent them from becoming more sustainable. Instead, they came up with solutions to compensate these perceived disadvantages.

In addition to the lack financial and human resources, it seems that SMEs do not have enough time and competencies either. SMEs tend to use their time in order to deal with issues that are more closely related to their daily survival (Hunt and Auster, 1990; Murillo & Lozano, 2006), which perhaps does not leave them much time to be concerned with issues such as sustainability that are perceived less vital to the company. Moreover, SMEs know less about environmental issues than larger companies do (Tilley, 1999) and many of them do not know from where to find more information and advice regarding this topic (Hillary, 2004). In addition, many of the sustainability programs have been designed mainly for large, international companies, which are seen capable of both engaging in and advancing sustainability (Baumann-Pauly et al., 2013).

Adoption of Sustainability management systems and achieved sustainability performance

Many researchers have found a positive relationship between company size and environmental performance (Etzion, 2007, Gimenez et al., 2012). Whether this is mainly due to smaller companies' lack of motivation (Holt and Ghobadian, 2009), lack of capabilities and resources, or

both, remains somewhat unclear. There exists also evidence suggesting that company size does not predict a company's environmental positioning (Crowe and Brennan, 2007) and that smaller companies can receive similar sustainability performance benefits from implementing environmental and social programs (Gimenez et al., 2012). However, the general opinion remains that SMEs are in a less advantageous position to adopt EMSs (see for instance Hillary, 2003).

There is a multitude of issues limiting SMEs from implementing EMSs. Implementing and running a formal EMS is comparatively expensive and requires available resources (Melnyk et al., 2003; Johnstone & Labonne, 2009). In addition, Hillary (2003) noted that there are both internal and external barriers that prevent especially SMEs from adopting EMSs. The internal barriers found relate to lack of resources, lack of knowledge about EMSs, experienced problems in EMS implementation, and general negative attitude towards EMSs, while the external barriers include problems experienced with certification, lack of market rewards, and lack of support and guidance.

Despite the hindrances, if an SME chooses to adopt an EMS they can expect to receive benefits, too. The studies analyzed by Hillary (2003) indicate that the implementation of formal EMSs is also awarding SMEs with benefits. According to Hillary (2003), SMEs can expect to receive organizational, financial, people, commercial, environmental, and communicational benefits. Yet, it is possible that larger companies are benefitting more from the use of EMSs (Johnstone and Labonne, 2009) while the benefits SMEs gain may be insufficient compared to the costs of implementation. Hillary (2003) found also a number of disbenefits that can result from SMEs' EMS adoption. These include unexpected resource use, non-materialized benefits, and negative surprises related to the use of EMSs.

Johnstone and Labonne (2009) studied whether facilities' EMS adoption is motivated by hopes to improve one's environmental and business performance or by the willingness to improve communication of one's environmental behavior to certain stakeholders. They suggested that due to smaller pressures related to improving environmental performance also the potential benefits gained from these improvements would remain smaller for SMEs when compared to larger

companies. On the other hand they also point out that certification might be more useful to smaller facilities because external parties know less about their characteristics. In addition, they pointed out that high costs of adoption and certification may prevent smaller facilities from EMS implementation. Their results showed that larger facilities were more likely to have an EMS. Furthermore, they concluded that both factors influence the decision to adopt an EMS and its certification but their importance depends on the size of the facility. Cost factors were the main motivator for smaller facilities to adopt EMS while signaling regulators motivates larger facilities the most.

Even though the results of Johnstone and Labonne (2009) indicate that SMEs seem to be less keen to adopt formal EMSs, it does not mean they could not improve their sustainability performance in other ways. The literature suggests that SMEs might be using more informal methods to advance their social and environmental performances (Russo and Tencati, 2009; Murillo and Lozano, 2006; Baumann-Pauly et al., 2013). This informal sustainability manifests itself, for example, in excellent management and in a desire of doing things "right" (Murillo and Lozano, 2006).

SMEs and large companies both have strengths and weaknesses related to sustainability adoption

Overall, it appears that engaging in sustainability is easier for larger companies. However, there exists criticism against this viewpoint of small companies simply being less advantaged in sustainability adoption. Accordingly, also SMEs possess certain characteristics that enable sustainability adoption. For instance, small size can be an advantage as it may allow SMEs to adjust their business model more quickly to respond to customers' sustainability demands (Stubblefield Loucks et al., 2010). In addition, Baumann-Pauly et al. (2013) found out in their research that SMEs might actually possess better abilities for integrating sustainability into existing processes than larger companies because of having less employees, sites, and hierarchy levels, while MNCs are often better in communicating their sustainability actions to external stakeholders as they have the resources for extensive external sustainability reporting.

2.6.2. Size, sustainability and profitability

Previous research related to whether sustainability can be profitable also for SMEs has reached inconsistent results. Some suggest a positive relationship between environmental performance and financial success amongst SMEs (Clemens, 2006; Murillo and Lozano, 2006; Russo and Tencati, 2009), while others are more pessimistic about SMEs' abilities to benefit from sustainability when compared to the benefits gained by larger companies (Orlitzky, 2001). Others claim that it is not company size, which determines whether environmental and social performance leads to financial success (Gimenez et al., 2012; Orlitzky, 2001). Instead, sustainability brings both financial and non-economic value to those companies, including SMEs, who are able to choose wisely which initiatives to implement (Stubblefield Loucks et al., 2010).

Yang et al. (2011) found in their study that companies with less than 250 employees and companies with more than 250 employees differ in terms of the adoption rate of environmental management practices as well as in resulting environmental and economic performance outcomes. According to their results, the strengths of the relationships between 1) *environmental management practices* and *environmental performance*, 2) *environmental management practices* and *market performance*, 3) *environmental management practices* and *financial performance*, 4) *environmental performance* and *market performance*, as well as 5) *environmental performance* and *financial performance* were weaker for smaller companies and some of these relationships were not statistically significant.

The potential benefits of sustainability for large companies are better known and more widely understood than the potential benefits of smaller companies. Many SMEs, on the other hand, do not believe that improving their environmental performance benefits them (Hillary, 2003). Many of them consider improving environmental performance costly and requiring a lot of effort (Bradford and Fraser, 2008). Similarly, most SMEs perceive social practices as an extra cost, which do not result in remarkable financial benefits (Theyel and Hofmann, 2012). It is no surprise if a company does not engage in sustainability, if the top management does not know how the company could benefit from it. Therefore, it is important that the implications of SMEs sustainability improvements are studied and reported. Murillo and Lozano (2006) also pointed

out the need to link SMEs sustainable behavior to competitiveness in order to ensure bigger acceptance of sustainability amongst SMEs.

Despite the doubts held by SMEs, many options exist that allow them to gain both financial and other benefits through sustainability adoption. Improving one's sustainability performance may both increase the loyalty of current customers and attract new customers (Stubblefield Loucks et al., 2010). Bradford and Fraser (2008) believe that energy prices will increase and therefore SMEs too could benefit from reducing their energy consumption with the help of suitable initiatives. In addition, improvements in SMEs sustainability performance can be assumed to improve their reputation and company image (Vyakarnam et al., 1997) as well as ensure the commitment and loyalty of good employees, which reduces staff turnover (Jenkins, 2004 in Stubblefield Loucks et al., 2010; Murillo and Lozano, 2006).

2.6.3. Hypotheses related to company size

While acknowledging that the influence of size on companies' sustainability behavior is a complex issue and it depends on several aspects, it can be assumed that while SMEs seem more than capable of assuming responsibility over social and environmental issues, the majority of them are still not engaged to sustainability to the same extent as larger companies are. Based on the literature reviewed in chapter 2.6., it is hypothesized that

H_4: Large companies experience more sustainability pressure from stakeholders than medium-sized companies do.

H_5: Large companies have adopted more sustainability management systems and programs than medium-sized companies have.

H_6: Large companies have better sustainability performance than medium-sized companies.

H_7: Large companies receive larger benefits from the adoption of sustainability management systems than medium-sized companies do.

H_8: Medium-sized companies receive financial benefits from improving their sustainability performance.

3. INTERNATIONAL MANUFACTURING STRATEGY SURVEY AND DATA COLLECTION

In fall 2013, I had the chance to be part of a research team involved in the sixth International Manufacturing Strategy Survey (IMSS VI). My task was to contact operations managers of manufacturing plants operating in Finland and persuade them to participate in the survey. As I was involved in the data gathering phase of the survey, I was also entitled with access to the international dataset gathered in 22 countries. The manufacturing companies involved in the survey belong to ISIC codes 25 to 30. This thesis is based on that data.

3.1. International Manufacturing Strategy Survey VI

The purpose of the International Manufacturing Strategy Survey (IMSS) is to study the manufacturing and supply chain practices and strategies of companies operating within the ISIC industry codes 25 to 30 (IMSS 26.10.2015). The industry codes in question and their explanations are listed below in table 1.

Table 1 ISIC Codes 25 – 30

25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic, and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment not elsewhere classified
29	Manufacture of motor vehicles, trailers, and semi-trailers
30	Manufacture of other transport equipment

(source: International Manufacturing Strategy Survey 2013 Questionnaire, page 1)

The history of IMSS began in 1992 when a group of business schools, coordinated by London Business School and Chalmers University of Technology, established the IMSS project. Since then, a global network of individual research groups has gathered new data every four or five

years. Nowadays, Politecnico di Milano and University of Bergamo are in charge of the project. (IMSS 26.10.2015)

This was the sixth time when the International Manufacturing Strategy Survey was conducted around the world. In total, companies from 22 countries took part in the survey. The amount of companies participating from different countries varied from 14 (Malaysia) to 128 (China), while the total number of companies who responded to the survey was 931. This was the first time that Finland took part in the survey.

Figures 2 and 3 below show how the amount of participants has evolved since the beginning of the IMSS studies in 1992. The number of countries involved has varied from 17 to 23 while the number of respondents has been roughly between 600 and 900 companies worldwide. With the exception of IMSS III, the number of respondents has increased every round.

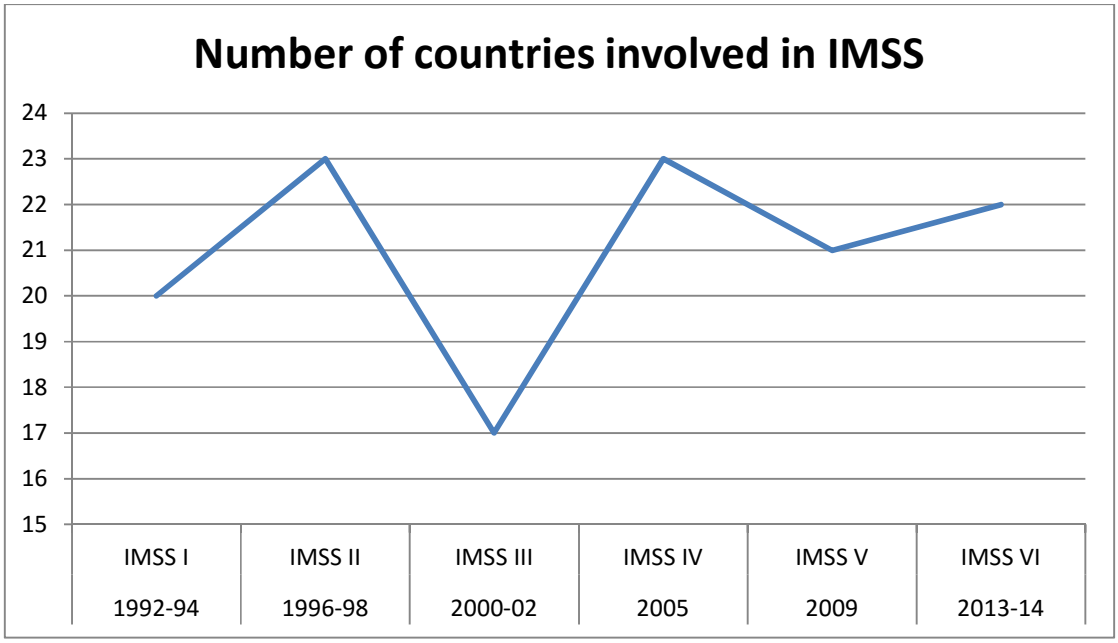


Figure 2 Number of countries involved in IMSS

(Created according to IMSS VI Start-up package, 2013)

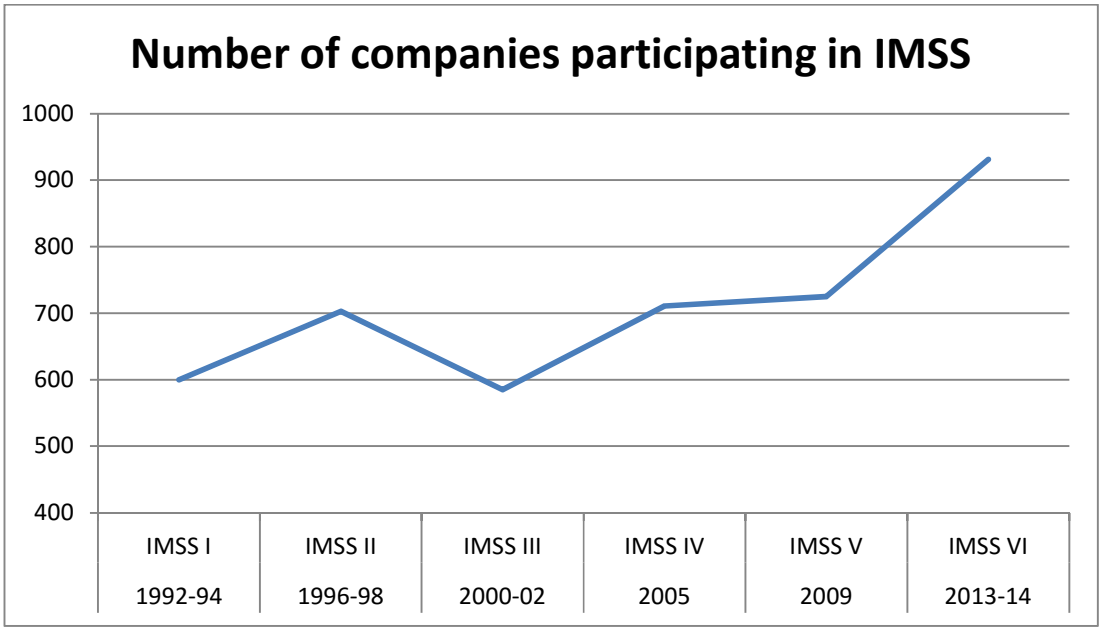


Figure 3 Number of companies participating in IMSS

(Created according to IMSS VI Start-up package, 2013)

Companies benefit from participating in the IMSS's by having access to the reports written based on the survey results (IMSS 26.10.2015).

3.2. The questionnaire

The data for IMSS is gathered via an extensive questionnaire (IMSS 26.10.2015) designed by the coordinating research team. The questionnaire is modified for each survey round without compromising the possibility for longitudinal research (IMSS 26.10.2015). The questionnaire was provided in English but it was allowed to be translated if considered necessary, as long as this was done in a reliable manner (IMSS VI Start-up package, 2013).

The survey questionnaire for IMSS VI contains 300 questions in total, which are divided into three sections, A, B, and C. Sections A and B focus on performance and strategy, while section C is labeled as "current manufacturing and supply chain practices and past action programs" (IMSS

VI Questionnaire, page 1). The themes included in section C are planning and control, technology, quality, sustainability, product development, risk management, supply chain management, and manufacturing network configuration. Detailed sustainability questions were not included in the first survey rounds (IMSS 26.10.2015). In section A, the questions are to be considered on the level of business unit, while in sections B and C respondents are advised to provide answers based on the dominant activity of the particular plant (IMSS VI Questionnaire).

Most of the questions included in the survey were to be answered on a five-point Likert scale, although the questionnaire also contained questions that were more precise. In other words, most of the questions were about the perceptions of the respondent in terms of effort and change within past three years, current level of implementation, and performance compared to that of competitors. The preferred respondent for the survey was operations, manufacturing, or technical manager of the company (IMSS VI Start-up package, 2013).

3.2.1. The survey questions used in the analysis

Out of the 300 questions, I found 40 to be relevant for my study. The questions I chose to focus on in the survey include both descriptive and sustainability related questions. The descriptive questions depict the companies' origin, size, and type of configuration of the manufacturing network, as well as sales and profitability figures. Their use in the analysis is described in more detail in sections 4.3. and 4.4.. The sustainability related questions include questions determining both environmental and social issues and are divided into the following three subgroups: outside pressure for sustainability, sustainability performance, and sustainability management.

The first subgroup consists of five questions that all relate to perceived stakeholder pressures. Respondents were asked to tell how strong social and environmental pressure they receive from their stakeholders as well as to indicate how important their customers' see certain environmental and social aspects. The second subgroup contains eight questions that indicate the change in both environmental and social performance within the last three years and the current performance level compared to competitors. The last subgroup has 20 questions related to the adoption of environmental and social certificates and programs as well as questions related to

suppliers' sustainability performance. These questions are measured both in terms of effort invested during the last three years and current level of implementation. Unfortunately, according to the coordinator's instructions the exact questions used in the analyses cannot be attached to this thesis (IMSS VI Start-up package).

3.3. Data collection

The data for the IMSS VI was collected simultaneously in 22 countries over a six-month period during summer and fall 2013. One or more individual researcher groups, often linked to a local university, gathered the data in a similar manner in all countries. For each group the timeframe for the data gathering process was 2 to 3 months. All research teams were provided with instructions how to proceed with the data collection in order to ensure a certain level of uniformity for the data collection process. This was done to increase the reliability of the combined database. In addition, certain quality checks were determined in the guidelines. (IMSS VI Start-up package, 2013)

However, the instructions also allowed the research teams some possibilities to influence the methods used in the data collection process. Therefore, some differences can be found both in the sampling and in the form in which data was collected. The research groups were allowed to use either random or convenience sampling and collect the responses either via a paper or online questionnaire. The convenience sampling could be useful for instance in cases where a certain company had participated in the previous IMSS studies. The coordinators set 30% as the acceptable minimum response rate for the survey. (IMSS VI Start-up package, 2013)

To ensure that each research team acted according to the given guidelines, the teams were asked to fill in a data collection checklist before sending their data to the coordinator (IMSS VI Start-up package, 2013).

3.3.1. Data collection in Finland

In Finland, we were able to engage 34 companies to fill the questionnaire. The companies were randomly chosen from a list of suitable companies operating within the ISIC codes 25 to 30 and having more than 50 employees as advised by the organizer of the IMSS VI. Fonecta provided the original list of companies.

The operations/production managers of the randomly chosen companies were then contacted by phone and asked, whether they would be interested to participate in the survey. If they were interested, they were sent an email with a link to the online questionnaire placed in SurveyMonkey. After a couple of weeks, those who had not yet responded were sent another email reminding them to fill in the survey. If they still did not respond, an additional phone call was made in order to remind them about the survey and the benefits of filling in the questionnaire. In total 210 companies were contacted, 84 agreed to respond to the survey and 34 actually fully completed the survey (fully = less than 30 % of missing answers). The response rate of those who had agreed to participate and to whom the survey was sent was 40.5 %.

The most common reasons why managers decided not to participate in the survey were lack of time in general and the length of the survey. This was not surprising, as providing answers to the survey could easily take from 30 minutes to an hour. Some managers also doubted their language skills, ability to answer the questions, or could not see how they or their companies would benefit from participating in the survey. In order to receive as many responses as possible, the companies were offered a benchmarking report after the survey results would be collected. The benchmarking reports were sent to the companies in spring 2014.

Although we were offered a chance to translate the questionnaire into Finnish, a decision was made not to do that. Translation might have improved the understanding of the questionnaire by the respondents, yet we believed that the target group would have high enough skills in English so that it would be unnecessary to translate the questions. By choosing not to translate the survey, we also did not have to be concerned whether the translations would have been made correctly.

After the data collection was completed, the quality of the data was checked before the dataset was sent to Italy to be combined with the results gathered in other countries.

3.4. The sample

IMSS's target group includes plants rather than companies, and therefore the data can include information about several plants belonging to the same company. The sample size was instructed to be 30 to 50 manufacturing companies/plants per research group with the possibility of having several research groups in larger countries. To ensure that the data is comparable, the coordinators limited the company size to a minimum of 50 employees. (IMSS VI Start-up package, 2013)

The original sample consisted of 931 companies/plants, yet I decided to exclude those respondents, who did not fulfill the requirements set by the organizers of the survey. These requirements included having at least 50 employees, having a maximum of 30 % missing answers and providing both the ISIC code and the number of employees. Two respondents had failed to provide the number of employees while none had failed to provide the ISIC code. Twenty-four respondents had reported less than 50 employees and 23 respondents had left unfilled more than 30% of the questions. After deleting these respondents, the sample consisted of 882 respondents. In addition to examining the descriptive statistics of the total international sample, I will also pay attention to the sample collected in Finland.

3.4.1. Respondents in terms of industry

As the figures 4 and 5 below show, the respondents are not divided evenly into the industry groups 25 to 30 neither in the whole sample nor in the Finnish sample. In the total sample, most respondents belong to ISIC codes 25 *Manufacture of fabricated metal products, except machinery and equipment* and 28 *Manufacture of machinery and equipment not elsewhere classified* (30.5 % and 24.7 % respectively), while only 4.6 % of the respondents belong to group 30 *Manufacture of other transport equipment*. In the Finnish sample, 44.1 % of the respondents

belong to ISIC code group 28 and 29.4 % to group 25. None of the Finnish respondents belongs to group 30.

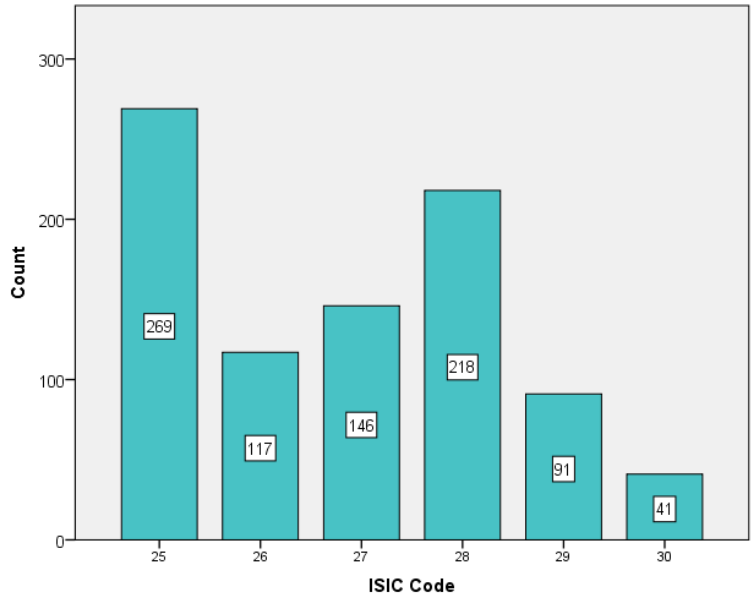


Figure 4 Respondents according to ISIC codes, total sample

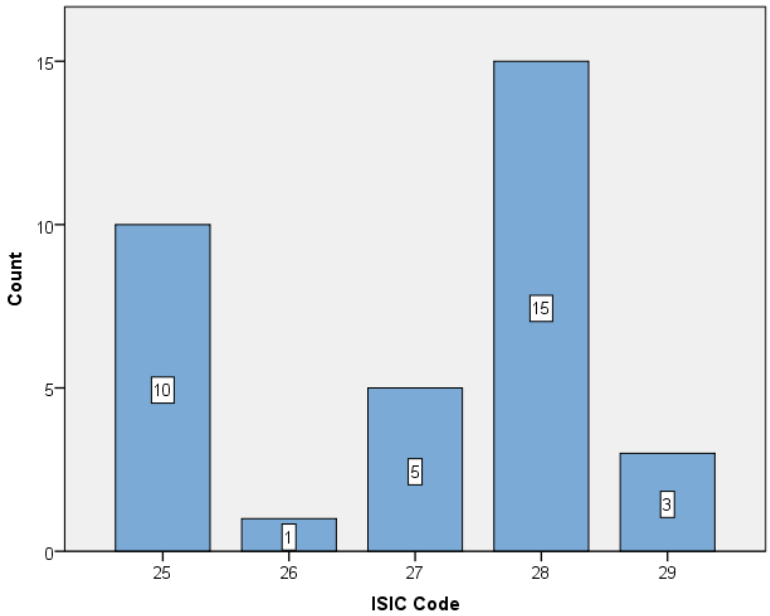


Figure 5 Respondents according to ISIC codes, Finnish sample

3.4.2. Respondents in terms of origin

For most of the countries, the sample size remained close to the target of 30 to 50 respondents, except for India and China who totaled with 90 and 119 respondents respectively. On the other hand, not all countries managed to reach the 30 respondent minimum set by the coordinators. In total, nine out of the 22 countries, namely Malaysia, Germany, Slovenia, Norway, Taiwan, Spain, Belgium, Switzerland, and Canada, failed to provide the data for at least 30 respondents.

It is worth to note that all countries are not represented equally in the data relative to their sizes. For instance, the USA has practically the same amount of respondents as Denmark, which indicates that the USA is very much under-represented in the survey. The numbers of respondents from each participating country are shown in table 2 below.

Table 2 Number of respondents from each participating country

Country

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Belgium	27	3.1	3.1	3.1
	Brazil	31	3.5	3.5	6.6
	Canada	29	3.3	3.3	9.9
	China	119	13.5	13.5	23.4
	Denmark	37	4.2	4.2	27.6
	Finland	34	3.9	3.9	31.4
	Germany	14	1.6	1.6	33.0
	Hungary	56	6.3	6.3	39.3
	India	90	10.2	10.2	49.5
	Italy	44	5.0	5.0	54.5
	Japan	76	8.6	8.6	63.2
	Malaysia	12	1.4	1.4	64.5
	Netherlands	47	5.3	5.3	69.8
	Norway	24	2.7	2.7	72.6
	Portugal	34	3.9	3.9	76.4
	Romania	40	4.5	4.5	81.0
	Slovenia	17	1.9	1.9	82.9
	Spain	27	3.1	3.1	85.9
	Sweden	32	3.6	3.6	89.6
	Switzerland	28	3.2	3.2	92.7
	Taiwan	26	2.9	2.9	95.7
	USA	38	4.3	4.3	100.0
	Total	882	100.0	100.0	

Overall, most of the respondents were from Europe and Asia as shown in the figure 6 below. Fourteen countries out of the 22 involved in the survey are European while five countries are Asian, two North American and only one South American. This division is not too surprising, even if it is uneven, as the project is organized from Europe (Italy) and it is aimed at companies operating in developed countries (IMSS 26.10.2015).

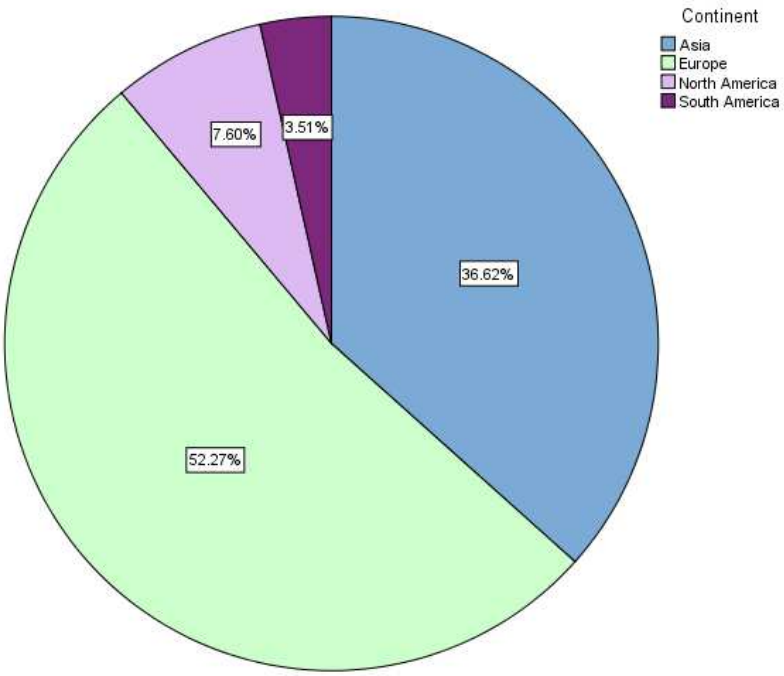


Figure 6 Continental division of respondents

3.4.3. Respondents in terms of number of employees

In the total sample, nearly half of the respondents (45.4 %) have 50 to 250 employees. In the Finnish sample 70.6 %, belong to this group. As already mentioned in the literature review, the large amount of SMEs is worth to note when it comes to sustainability. The fact that medium-sized companies create almost half of the whole sample supports the initiative to research sustainability behavior of medium-sized companies. Figures 7 and 8 provide categorizations of the respondents according to their number of employees.

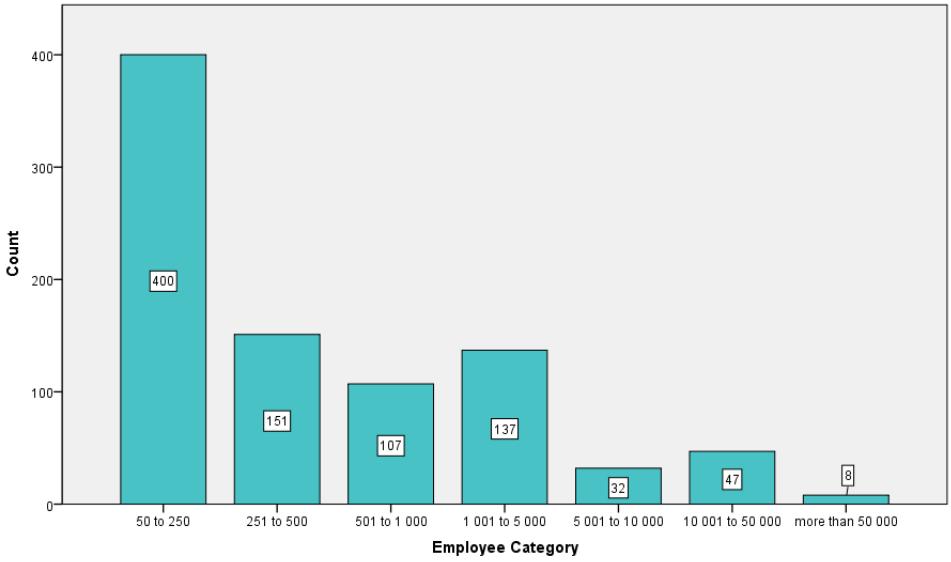


Figure 7 Respondents according to the number of employees, total sample

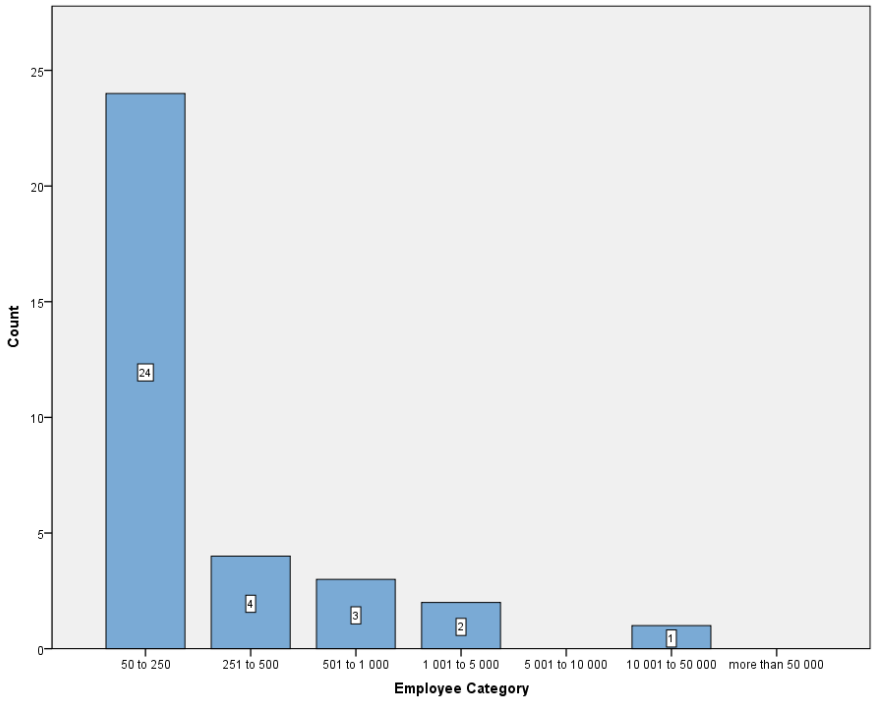


Figure 8 Respondents according to the number of employees, Finnish sample

3.4.4. Respondents in terms of sales and profitability

Around one third of the respondents have revenue of EUR 10 to 50 million, while the rest of respondents are divided quite evenly to the other sales groups (see figure 9). Between 2009 and 2012, the amount of sales has stayed the same or increased for the majority of respondents as only 21.3% of the respondents indicated that their revenue had decreased during that time by choosing 1 or 2 on the scale from “much lower”(1) to “much higher”(5) (see figure 10).

When it comes to the profitability of companies, only for 6.1% of respondents Return on Sales (ROS) of the business unit in 2012 was negative (see figure 11). For most respondents ROS in 2012 was 5 to 10%. For most companies ROS has remained on the same level compared to 2009 while for 29.0% of respondents ROS had decreased and 25.4% of respondents indicated a positive change in ROS (see figure 12).

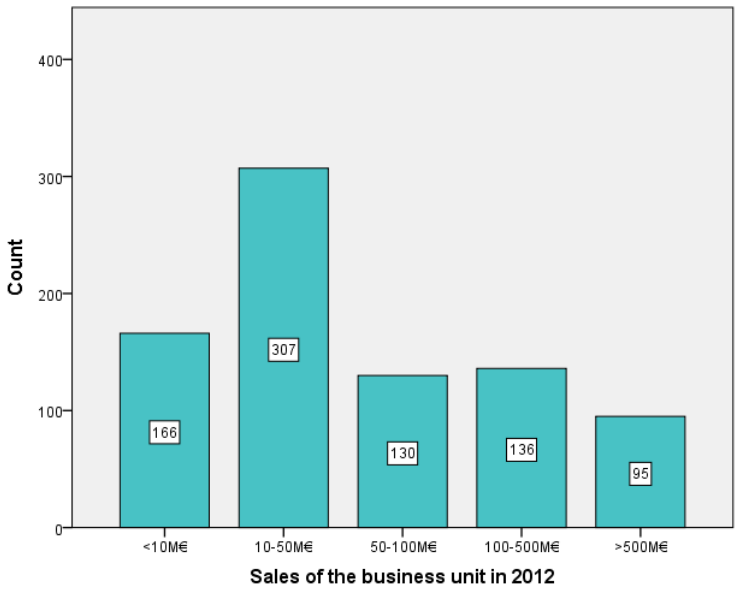


Figure 9 Respondents’ amount of sales of the business unit in 2012

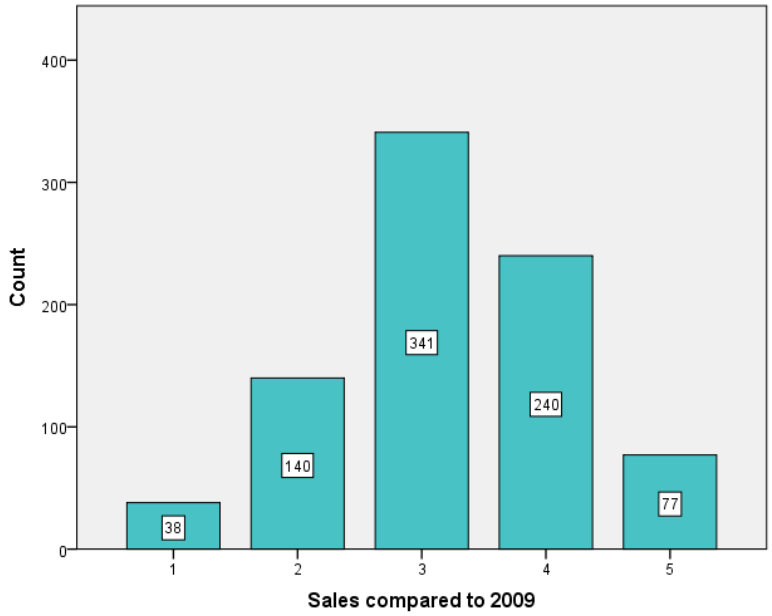


Figure 10 Change in respondents' amount of sales between 2010 and 2012

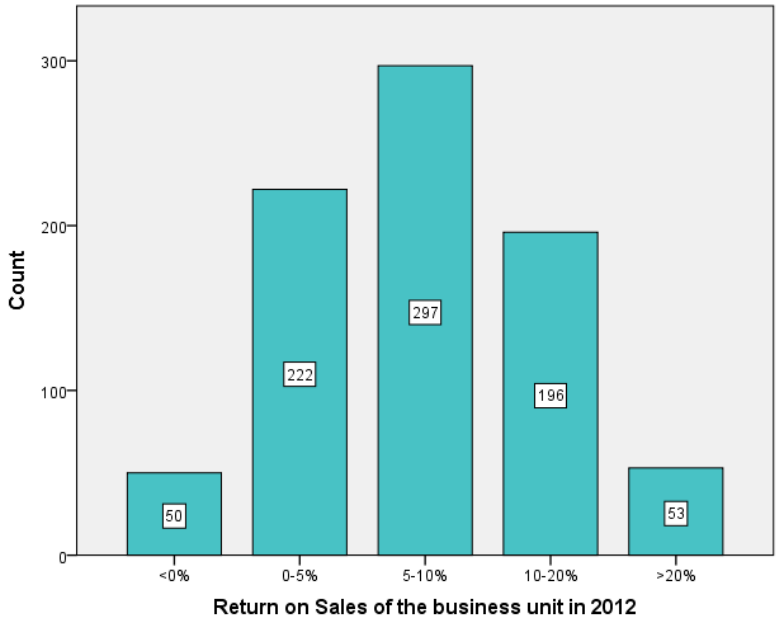


Figure 11 Respondents' Return on Sales of the business unit in 2012

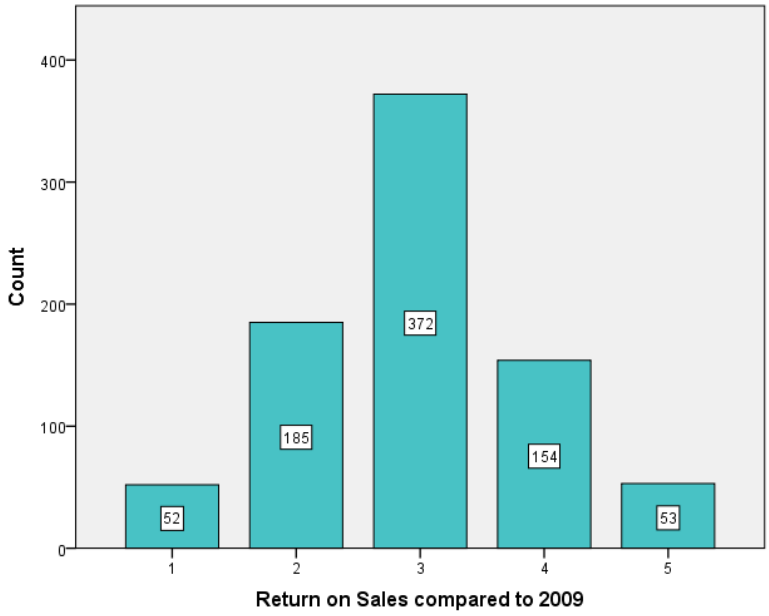


Figure 12 Change in respondents' Return on Sales between 2009 and 2012

3.4.5. Other details related to the total sample

Even though it was preferable to target especially those companies who had participated the study in the previous rounds (IMSS VI Start-up package, 2013), only a handful of respondents had participated also in the IMSS V (34 out of 882). There was no indication that any of the respondents would have participated in IMSS I-IV studies.

Table 3 presents the division of respondents according to their manufacturing network configuration. On the scale from "1" to "4", "1" indicates that the respondent is the only plant belonging to the company while "2" means that there are several plants belonging to the company, but they are all located in the same country. "3" includes those respondents that have several plants located in one continent and "4" consists of respondents that are part of a global manufacturing network. 33.5% of all respondents represent individual companies and 52.3 % of respondents belong to a domestic network. Yet, this varies between different continents. In Asia 71.4 % of respondents belonged to a domestic manufacturing network and 28.6 % to a global network. For the European respondents these proportions were close to opposite with 39.3 % and 60.7 % respectively. In the Americas, the situation was close to 50% / 50%.

Table 3 Respondents' manufacturing network configurations

Continent * G1_Manufacturing network Crosstabulation

Count

		G1_Manufacturing network				Total
		1.0	2.0	3.0	4.0	
Continent	Asia	124	103	21	70	318
	Europe	141	39	57	221	458
	North America	21	13	6	27	67
	South America	7	9	0	15	31
Total		293	164	84	333	874

3.5. Data equivalence

Establishing data equivalence is important in cross-cultural studies in order to ensure the validity of the findings. There exist three dimensions of data equivalence, namely construct, measurement, and data collection equivalence. There are several possibilities for researchers to test these aspects of data equivalence both pre- and post-data collection. (Hult et al., 2008)

In this research, I was not able to influence the pre-data collection phase, yet, the questionnaire used in the survey was pretested and validated before it was distributed to the respondents (IMSS 26.10.2015). However, as this is already the sixth time when IMSS has been organized, the questions have remained very similar to the ones used in the previous surveys, and multiple research has been conducted based on the previous IMSSs, it is quite safe to assume that data equivalence does not create a big problem for this thesis. In addition, manufacturing and sustainability can both be expected to be well known concepts within the industrialized world, which contributes to establishing construct equivalence (Hult et al., 2008).

According to Hult et al. (2008), data collection equivalence is established when data collection procedures are same in the different countries involved in the study. For the IMSS VI, the data collection process was done in a similar manner and during the same period of time in all countries. In addition, all research teams were instructed to check for both non-respondent and late-respondent biases (IMSS VI Start-up package, 2013). All these factors support the formation

of data collection equivalence (Hult et al., 2008). The teams were also ordered to check the quality of the data in terms of limiting the amount of missing answers to 30% at maximum and to make certain that the data did not include any unreliable answers (IMSS VI Start-up package, 2013). Data collectors were also to ensure that each respondent had provided both the number of employees and the ISIC code to allow the categorization of the companies. Even though the final dataset did include some cases with more than 30% missing values as well as respondents who had not submitted the number of employees, it is quite safe to conclude that the dataset does not include remarkable problems related to these issues.

Even though it is unlikely that data equivalence would cause significant problems to the analyses conducted in this thesis, the possible problems related to it cannot be completely excluded. Therefore, it needs to be noted that issues related to the lack of data equivalence may have an impact on the research results included in this thesis.

3.5.1. Possible problems related to the data and data gathering process

In addition to potential issues with data equivalence, it is possible that the dataset comprises problems related for instance to the following issues:

1. Some respondents (despite their cultural backgrounds) may have understood some of the questions differently than other respondents. Yet, this issue is likely to be minimal because of the pretesting done with the questionnaire.
2. Many of the questions require self-assessment. In addition, the questions are both subjective and based on perceptions, which may result to misleading conclusions compared to the use of more objective data.
3. The high amount of missing values of certain variables may indicate that these questions were either not wanted to be answered or difficult to answer. For instance, out of the sustainability related questions, all four social and environmental performance questions concerning *the current level of implementation compared to competitors* were among the questions with most missing values. In this case, it is likely that the latter is true and the respondents simply did not know where they stand with these issues compared to their

competitors. This may imply that some companies perhaps still are not that familiar with sustainability related issues.

4. With 300 individual multiple-choice questions, the questionnaire demanded a considerable effort from the respondents. Due to the length and tediousness of the questionnaire, it is possible that some respondents became tired of answering and employed for example skipping of questions or random answering. Yet, this problem is minimized at least for the data gathered in Finland as the respondents were promised benchmarking reports. If the respondents did not answer truthfully to the questions, the benchmarking report would not be of much use for them either.

4. DATA ANALYSIS AND RESULTS

In this section the analysis for each research question and the related set of hypotheses are examined one by one. The data analysis was conducted with IBM SPSS Statistics 23.0 and IBM Amos Graphics 23.0. As a reminder, both the research questions introduced in the beginning as well as the hypothesized model described in chapter 2.5.1 and the hypotheses conducted in chapters 2.5. and 2.6.3. are shown below.

Research questions:

1. How widely has sustainability adoption spread in manufacturing companies?
2. How does external pressure influence the adoption of sustainability programs and management systems, and do these programs and systems and/or increased sustainability performance improve the financial performance of manufacturing companies?
3. Does company size affect the adoption rate of sustainability programs and management systems, the improvement of sustainability performance achieved, or the impact that sustainability has on a company's financial performance?

Hypothesized model:

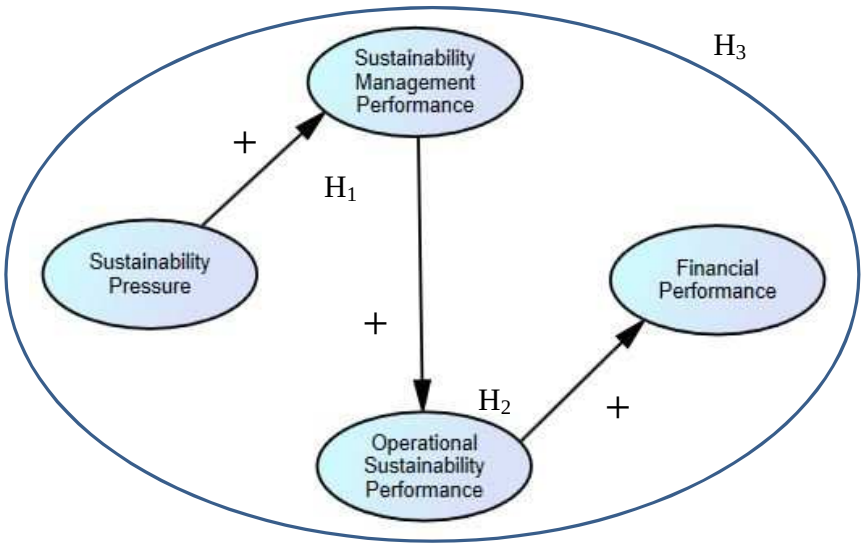


Figure 13 The hypothesized model

Hypotheses:

H_1: Sustainability management systems and programs mediate the positive relationship between external sustainability pressure and operational sustainability performance.

H_2: Improved operational sustainability performance mediates the positive relationship between the adoption of sustainability management systems and programs and a company's financial performance.

H_3: Improved sustainability management performance combined with improved operational sustainability performance mediate the positive relationship between external sustainability pressure and a company's financial performance.

H_4: Large companies experience more sustainability pressure from stakeholders than medium-sized companies do.

H_5: Large companies have adopted more sustainability management systems and programs than medium-sized companies have.

H_6: Large companies have better sustainability performance than medium-sized companies.

H_7: Large companies receive larger benefits from the adoption of sustainability management systems than medium-sized companies do.

H_8: Medium-sized companies receive financial benefits from improving their sustainability performance.

The analysis conducted in this chapter will proceed in the following way. First, the data is cleaned in order to obtain a complete dataset based on which the analyses can be conducted

(4.1.). Then the first question is examined using simple descriptive statistics in order to reveal the general perception and the adoption rate of sustainability amongst the respondents (4.2.). Moving on to the second research question, confirmatory factor analysis and subsequently structural equation modeling are used in order to determine whether sustainability implementation pays off (H_1 through H_3) (4.3.). Finally, Mann-Whitney U test is conducted to compare the differences between medium-sized and large companies in terms of experienced sustainability pressure, use of sustainability management systems, and obtained sustainability outcome improvements (H_4 through H_6) and the structural equation model constructed in chapter 4.3. is revisited in order to determine whether medium-sized and large companies differ in terms of received sustainability benefits (H_7 and H_8) (4.4.).

4.1. Data cleaning

The dataset consisting of the international sample of 882 respondents still had to be modified before the actual analyses could be conducted. In order to increase the reliability of results, it was decided to only include those companies in the analyses who had answered at least 75% of the questions. This reduced the dataset by 17 respondents to 865. In addition, all those respondents who had not provided answers to 25% or more of the sustainability related questions used in the analysis were also excluded in order to limit the problems related to excessive amount of missing values. This reduced the dataset by additional 24 respondents to 841. The 24 respondents that had responded to less than 75% of the 33 sustainability related questions still had responded to more than 75% of all questions. Therefore, it may be that they chose not to answer these questions for a reason. Out of the 24 respondents, 17 had not answered to 10 or more of the 20 questions related to sustainability management. This may be, for instance, because they perceived the questions either difficult or unimportant, or because the manufacturing site in question had not put much effort in these issues.

Despite these eliminations, the dataset still included some missing data values that needed replacing. The missing value analysis showed that of the sustainability related variables only four variables had 3% or more of the values missing. These variables were *Pollution emission and*

waste production levels compared to competitors (9.8 % of values missing), *Materials, water and/or energy consumption compared to competitors* (9.3 %), *Health and safety conditions compared to competitors* (7.3 %), *Workers' motivation and satisfaction compared to competitors* (7.1 %).

In order to be able to make the right choice for an imputation method, it needed to be checked whether the data was missing at random or not. To verify that the data is missing completely at random, Little's MCAR test was conducted for the total dataset. As the test confirmed that the data truly was MCAR (with 200 iterations: Chi-Square=447.833, DF=158433, Sig.=1.000), Expectation Maximization (EM) method was chosen in order to impute the missing values of sustainability related questions. The missing value imputation was done only to the proportion of the original dataset, which included the sustainability related variables. However, values were not imputed for variables related to size or financial performance as it was considered important to ensure the authenticity of these variables. Instead, when this information was needed in the analysis, the cases including missing values were deleted. Therefore, the number of cases included in the different analyses varies a little.

4.2. Current level of sustainability adoption amongst manufacturing companies

This section aims to create a picture of how manufacturing companies perceive sustainability related issues, how widely has sustainability adoption spread amongst the respondents, what actions have they taken and at what stage of sustainability implementation they were in 2013. The dataset used for this section consists of 841 respondents.

4.2.1. The current level of implementation of sustainability management practices

The respondents were also asked their current level of sustainability management implementation on a scale from "none" to "high". Next, their responses will be compared between different programs.

Sustainability certifications, communication, and training

Respondents' answers indicate that companies have more environmental certificates compared to the amount social certificates (or that at least the implementation of environmental certificates has advanced further than that of social certificates). The means for these variables are 3.42 and 2.69 respectively. 16.6 % of the respondents do not have an environmental certificate while 34.7% do not have a social certificate. 14.9 % of the respondents do not have any formal sustainability oriented communication or training programs. This, however, does not mean that these companies could not be engaging in less formal sustainability practices.

Environmental programs

According to the data, the current level of implementation on average is only slightly higher for programs reducing pollution and recycling waste (mean=3.30) than for programs aimed at resource consumption reduction (mean=3.24). Only 8.7% and 8.6% of the respondents respectively do not have any such programs while 12.4% and 15.3% claim that their level of implementation for these programs is high.

Social programs

Of social programs, manufacturing companies have a higher level of implementation of *formal occupational health and safety management systems* (mean=3.51) than of *work/life balance policies* (mean=2.86). While only 4.8% of the respondents did not have any formal health and safety management system, 17.2% had no work/life balance policies implemented.

Suppliers' sustainability

The questionnaire includes three questions related to suppliers' sustainability. The mean of level of implementation for *Suppliers' sustainability performance assessment* is higher (3.06) than the means of *Joint efforts with suppliers to improve their sustainability performance* (2.78) and *Training/education in sustainability issues for suppliers' personnel* (2.54).

28.1 % of the respondents did not engage in any supplier sustainability training and only 5.6% had achieved a high level in it. Suppliers' sustainability assessment was most commonly used by respondents as only 11.8% had not implemented this initiative and 9.2% are excelling in it. Joint sustainability efforts with suppliers ranked between the two other suppliers' sustainability related variables.

4.2.2. The amount of effort put in implementing sustainability management practices

The respondents were also asked how much effort they had used in order to implement sustainability action programs between 2010 and 2013 on a scale from "none" to "high". In the following section, these efforts will be compared between different programs.

Sustainability certificates, communication, and training

According to the data, the respondents have put more effort into the implementation of environmental certificates than on social certificates. As much as 35.8% of the respondents have not put any effort in social certification. As the amount of respondents who chose "none" for the current level of implementation for these certificates is close to the same percentage, it indicates that this lack of effort does not originate from companies already having a high level of implementation but instead indicates that there are many companies, who do not see that it benefits them to implement social certifications.

The means of these variables show that the respondents have put the most effort in environmental certification (3.26), while formal sustainability communication and training (2.88) and social certifications (2.63) are both somewhat lagging behind.

Environmental programs

The amount of effort put into programs that aim at reducing resource consumption or emissions and waste are nearly the same with means 3.10 and 3.13 respectively. A little over 11 % of the respondents have put no effort in consumption reduction programs during the three-year period

while 11.3 % claim to have put high amount of effort into the implementation of these programs. The same proportions are 12.2% and 12.5% for pollution and waste reducing programs.

Social programs

Between the social programs, there are bigger differences on the effort levels. The respondents' answers indicate that more effort has been put on formal occupational health and safety systems (mean=3.40) than on work/life balance policies (mean=2.75). 49.9% of the respondents answered 4 or 5 as indicating a high effort level related to occupational health and safety while only 26.9% did the same for work/life balance policies.

Suppliers' sustainability

Suppliers' sustainability performance assessment has the highest mean (2.97) when compared to the other two variables related to suppliers' sustainability improvement (supplier sustainability training, mean=2.43, and joint efforts with suppliers, mean =2.67) in terms of effort used. Almost one third of the respondents had put no effort in training the suppliers' personnel in sustainability issues, while 20.1% had not engaged in joint efforts with suppliers in order to improve their sustainability performance. 13.1% had not been involved in suppliers' sustainability assessments during the three-year period. On the other hand, only a small portion of the respondents had put a high amount of effort in these issues, 4.9%, 5.4%, and 8.7% respectively.

4.2.3. Respondents' level of sustainability performance

The respondents were also asked to indicate their current level of environmental and social performance compared to that of their main competitors. Social performance was measured on a scale from "much lower"(1) to "equal"(3) to "much higher"(5) while environmental performance was measured on an opposite scale from "much higher"(1) to "equal"(3) to "much lower"(5) as a "much higher" resource consumption is actually a negative outcome.

Social performance

Social performance is measured by two variables, *Workers' motivation and satisfaction* and *Health and safety conditions*. The means of these variables indicate that on average, respondents' overall performance level is slightly higher for Health and safety conditions (3.49) than on Workers' motivation and satisfaction (3.31). Only 5.7% and 9.8% of respondents respectively indicated that their performance level was lower than that of their main competitors'.

Environmental performance

Also the means of the variables related to environmental performance were over 3, indicating that on average companies perceive their resource consumption as well as pollution and waste creation levels to be lower than those of their main competitors. The means for the environmental performance variables were quite close to each other as *Pollution emission and waste production levels* scored a mean of 3.23 while the mean for *Materials, water and/or energy consumption* was 3.15. 9.4% of the respondents perceive their resource consumption to be higher than that of competitors', while 21.8% believe their resource consumption is lower than that of their main competitors'. For pollution and waste production, the same proportions are 9.9% and 28.3%.

4.2.4. Change in respondents' sustainability performance between 2009 and 2012

The change in respondents' social and environmental performance levels between 2009 and 2012 was requested on a five-point scale. For social performance change variables the scale went from a decrease of 5% or more, via stayed the same (-5% to + 5%), slightly increased (+5% to +15%), increased (+15% to +25%), until strongly increased (+25% or more). The scale for the change in environmental performance was again the opposite from "increased" to "strongly decreased" on an otherwise similar scale.

Social performance

According to the responses, *Workers' motivation and satisfaction* (mean=2.90) had increased less than *Health and safety conditions* (mean=3.27) on average. For 34.2 % of respondents,

workers' motivation had decreased or stayed the same during the three-year period, while the same was true only for 22.1% on health and safety conditions.

Environmental performance

In general, resource consumption (mean=2.58) of the respondents' had improved less than their pollution and waste production levels (mean=2.81) during the three-year period. For 50.8% of the respondents resource consumption had either increased or stayed about the same, while for 42.6% the pollution and waste levels had increased or stayed about the same.

4.2.5. Stakeholder pressure

On a scale from very weak (1) to very strong (5), respondents find environmental pressure on average to be 3.33 and social pressure to be 3.24. Only 5.1 % of the companies feel that environmental pressure is very weak, while 13.7% perceive it very strong. Social pressure is perceived very weak by 7.3% and very strong by 11.9% of the respondents.

In terms of what are considered to be the order winners from most important customers on a scale from not important to very important, *More safe and health respective processes* rank the highest of the three sustainability related variables with a mean of 3.40. The mean for *More environmentally sound products and processes* is 3.26 while *Higher contribution to the development and welfare of the society* has a mean of 3.02. Even 31.2% of respondents do not see social issues in terms of *Higher contribution to the development and welfare of the society* important when it comes to winning orders as they chose either 1 or 2 on the scale.

Of all 12 non-sustainability related order winner variables only *Offer new products more frequently* –variable had a lower mean (3.25) than the highest scoring sustainability related variable. The most important order winner -variables were *Better product design and quality*, *Better conformance to customer specifications*, and *More reliable deliveries* with means of 4.22, 4.20, and 4.15 respectively. In other words, sustainability is not perceived as important as other product related attributes when it comes to winning orders from major customers.

4.3. Sustainability and financial performance

To study the effects which sustainability has on manufacturing companies' financial performance, cases with missing values for variables related to profitability and company size were deleted. After these eliminations the dataset had 745 cases left. In addition, the data was detected for outliers and normality. The data used in the following analyses refer to the currently (2013) felt pressure, the effort put in sustainability implementation between 2009 and 2012 and the change achieved from 2009 to 2012 in both operational sustainability performance and financial performance.

4.3.1. Multivariate outliers and normality

First, Mahalanobis distances were calculated in order to check whether there are any multivariate outliers in the data. The results are shown below in figure 14.

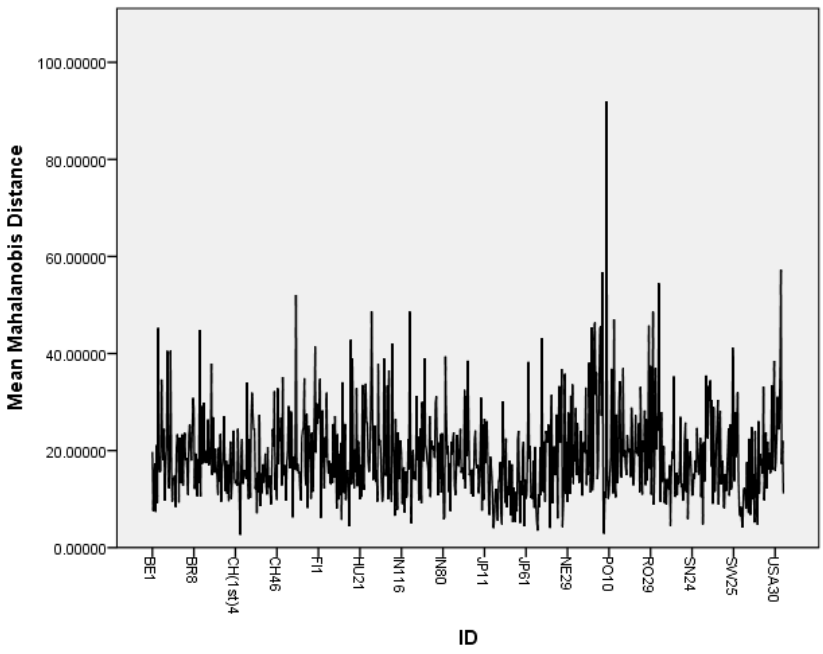


Figure 14 Mahalanobis distance (1)

As suggested by Hair et al. (2010, p. 66) significance level 0.001 was used to detect multivariate outliers. According to the Mahalanobis distances received, the dataset has 32 multivariate outliers and it was decided to exclude these cases from the analysis. Below in figure 15 are shown the Mahalanobis distances of the remaining cases. The range of the values received for each case has decreased from between 0.00 and 100.00 to between 0.00 and 45.00.

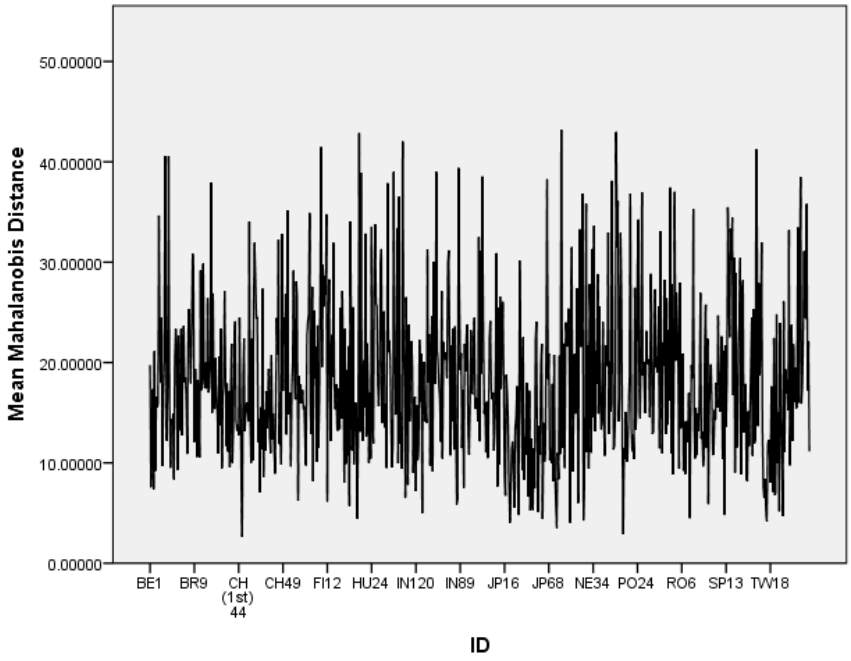


Figure 15 Mahalanobis distance (2)

According to Byrne (2010, p.102), the data needs to be multivariate normal to be suitable for SEM. However, the data used in these analyses does not fulfill this requirement as the critical ratio of 16.155 (see table 4) is greater than the suggested cut-off point of 5 (Bentler, 2005 in Byrne, 2010 p. 104). The individual critical ratios for skewness and kurtosis indicate that there are normality related issues with most of the variables. However, this is not a surprising finding due to the use of 5-point Likert scales in the questionnaire.

One solution to multivariate non-normality is to change the estimation method. According to Brown (1984a in Byrne, p. 105), asymptotic distribution-free (ADF) estimation can be used in such cases. However, ADF is not suitable for this analysis as the amount of data is not sufficient for using it. Instead, maximum likelihood (ML) estimation will be used in the analyses even though it is acknowledged that the results will not be as reliable as they would be if the data truly was multivariate normal.

Table 4 Assessment of normality

Assessment of normality (All)

Variable	min	max	skew	c.r.	kurtosis	c.r.
SocMP3	1,000	5,000	,041	,451	-,884	-4,925
SocMP2	1,000	5,000	-,351	-3,909	-,614	-3,419
SocMP1	1,000	5,000	,347	3,867	-1,325	-7,382
SMP1	1,000	5,000	-,018	-,201	-,930	-5,181
SMP2	1,000	5,000	-,111	-1,241	-,836	-4,658
SMP3	1,000	5,000	,346	3,859	-,986	-5,492
SMP4	1,000	5,000	,137	1,528	-,942	-5,249
EnvMP1	1,000	5,000	-,309	-3,442	-1,195	-6,659
EnvMP2	1,000	5,000	-,180	-2,008	-,749	-4,171
EnvMP3	1,000	5,000	-,222	-2,469	-,827	-4,609
EnvOP1	1,000	5,000	,405	4,510	-,147	-,821
EnvOP2	1,000	5,000	,579	6,451	-,144	-,804
SocOP1	1,000	5,000	,073	,816	-,424	-2,360
SocOP2	1,000	5,000	,218	2,434	-,666	-3,712
FP1	1,000	5,000	-,149	-1,664	-,253	-1,409
FP2	1,000	5,000	,045	,502	-,117	-,652
EnvP1	1,000	5,000	-,212	-2,359	-,483	-2,691
EnvP2	1,000	5,000	-,131	-1,459	-,575	-3,203
SocP1	1,000	5,000	-,236	-2,631	-,479	-2,667
SocP2	1,000	5,000	-,019	-,214	-,594	-3,308
SocP3	1,000	5,000	-,294	-3,280	-,583	-3,251
Multivariate					36,792	16,155

4.3.2. Factor analysis

Next, a factor analysis was run with SPSS in order to check that the variables included in the analysis load on the different factors as intended. The results of the factor analysis are shown in Appendix 1. As expected, the Principal Component Analysis with varimax-rotation resulted in

four factors including Sustainability Pressure, Sustainability Management Performance, Operational Sustainability Performance, and Financial Performance each consisting of 2 to 10 variables.

According to Hair et al. (2010, p. 117), loadings +/- 0.50 indicate practical significance. More precisely, they suggest that statistical significance is achieved when the factor loadings exceed 0.30 while sample size is at least 350. As the factor loadings shown in the Rotated Component Matrix are all above 0.30 and most of them close or above 0.7, they are considered adequate. Some of the communalities of the variables which indicate the "amount of variance accounted for by the factor solution for each variable" are below the suggested 0.50 level (Hair et al., 2009, p. 119). Although it is acknowledged that variables SocP1 (0.458), SocOP1 (0,473), and SocMP2 (0,499) are not that well represented in the factor solution, none of these variables are decided to be excluded at this point. Instead, these factors will be next used in a confirmatory factor analysis.

4.3.3. Confirmatory factor analysis

The confirmatory factor analysis (CFA) is used in order to test the validity of the measurement model underlying a full SEM -model (Byrne, 2010, p.164). The initial CFA model created based on the hypotheses introduced earlier is shown below in figure 16. The model consists of four latent variables and 21 observed variables.

Kline (2016, p. 269) suggests that out of all goodness-of-fit statistics at least Chi-square, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR) should be reported. According to his advice, the first three will be used in the following analyses, while SRMR will not, as it is not available in AMOS. Receiving a small Chi-square statistic with a large p-value is an indication of good fit (Hair et al., 2009, p. 666). However, the Chi-square statistic also poses some difficulties as due to mathematical reasons it tends to increase when the sample size and number of variables increases, often resulting in indicating poor fit between the theoretical model and reality (Hair et al., 2009, p. 666). Therefore, the Chi-square statistic becomes a less meaningful statistic with a large

sample size and/or large number of variables included in the model which suggests for using also other fit indices in the evaluation of model fit (Hair et al., 2009, p. 667). RMSEA is an often included measure to reduce this problem (Hair et al., 2009, p. 667) and its advised cut-off value is < 0.05 (Browne and Cuddeck, 1993 in Byrne 2010 p. 80). For CFI values above 0.95 indicate a good fit for the model (Hu and Bentler, 1999 in Byrne 2010 p. 78).

4.3.4. The initial model

The initial model is shown below in figure 16. Using ML estimation the initial model received the following fit statistics, indicating a poor overall fit of the model:

Chi-Square:	3134.480 (degrees of freedom=549, p=0.000)
CFI:	0.836
RMSEA:	0.056

In addition, the standardized residual covariances indicate that there are problematic variables included in the model. Acceptable values for variable pairs included in the standardized residual covariances matrix are between -2.58 and 2.58 (Jöreskog and Sörbom, 1993 in Byrne, 2010, p. 86). In total 10 out of 210 variable pairs received values outside this range.

In order to remedy these issues, modification indices (M.I.s) were inspected in order to determine whether there exist covariances between the error terms in the model. Several error term pairs with high M.I.s were identified, suggesting that they should be connected with error covariance. These error covariances connections are shown in the figure 17 below.

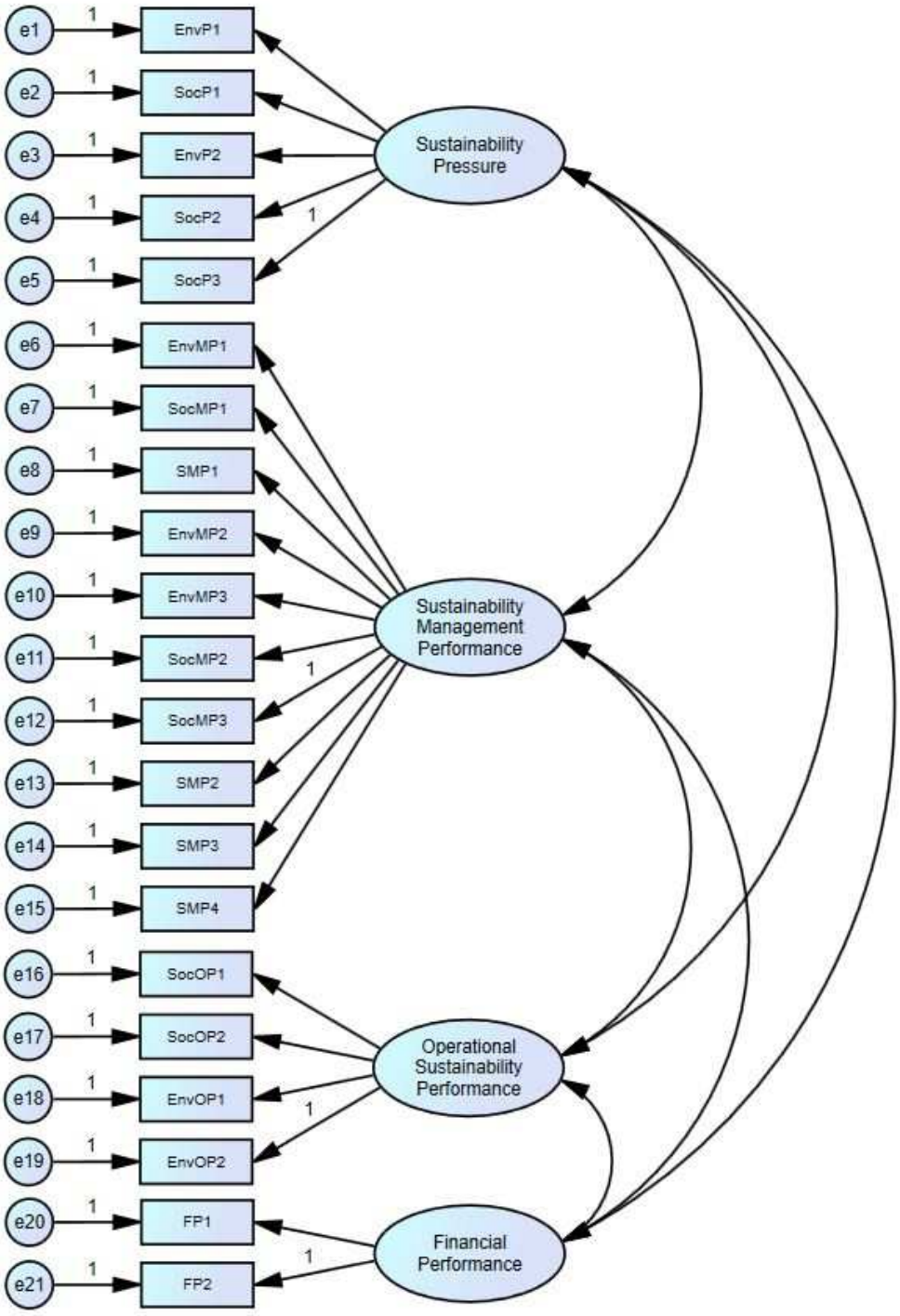


Figure 16 The initial model

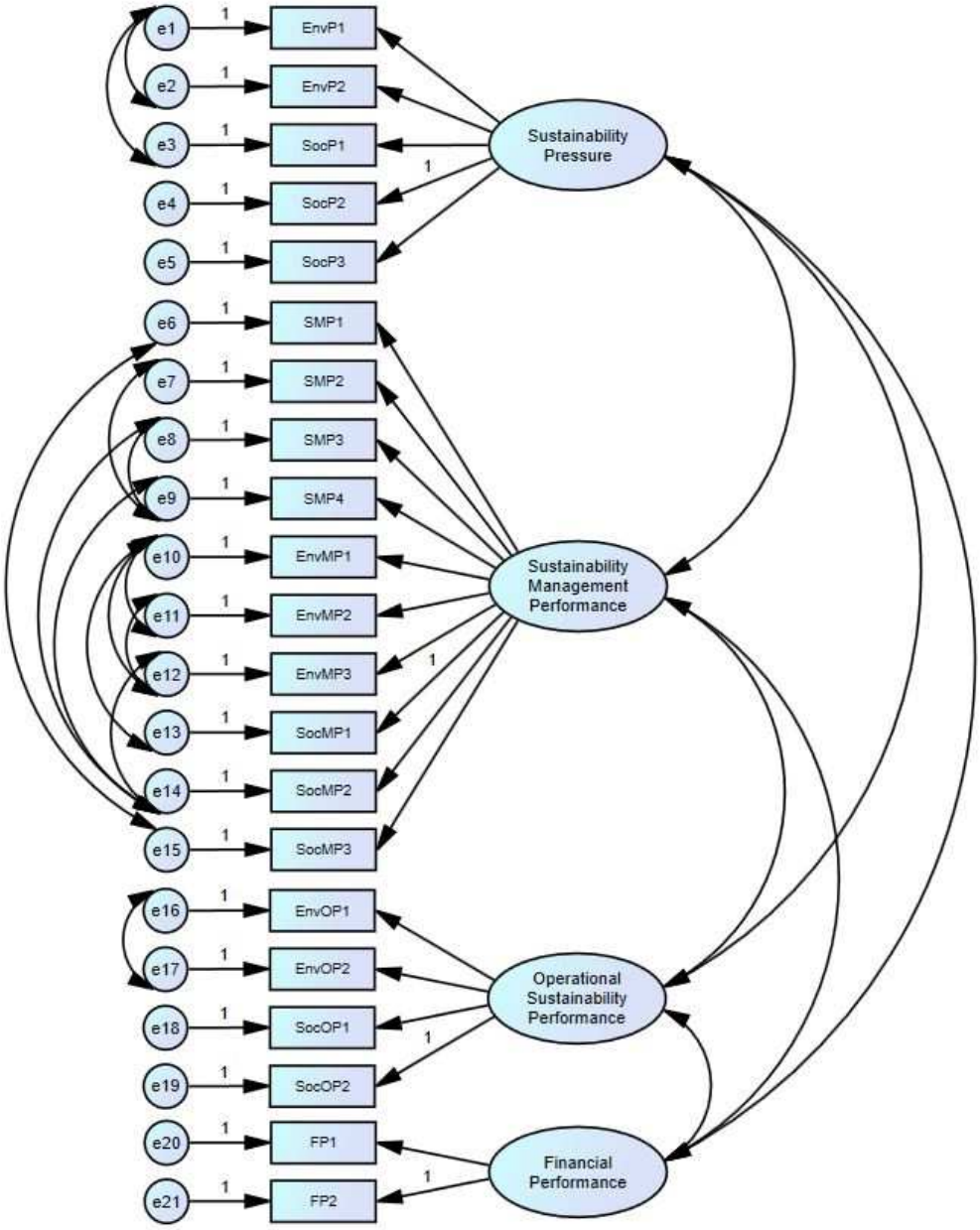


Figure 17 The initial model with error covariances

Although adding error covariances into the model improved the goodness of fit statistics remarkably (Chi-Square: 1204.874 degrees of freedom= 510, p=0.000, CFI: 0.956, RMSEA: 0.030), the standardized residual covariances still presented problems as five pairs did not fit in the acceptable range of standardized residual covariances. Thus, it was decided to exclude

variables from the model one-by-one until these problems would be solved. In total five variables including EnvP1, SocP1, SMP4, SocMP3, and EnvOP1, were deleted before the measurement model became acceptable and the problems related to the standardized residual covariances disappeared. After also including the error covariances in the model, the goodness of fit statistics were the following: Chi-Square: 662.487 (degrees of freedom: 279, p=0.000), CFI: 0.966, RMSEA: 0.030 suggesting a remarkable improvement to the initial model. Even though the value of Chi-square did not reach an acceptable level it decreased by nearly 80 % from its original value. As the values of CFI and RMSEA both reached their limits of acceptability, the revised CFA model was accepted. This model is shown below in figure 18.

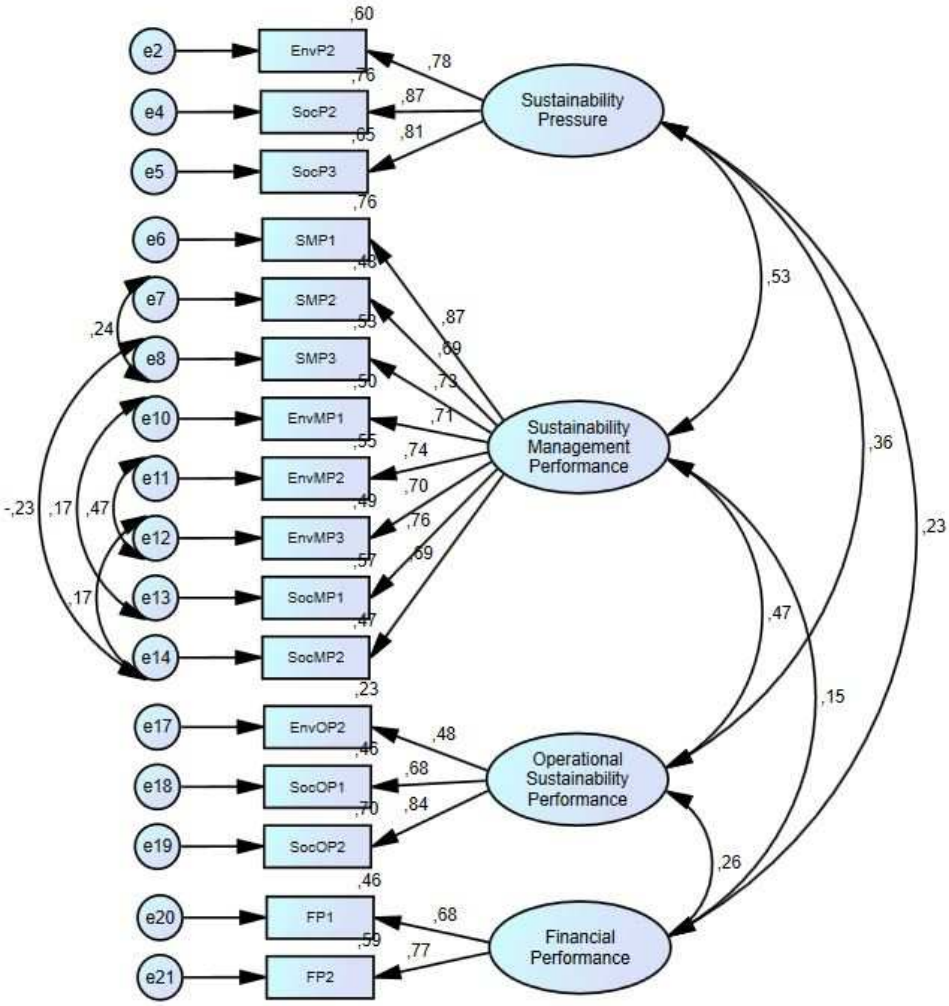


Figure 18 The revised CFA model

4.3.5. Construct validity

It is important to attain construct validity for the theoretical latent constructs included in the model. Next, one of the aspects of construct validity, namely convergent validity (Hair et al., 2010, p. 708-710) will be examined with the help of Amos Graphics and a third party excel tool provided by Statwiki (30.5.2016).

Convergent validity can be evaluated by assessing factor loadings (that need to be statistically significant and higher than 0.5), average variance extracted (AVE) (>0.5), and construct reliability (CR) (>0.6/0.7) (Hair et al., 2010, p. 709-710). All standardized factor loadings are significant, yet EnvOP2 does not exceed the limit of 0.5, with a loading of 0.477. The AVEs are higher than 0.5 for all other latent constructs except for Operational Sustainability Performance, which equals 0.461. The calculated CR values are acceptable for all constructs yet the CR value Financial Performance is slightly below 0.70 which might suggest a problem. However, the low AVE of Operational Sustainability Performance and unacceptable loading of the EnvOP2 variable are likely to pose a bigger problem for achieving construct validity, yet there EnvOP2 cannot be deleted for theoretical reasons, as it is the only environment related variable left measuring the OSP construct. See Appendix 2 for the tables related to construct validity assessment.

4.3.6. The full structural model

The full structural model is depicted in figure 19 below. The goodness of fit statistics of the full model are the following:

Chi-Square:	711,558 (degrees of freedom=288, p=0.000)
CFI:	0.962
RMSEA:	0.031

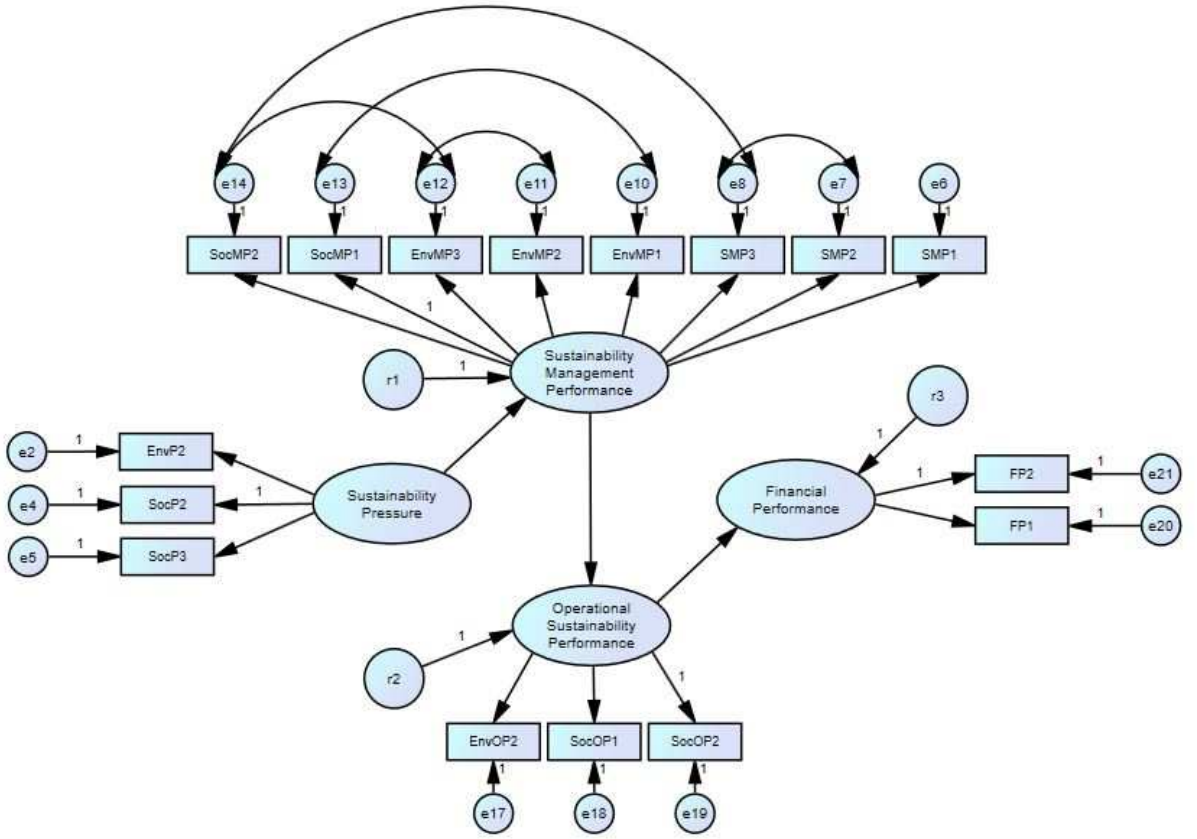


Figure 19 The full structural model

The H_1 was tested by comparing the direct influence of sustainability pressure to operational sustainability performance and the indirect path between the two via sustainability management performance. The standardized estimate of the direct effect was reduced from 0.343 to 0.155 as a consequence of adding the mediating construct in to the model. Furthermore, the paths between sustainability pressure and SMP as well as SMP and OSP are statistically significant (see table 5). However, also the path between sustainability pressure and OSP remained significant suggesting that full mediation does not occur. However, as the addition of SMP in the model reduced the standardized estimate of path between sustainability pressure and OSP, partial mediation is suggested (Hair et al., 2010, p. 768). To conclude, the research results offer only some support for H_1: sustainability management systems and programs mediate the positive relationship between external sustainability pressure and operational sustainability performance.

When analyzing the relationships between SMP and Financial Performance, it was found that OSP fully mediates this relationship as the direct path is no longer significant when the indirect path is included into the model (see table 6). Therefore, it can be concluded that H_2: improved operational sustainability performance mediates the positive relationship between the adoption of sustainability management systems and programs, is supported.

Finally, the direct impact of sustainability pressure on financial performance was compared to that mediated by the combined effect of SMP and OSP. The standardized estimate of the direct effect was reduced from 0.227 to 0.157 after including both SMP and OSP into the model. However, the direct path remained positive and significant suggesting that SMP and OSP do not fully mediate the relationship between sustainability pressure and financial performance (see table 7). As the relationships along the indirect path are significant as well, it indicates that a partial mediation occurs. However, the drop in the standardized estimation for the direct path is quite small and therefore the existence of even partial mediation is somewhat questionable. That being said, the research results offer only some support for H_3: improved sustainability management performance combined with improved operational sustainability performance mediate the positive relationship between external sustainability pressure and a company's financial performance, and further research is needed to confirm this partial mediation.

Table 5 Mediation effect (H_1)

			Estimate	S.E.	C.R.	P	Standardized Estimate
Operational Sustainability Performance	<---	Sustainability Pressure	0,3	0,037	8,025	***	0,343

			Estimate	S.E.	C.R.	P	Standardized Estimate
Sustainability Management Performance	<---	Sustainability Pressure	0,627	0,05	12,633	***	0,531
Operational Sustainability Performance	<---	Sustainability Management Performance	0,268	0,036	7,402	***	0,376
Operational Sustainability Performance	<---	Sustainability Pressure	0,13	0,042	3,099	0,002	0,155

Table 6 Mediation effect (H_2)

			Estimate	S.E.	C.R.	P	Standardized Estimate
Financial Performance	<---	Sustainability Management Performance	0,105	0,033	3,22	0,001	0,149

			Estimate	S.E.	C.R.	P	Standardized Estimate
Operational Sustainability Performance	<---	Sustainability Management Performance	0,324	0,031	10,531	***	0,465
Financial Performance	<---	Operational Sustainability Performance	0,229	0,058	3,914	***	0,239
Financial Performance	<---	Sustainability Management Performance	0,027	0,036	0,767	0,443	0,041

Table 7 Mediation effect (H_3)

			Estimate	S.E.	C.R.	P	Standardized Estimate
Financial Performance	<---	Sustainability Pressure	0,169	0,039	4,373	***	0,227

			Estimate	S.E.	C.R.	P	Standardized Estimate
Sustainability Management Performance	<---	Sustainability Pressure	0,628	0,049	12,759	***	0,536
Operational Sustainability Performance	<---	Sustainability Management Performance	0,33	0,031	10,676	***	0,477
Financial Performance	<---	Operational Sustainability Performance	0,188	0,05	3,78	***	0,267
Financial Performance	<---	Sustainability Pressure	0,121	0,038	3,18	0,001	0,157

4.4. Sustainability and size

In order to determine whether company size influences sustainability pressure and adoption and the financial benefits potentially gained from it, the companies were allocated into two groups of which the first consisted of medium-sized and the second of large companies. The first group includes those companies with 50 to 250 employees and maximum turnover of €50M. Similarly, the second group is for companies with 250 or more employees and turnover of more than €50M. Companies that fall between these two groups (exceed only one of these limits) are considered to belong to the second group. As companies with less than 50 employees that would classify as small companies were not included in the IMSS VI, the analysis will focus only on the potential differences between large and medium sized companies rather than large companies and SMEs.

The dataset consisting of 745 cases used for the analyses in the previous chapter was also used for the analyses related to company size. As company size was not offered directly, some assumptions had to be made in order to allocate the respondents into the two groups defined above. As the unit of analysis in the questionnaire was a manufacturing plant rather than the whole company, the number of employees and turnover were reported on a factory level. Therefore, this information can be used to divide the respondents to medium sized and large factories rather than to medium sized and large companies. Literature suggests, that the size of a factory does not have a similar expected impact on environmental performance as might be the case when analyzing the entire company (Grant, Bergesen, & Jones, 2002). Thus an additional variable related to the size of the manufacturing network was used to determine which of the medium-sized plants truly were medium-sized companies rather than a part of a larger company. Only those companies that had less than 250 employees, a maximum turnover of €50M, and classified as being the only factory belonging to the company were allocated to the first group and the rest were allocated to the second group, it is possible that some companies that actually were medium-sized ended up to the second group. With this allocation method, the first group consisting of medium-sized companies included 156 (20.9%) respondents and the second group of large companies 589 (79.1%) respondents.

The third research question is divided into two parts: the influence that company size has on perceived sustainability pressure and implementation of sustainability programs is examined by conducting a Mann-Whitney U test while determining the influence of size on the relationship between sustainability and financial performance is done via structural equation modeling.

4.4.1. Mann-Whitney U test

In order to examine whether there are sustainability related differences in the distributions between medium-sized and large companies, a Mann-Whitney U test was run on the data consisting of the remaining 745 cases. The Mann-Whitney U test was chosen as the method of analysis instead of the independent samples t-test because the data is not normally distributed for any of the variables according to the Shapiro-Wilk test (see appendix 3), and because Levene's test statistic indicates a problem with the homogeneity of variance for 16 out of the 33 variables.

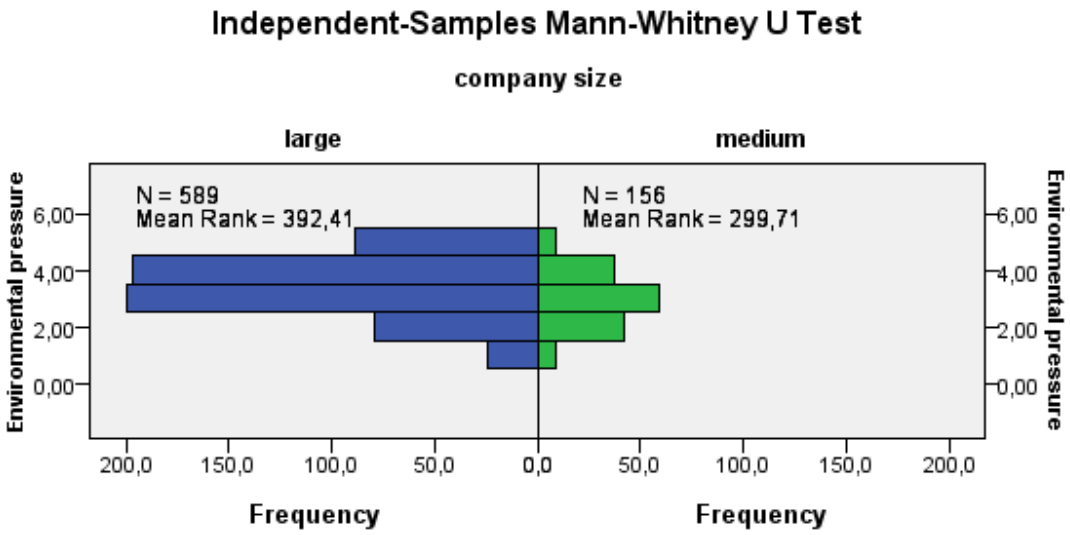
The Mann-Whitney U test compares the mean ranks of two independent groups. The null hypothesis for the test is as follows: "the distribution of *dependent variable* is the same across categories of *independent variable*". If the null hypothesis is accepted, it indicates that there is no significant difference between the two groups. If the null hypothesis is rejected, the alternative hypothesis that the distribution is not the same across categories is accepted. An example of the test results considering environmental pressure is depicted below in table 8 and figure 20.

Table 8 Example of Mann-Whitney U test results

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Environmental pressure is the same across categories of company size.	Independent-Samples Mann-Whitney U Test	,000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.



Total N	745
Mann-Whitney U	57 376,000
Wilcoxon W	231 131,000
Test Statistic	57 376,000
Standard Error	2 292,848
Standardized Test Statistic	4,987
Asymptotic Sig. (2-sided test)	,000

Figure 20 Example of Mann-Whitney U test results: Environmental pressure

The Mann-Whitney U test shows that there are differences between environmental pressure felt by medium and large manufacturing sites on a scale from very weak to very strong. The mean ranks indicate that the environmental pressure felt is higher for large (mean rank=392.41) than medium-sized (mean rank=299.71) manufacturing sites. As the asymptotic significance is less than 0.05, the difference between the two distributions is statistically significant.

For convenience, the results of the Man Whitney U tests are summarized in a table, which can be found in the appendix 4. The main results of the Mann-Whitney U tests on different variables are explained below.

Sustainability pressure

As already noted above, larger companies perceive environmental pressure to be stronger than medium-sized companies do. Similar results were also found for social pressure. In addition, the analysis results show that the major customers of larger companies are more appreciative of both social and environmental issues than customers of medium-sized companies are. However, the difference related to *more safe and health respectful processes* is not statistically significant.

However, overall these results indicate that medium-sized companies receive less pressure from their stakeholders to become more sustainable than larger companies do. Thus, H_4: Large companies experience more sustainability pressure from stakeholders than medium-sized companies do is supported.

Sustainability management systems

According to the data analysis, in terms of both effort invested and the current level of implementation, larger companies have significantly higher mean ranks in adoption of certifications, in the use of both environmental and social programs as well as in use of supplier related sustainability initiatives. These results support H_5: Large companies have adopted more sustainability management systems and programs than medium-sized companies have.

Sustainability performance

The mean ranks of two out of four sustainability performance improvement variables indicate that medium-sized companies have improved their sustainability performance more between 2010 and 2013 than what large manufacturing companies have, while the opposite is true for the two other variables. However, none of these variables show a significant difference between the mean ranks of large and medium-sized companies.

The current level of sustainability performance variables, on the other hand, show non-significant differences for three out of four variables, although the actual mean ranks are all

higher for larger companies. To sum up, the environmental and social performance variables indicate somewhat inconsistent results and due to lack of significant differences for 7 out of 8 variables it is concluded that H_6: Large companies have better sustainability performance than medium-sized companies is not supported.

4.4.2. Structural equation modeling: The impact of overall sustainability performance on the profitability of medium-sized and large manufacturing companies

In order to test the hypotheses H_7 (Large companies receive larger benefits from the adoption of sustainability management systems than medium-sized companies do) and H_8 (Medium-sized companies receive financial benefits from improving their sustainability performance), the structural equation model introduced in section 4.3. was intended to be analyzed further by examining the moderating effect of size on the relationship between OSP and financial performance. However, it was soon noted that the model created based on the whole sample including both large and medium-sized companies was not suitable for such an analysis. While the fit of the revised CFA model was acceptable for both large (Chi-square=244.619, CFI=0.965, RMSEA=0.053) and medium-sized companies (Chi-square=143.314, CFI=0.955, RMSEA=0.059), the basic factor structure differed for the group consisting of medium-sized companies as the estimate of one of the two observed variables loading on the financial performance construct turned out to be insignificant. As this finding refers to a lack of configural invariance, which is essential in order to be able to test whether a relationship between constructs is the same across different groups (Hair et al., 2010, pp. 758-762), it indicates that the potential differences between large and medium-sized companies cannot be tested with this dataset.

The reason why the dataset is not suitable for the comparison of medium-sized and large manufacturing companies might relate to the comparatively small number of medium-sized companies included in the data (156 out of 745 cases). Another possible explanation might be that these two observed variables related to financial performance, namely *change in sales* and *change in ROS*, behave differently when it comes to large and medium-sized companies. For medium-sized companies it is possible that an increase in sales requires relatively large

investments, which can cause a drop in ROS. In addition, only a small amount of variables related to financial performance were included in the questionnaire, which limited the possibilities available to measure the financial performance of companies.

Therefore, it is concluded that the hypotheses H_7: Large companies receive larger benefits from the adoption of sustainability management systems than medium-sized companies do and H_8: Medium-sized companies receive financial benefits from improving their sustainability performance cannot be tested in a trustworthy manner with this particular dataset. Further research on this topic is therefore suggested.

5. DISCUSSIONS

The influence of environmental and social management systems and environmental and social operational performance on companies' financial performance is somewhat tangled together and therefore it is sometimes difficult to separate these impacts from each other. Thus, it is not that easy to determine the causal relationships between the different dimensions.

According to the results received in the previous chapter, sustainability can be profitable. On the other hand, the results show that even though many manufacturing companies are including sustainability in their activities, it still is not a top priority for most of them and some of the companies seem to be only at the beginning of their sustainability journey. Especially smaller companies seem to be behind larger companies when it comes to the implementation of different sustainability programs. This finding was expected, as smaller companies tend to receive less encouragement towards engaging in sustainability. Interestingly, the level of operational sustainability performance, however, was not significantly lower for medium sized companies. This might be explained, for instance, by the adoption of informal rather than formal sustainability initiatives amongst medium-sized manufacturing companies but also other explanations are possible. In order to determine the main reasons behind this result, more research would be needed.

5.1. The impact of sustainability pressure on operational sustainability performance and financial performance

The results obtained from the SEM analysis indicate that sustainability pressure has a smaller direct influence on manufacturing companies' financial performance when also the indirect impact via SMP and OSP was included in the analysis. Yet, the change was not big enough to make the direct path insignificant. Instead, even with the SMP and OSP included in the model, the direct relationship between sustainability pressure and financial performance remained positive and significant even though the theory does not directly support this finding. In addition, according to the data, sustainability pressure has a direct positive impact also on operational

sustainability performance. One explanation for the unexpected results might be that not all impacts caused by sustainability related pressure are included in the data. In order to confirm this, more research will be required. It is possible, that the partial mediation effect related to H_1 as opposed to a full mediation effects largely explains the partial mediation effect related to H_3 as well.

5.2. Different aspects that may have an influence on the profitability of sustainability adoption

Although the hypothesis considering the link between sustainability and financial performance was supported, and this result supports earlier findings (Orlitzky et al., 2003; Molina-Azorín et al., 2009), it is important to note that the link between sustainability and profits is not self-evident. Even though in theory sustainability seems to encompass many potential benefits for those who adopt it, in practice there are a number of issues, which question the positivity of this relationship and can thus hinder the adoption of sustainability. Therefore, it is not guaranteed that each company will benefit similarly from engaging in sustainability.

First of all, it usually takes time before the monetary benefits related to sustainability are realized while costs often occur sooner. For instance, it can be assumed, that the implementation of environmental management practices causes negative financial impacts straight away while the positive impacts often require a longer time span (Yang et al., 2011). Also Molina-Azorín et al. (2009) suggest that it can take some time before the impacts of environmental management show in the company's performance. Same seems to be true also for social sustainability initiatives as the research results obtained by Gimenez et al. (2012) suggest that the impact of social initiatives on company's financial performance seem to be negative at least in the short-term. Stubblefield Loucks et al. (2010) point out that some sustainability benefits come sooner while others may require a longer time to be realized. Even though sustainability benefits tend to materialize in the long-term, it does not imply that the short-term view should or could be discarded (Hörisch et al., 2013). Instead, there is evidence that sustainability can also offer companies benefits and opportunities in the short-term (Hörisch et al., 2013).

It takes time and effort to implement environmental management practices company-wide, especially in larger companies. Even though cost reductions can start quite shortly after implementation, the image and reputational improvements are likely to take longer. Therefore, it is no wonder that it takes time before the benefits are completely monetized. On the other hand, some sustainability decisions can take considerably longer before they bring profits. For example, new sustainable product innovations can take a long time before they a reach full-scale production phase. Another question that remains is whether three years is a long enough time for sustainability efforts to generate positive results. Thus, it is possible that the financial performance improvements resulting from the sustainability efforts will not have been fully concretized yet. After all, the IMSS VI considers only a three-year time span.

Secondly, even though the results of this study indicate a positive link between sustainability programs, sustainability performance, and financial performance, it is not self-evident that sustainability is the cause and economic benefits the consequence. Another possibility is that better performing companies simply can afford to be more sustainable. Orlitzky et al. (2003) found in their study that there exists a so-called "virtuous cycle" between sustainability and profits. In other words, better performing companies can invest more into sustainability improvements, which in turn increases the financial success of the company.

Thirdly, doing "too much" is not economical. It has been proposed that companies "should invest in environmental activities only to the extent that their marginal benefit of doing so equals their marginal cost" (Darnall et al., 2008). It is more than possible that the costs of implementing some initiatives can be higher than what the obtained benefits will be (Sarkis, 2001). To allow the comparison of different initiatives, it is important that companies are able to make accurate estimates of the costs related to their products and processes (Sarkis and Rasheed, 1995). Schrettle et al. (2013) claim that companies need to be aware of not exceeding the optimal effort-performance-rate while adopting sustainability initiatives as customers may not value such efforts enough for them to be profitable. Thus, they propose that both customer preferences related to sustainability and the costs of implementing sustainable technology determine the link between a company's performance and its sustainability efforts (Schrettle et al., 2013). It is therefore essential that companies weigh the different options available to increase their

sustainability performance before charging in. However, when determining the costs and benefits, companies need to consider them both in the short and long term.

Fourth, the reason why companies decide to engage in sustainability is likely to have an influence on the received results. Wolf (2014) studied whether or not stakeholder pressure is the main reason for companies to improve their sustainability performance and found out that both external pressure and internal pressure have separate direct impacts. Darnall et al. (2008) on the other hand found that while both external pressure and internal resources and capabilities promote the implementation of more comprehensive EMSs, the latter resulted in better business performance on a facility level. These results suggest that the reason why sustainability is adopted as well as the company specific abilities have an influence on the overall success of the implementation of sustainability.

Fifth, in addition to sustainability benefits taking time, some of these benefits can also emerge in an indirect and perhaps less expected fashion. Schrettle et al. (2013) believe that decisions related to the sustainability challenge are of strategic nature. While the benefits received from the "low hanging fruits" (referring to the resource consumption related sustainability improvements which are rather straight forward for anyone to adopt) are easy to understand, (Hart and Ahuja, 1996), sustainability can offer companies a totally new direction. The resource-based view of the firm suggests that when companies undertake environmental strategies, they can simultaneously create new competencies and resources through the enhancement of both human resources and organizational capabilities which may result in competitive advantage if their development is unique when compared to competitors (Russo & Fouts, 1997). According to Crowe and Brennan (2007), environmental problems offer plenty of possibilities for gaining a competitive advantage. Many companies seem to have acknowledged this too as they are taking more collaborative approaches and realizing the potential for creating competitive advantages through adopting environmental strategies (Sarkis, 2001).

As all the potential benefits gained from sustainability adoption are not necessarily easy to estimate nor even to comprehend, these benefits might not be linked to sustainability at all, at least not at the time when a company is first considering whether and how to engage in sustainability. This might be reasonable, as the benefits that are based on the development of

competitive advantage include a lot more uncertainty in terms of both existence and volume than those received from reductions in resource use for instance. Yet, excluding the potential long-term benefits from the calculations can make sustainability to appear less tempting to managers. In addition, as suggested by Stubblefield Loucks et al (2010), the business case for sustainability differs between companies. As companies, industries, and sustainability programs vary a lot, companies need to consider which sustainability programs suit them best in order to achieve the best sustainability and financial results.

Finally, the extent of the benefits to be gained is likely to be dependent on the manner in which a company decides to adopt sustainability. Laszlo and Zhexembayeva (2011, p.100-106) divide companies into two groups, those who decide to embed sustainability and those who simply "bolt it on". The former refers to taking sustainability seriously and making the most of it by integrating it into the corporate strategy. Companies that use the bolt-on approach can be recognized, for instance, from having a separate sustainability strategy or having a sustainable product line amongst unsustainable product lines. Consequently, those who embed sustainability are more likely to also benefit from it more than companies who take it less seriously. (Laszlo and Zhexembayeva, 2011, p.100-106.)

5.3. Size is not the only factor that explains the differences between small and large companies when it comes to sustainability adoption

In addition to all the issues mentioned above, various other factors can have an influence on the success of sustainability implementation and therefore its impact on companies' financial performance. These include for instance site competence (Golini et al., 2014), the industry within which the company operates (Klassen and McLaughlin, 1996), and company size (Melnyk et al., 2003). According to the results obtained in the previous chapter, the medium-sized companies are not engaging in sustainability management programs in the same scale as larger companies are. However, Stubblefield Loucks et al. (2010) argue that small size is not the only issue determining the abilities of a company to adopt sustainable practices. Instead, they suggest that

SMEs possess several other characteristics that hinder the implementation of sustainability. Stubblefield Loucks et al. (2010) claim that in addition to size also other characteristics differentiate SMEs from larger companies in terms of their sustainability related activities. These characteristics include ownership structure, business culture, organizational and capital structures, employees' knowledge, values, skills and experience, the role of external personal relationships and social capital, business networks, relationships with governments, and visibility (Stubblefield Loucks et al., 2010).

6. CONCLUSIONS

In this chapter, the main results, both theoretical contributions and practical implications, limitations, as well as suggestions for further research are provided.

6.1. Research summary

The results obtained in this thesis confirmed the prevalent result of previous studies related to the impact sustainability has on companies' financial performance. However, this thesis also provided new evidence of how sustainability adoption has been developing recently amongst manufacturing companies.

According to the responses to the questionnaire, it seems that even though many companies are engaging in sustainability performance management, only a small portion have reached a high level of implementation, while some have not yet started their sustainability journey, at least not in a formal manner. The average level of implementation also varies between different types of sustainability programs.

The main conclusions that can be drawn from the analysis related to the first research question include the following:

1) environmental certificates are more commonly used than social certificates
2) more effort is put on internal sustainability programs than external programs
3) of the different sustainability programs health and safety related issues seem to be the top priority of companies suggesting that employees are put before the environment and society at large
4) operational social performance is both at a higher level and has been improved more than operational environmental performance
5) external environmental pressure is stronger than social pressure
6) Sustainability is not perceived as important as other product related attributes when it comes to winning orders

The dataset offers some insights to how companies are acting when it comes to sustainability, yet this level of analysis does not tell the whole truth. What remains unclear is whether the same companies are putting a lot of effort in all initiatives, or whether the opposite is true, indicating that different companies are focusing only on certain programs at a time.

The main findings related to the second research question reveal that sustainability performance seems to have a positive influence on manufacturing companies' financial performance. However, it was left unclear whether both medium-sized and large manufacturing companies are receiving financial benefits from their sustainability adoption.

According to the results obtained in this thesis, there still exist both medium-sized and large companies who have not engaged in sustainability and potentially question both the necessity of sustainability and the potential benefits it has to offer. It seems that especially medium-sized companies still require more motivation for the adoption of sustainability. Even though, sustainability is being increasingly recognized as an important aspect of business, it still seems that the majority of medium-sized manufacturing companies have not adopted sustainability related management systems and programs to the same extent as larger companies have. This is not surprising, as medium-sized manufacturing companies seem to experience less external sustainability related pressure than larger companies do and are often assumed to receive fewer benefits from engaging in sustainability as well. On the other hand, it seems that even if medium-sized manufacturing companies are not as keen to adopt sustainability management systems and programs, they are not necessarily that far behind larger companies when it comes to their level of operational sustainability performance. This might be explained by the use of less formal tools, for instance.

The importance of sustainability is expected to increase in the future, which implies that there are both moral as well as business reasons that urge companies to engage in sustainable behavior. In addition to having a big influence on sustainability related issues, companies need to also ensure their own existence by securing resource sufficiency and maintaining their license to operate. As the pressures grow, it is essential, that companies find profitable ways to take both social and

environmental issues into consideration in order to guarantee their own long-term survival in the changing environment.

6.2. Theoretical contributions

The main theoretical contribution of this thesis centers on the relationships between external sustainability pressure, sustainability management performance, operational sustainability performance, and financial performance. The obtained results confirm the hypothesized positive relationships between SMP, OSP, and financial performance amongst manufacturing companies. Instead of expected full mediation, the results indicate a partial mediation of SMP on the relationship between sustainability pressure and OSP as well as a partial mediation of SMP and OSP on the relationship between sustainability pressure and financial performance. To my knowledge, similar studies have not been conducted previously.

6.3. Practical implications

Even though there exist well known examples of companies, such as Walmart and Patagonia, who have adopted sustainability and succeeded (Bogue, 2014), many managers still have doubts of the benefits of fully engaging to sustainability. Hertin et al. (2008) suggest that perceived high costs associated with environmentally friendly behavior, lack of felt responsibility and considering environmental resources as free goods may hinder the adoption of environmentally friendly behavior amongst companies. Therefore, the results obtained in this thesis are important as they indicate that companies can benefit financially from improving their operational sustainability performance.

6.4. Limitations

As sustainability is such a complex issue it is next to impossible to create a study that would take into consideration all of the different aspects at once. The research conducted in this thesis also

has its limitations, of which the most important ones are explained below. According to Etzion (2007, p.655), the "research on environmental performance is plagued by insufficient data". Thus, it is not surprising that most of the limitations listed below are related to the data used in the analysis.

First, the fact that the data used in the analysis was not collected precisely for the use of this study can be considered a limitation of this thesis. As the dataset used in the analysis was collected as a part of a larger survey, I was not able to influence the questions included in the questionnaire. It is possible that the ability to influence the questions asked would have resulted in more interesting and useful answers. On the other hand, without taking part in the IMSS VI, I would not have been able to use such a vast and international dataset for my analysis. In addition, the fact that the questionnaire was created by professionals increases the trust that can be placed on the results obtained from the analysis.

Second, the IMSS VI survey did not focus solely on sustainability related issues. This approach contains both advantages and disadvantages. As sustainability was not the only topic, it might reduce the likelihood of inclusion of social desirability bias in the responses (Crowe and Brennan, 2007). On the other hand, there were only a limited amount of sustainability related questions included in the survey and some additional questions could have been useful for the interpretation the results. The lack of sustainability related questions has been recognized as a problem with earlier IMSS surveys as well (Gimenez et al., 2012; Crowe and Brennan, 2007).

For instance, the survey does not reveal for how long companies have used different sustainability programs and certificates (Gimenez et al., 2012). In addition, even though there are various ways to benefit from sustainability, only improvements in certain environmental and social operational performance were included in the survey. This implies that the data does not necessarily capture all competencies and resources that have an impact on sustainability related matters (Crowe and Brennan, 2007). For instance, according to Sharma and Vredenburg (1998) sustainability related innovations have an important role in turning sustainability into a competitive advantage. Yet, this topic was not included in the data, which might lead to somewhat distorted results.

In addition, the data does not reveal how important companies themselves see this topic even though this information might have an impact on the hypothesized model analyzed in this thesis. Wolf (2014) studied whether or not stakeholder pressure is the main reason for companies to improve their sustainability performance and found out that both external pressure and internal pressure have separate direct impacts. Even though it is acknowledged that stakeholder pressure is not the only issue that drives companies toward increased sustainability performance, variables related to the internal realization were not included in the IMSS VI. Therefore, the impact of internal motivation to sustainability engagement could not be included in the analysis even if it perhaps should have been as internal motivation too can have a big impact on how sustainability is both approached to and benefitted from.

Third, much of the data used in the analyses is based on the respondents' perceptive self-assessment on a scale from 1 to 5, which is not the same as having exact, quantifiable data. As such, the dataset does not allow the comparison of the actual operational sustainability performance (such as concrete pollution levels) of the studied companies. Thus, the results received are not as reliable and valid as results based on actual values would be (Hertin et al., 2008). The use of such measures is however justified, as it still offers information of the current situation and also ensures perhaps a better comparability of the data. Furthermore, it can be the only way that this kind of information can be obtained (Melnyk et al., 2003). The way the questionnaire has been formulated regarding to both operational environmental and social performance, allows the comparison between a large number of different manufacturing sites and can be perceived as good enough indicator of the underlying sustainability performance of the respondents. However, self-reported data contains the possibility of being biased (Darnall et al., 2008) and limits the validity of the research results (Hertin et al., 2008).

Fourth, as the sample consists of respondents belonging only to certain manufacturing industries the results cannot be generalized to all companies operating in all industries. On the other hand, the international dataset does not take into account the potential regional differences and therefore the results would not necessarily be the same if only companies from a particular area were examined. In addition, the generalizability of the results is questionable as the operational sustainability performance is included in the model only narrowly (Trump et al., 2015).

Finally, the problems that were faced during the data analysis related to non-normally distributed data and certain problems with validity and reliability of the model limit the validity and generalizability of findings obtained in this thesis.

6.5. Suggestions for further research

There are a number of issues that were excluded from this study that could offer more information about the relationships examined in this thesis. Firstly, as the dataset consists of responses from several countries, it could be examined whether the relationships between the factors remain the same when considered only European or Asian companies, for instance. Secondly, as there seems to be certain differences between social and environmental issues, it would be justified to test whether the relationships are similar when social and environmental issues are examined separately. Third, a longitudinal study related to these issues using either previous and/or future IMSS data, would be interesting and remove some of the limitations related to this research.

On the other hand, a similar study could be conducted with more suitable data including actual performance levels and broader set of variables related on operational sustainability performance to confirm the results obtained in this thesis. As it remains unclear whether there are differences between large and medium-sized manufacturing companies when it comes to the profitability of sustainability adoption, also this could be studied further. The use of more evenly distributed data in terms of company size as well as including more variables related to financial performance would likely allow this kind of analysis to be conducted. Furthermore, the influence of internal realization of the importance of sustainability adoption should perhaps be included in the model in order to obtain more interpretable results. Exploring all these aspects further would create a more comprehensive picture of the overall relationships between the different sustainability aspects and companies' overall performance.

REFERENCES

Albino, V., Balice, A., and Dangelico, R.M. (2009) "Environmental strategies and green product development: an overview on sustainability-driven companies", *Business Strategy and the Environment*, Vol. 18, pp. 83–96.

Anstine, J. (2000) "Consumers' willingness to pay for recycled content in plastic kitchen garbage bags: a hedonic price approach", *Applied Economics Letters* 7:1, pp. 35–39.

Anstine, J. (2007) "Organic and All Natural: Do Consumers Know the Difference?", *Journal of Applied Economics and Policy*, Vol. 26, No. 1, pp. 15-27.

Barney J. (1995) "Looking inside for competitive advantage", *The Academy of Management Executive*, Vol. 9, No. 4, pp. 49–61.

Baumann-Pauly, D., Wickert, C., Spence, L.J. and Scherer A.G. (2013) "Organizing corporate social responsibility in small and large firms: Size matters", *Journal of Business Ethics*, Vol. 115, pp. 693-705.

Bogue, R. (2014) "Sustainable manufacturing: a critical discipline for the twenty-first century", *Assembly Automation*, Vol. 34, No. 2, pp. 117–122.

Bradford, J. and Fraser, E.D.G. (2008) "Local Authorities, Climate Change and Small and Medium Enterprises: Identifying Effective Policy Instruments to Reduce Energy Use and Carbon Emissions", *Corporate Social Responsibility and Environmental Management*, Vol. 15, pp. 156-172.

Brundtland Commission, United Nations General Assembly (1987) "Report of the World Commission on Environment and Development: Our Common Future", p.300.

BSI Group (2016) "ISO 45001 Whitepaper - A new International Standard for Occupational Health and Safety Management Systems Approaching change". Online. Available at: http://www.bsigroup.com/LocalFiles/en-IN/Resources/BSI-ISO45001-Revision-Whitepaper.pdf, [26.5.2016]

Buysse, K. and Verbeke, A. (2003) "Proactive environmental strategies: A stakeholder management perspective", *Strategic Management Journal*, 24, pp. 453-470.

Byrne B.M. (2010) Structural Equation Modeling with AMOS - Basic Consepts, Applications, and Programming, second edition, Routledge, Taylor & Francis Group, University of Ottawa, Ottawa, Ontario, Canada, p. 396.

Clemens, B. (2006) “Economic incentives and small firms: does it pay to be green?”, *Journal of Business Research*, Vol. 59, No. 4, pp. 492-500.

Cohen, M. J. (2007) “Consumer credit, household financial management, and sustainable consumption”, *International Journal of Consumer Studies*, Vol. 31, No. 1, pp. 57-65.

Crowe, D. and Brennan, L. (2007) “Environmental Considerations within Manufacturing Strategy: an International Study”, *Business Strategy and the Environment*, Vol. 16, pp 266-289.

Darnall, N. and Edwards Jr., D., (2006) “Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure”, *Strategic Management Journal*, Vol. 27, pp. 301–320.

Darnall, N., Henriques, I., and Sadorsky, P. (2008) “Do Environmental Management Systems Improve Business Performance in an International Setting?”, *Journal of International Management*, Vol. 14, pp. 364-376.

Donaldson, T. and Preston, L. E. (1995) “The stakeholder theory of the corporation: Concepts, evidence, and implications”, *Academy of Management Review*, Vol. 20, No. 1, pp. 65-91.

Dyllick, T. and Hockerts, K. (2002) “Beyond the business case for corporate sustainability”, *Business Strategy and the Environment*, 11, pp. 130–141.

Elkington, J. (1994) “Towards the sustainable corporation: Win–win–win business strategies for sustainable development”, *California Management Review*, Vol 36 No. 2, pp. 90–100.

EMAS (2016). Online. Available at: http://ec.europa.eu/environment/emas/documents/articles_en.htm, [26.5.2016]

Etzion, D. (2007) “Research on Organizations and the Natural Environment 1992-Present: A Review”, *Journal of Management*, Vol.33, No. 4, pp. 637-664.

European Commission (2015). Online. Available at: http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm, [13.10.2015]

Florida, R. (1996) “Lean and green: The move to environmentally conscious manufacturing”, *California Management Review*, Vol. 39, No. 1, pp. 80-105.

Fombrun, C. and Shanley, M. (1990) “What’s in a name? Reputation building and corporate strategy”, *Academy of Management Journal*, Vol. 33, Issue 2, pp. 233–258.

Foster, C., and Green, K. (2000) “Greening the innovation process”, *Business Strategy and the Environment*, Vol. 9, pp. 287-303.

Frooman, J. (1999) “Stakeholder influence strategies”, *Academy of Management Review*, Vol. 24, No. 2, pp. 191-205.

Gimenez, C., Sierra, V., and Rodon, J. (2012) “Sustainable operations: Their impact on the triple bottom line” *International Journal of Production Economics*, Vol. 140, pp. 149–159.

Golini, R., Longoni, A., and Cagliano, R., (2014) “Developing sustainability in global manufacturing networks: The role of site competence on sustainability performance”, *International Journal of Production Economics*, Vol. 147, Part B, pp. 448-459.

Grant, D. S. I., Bergesen, A. J., and Jones, A. W. (2002) “Organizational size and pollution: The case of the U.S. chemical industry”, *American Sociological Review*, Vol. 67, No. 3, pp. 389-407.

Hair, Jr. J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2010) Multivariate Data Analysis – A Global Perspective, seventh edition, Pearson Education, Inc., Upper Saddle River, New Jersey, p. 800.

Handfield, R., Walton, S., Seegers, L., and Melnyk, S. (1997) “Green value chain practices in the furniture industry”, *Journal of Operations Management*, Vol. 12, No. 5, pp. 38–53.

Hart, S.L. and Ahuja, G., (1996) “Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance”, *Business Strategy & the Environment*, Vol. 5, Issue 1, pp. 30–37.

Hertin, J., Berkhout, F., Wagner, M., and Tyteca, D. (2008) “Are EMS environmentally effective? The link between environmental management systems and environmental performance in European companies”, *Journal of Environmental Planning and Management*, Vol. 51, No. 2, pp. 259-283,

Hillary, R. (2004) “Environmental management systems and the smaller enterprise”, *Journal of Cleaner Production*, Vol. 12, pp. 561–569.

Hindmarsh, R. (2010) “Wind farms and community engagement in Australia: A critical analysis for policy learning”, *East Asian Science, Technology and Society*, Vol. 4, Issue 4, pp. 541-563.

Holt, D. and Ghobadian, A. (2009) “An empirical study of green supply chain management practices amongst UK manufacturers”, *Journal of Manufacturing Technology Management*, Vol. 20, No. 7, pp. 933–956.

Hult, G.T.M., Ketchen, Jr. D.J., Griffith, D.A., Finnegan, C.A., Gonzalez-Padron, T., Harmancioglu, N., Ying Huang, Y., Talay, M.B., and Cavusgil, S.T. (2008) "Data equivalence in cross-cultural international business research: assessment and guidelines", *Journal of International Business Studies*, Vol. 39, pp. 1027-1044.

Hunt, C. B., and Auster, E. R. (1990) "Proactive environmental management: Avoiding the toxic trap", *Sloan Management Review*, Vol. 31, No. 2, pp. 7-18.

Hörisch, J., Freeman, R. E., and Schaltegger, S. (2014) "Applying Stakeholder Theory in Sustainability Management: Links, Similarities, Dissimilarities, and a Conceptual Framework", *Organization & Environment*, Vol. 27, No. 4, pp. 328-346.

IMSS (2015). Online. Available at: http://www.manufacturingstrategy.net/ , [26.10.15]

IMSS VI Questionnaire, 2013

IMSS VI Start-up package, 2013

ISO (2016) Online. Available at: http://www.iso.org/iso/news.htm?refid=Ref1868, [26.5.2016]

Jabbour, C. and Santos, F. (2006) "The evolution of environmental management within organizations: toward a common taxonomy", *Environmental Quality Management*, Vol. 16, No. 2, pp. 43-59.

Jiang, R. J. and Bansal, P. (2003) "Seeing the need for ISO 14001", *Journal of Management Studies*, Vol. 40, No. 4, pp. 1047-1067.

Johansson, G. and Winroth, M. (2010) "Introducing environmental concern in manufacturing strategies: implications for the decision criteria", *Management Research Review*, Vol. 33, No. 9, pp. 877-99.

Johnstone, N. and Labonne, J. (2009) "Why do manufacturing facilities introduce environmental management systems? Improving and/or signaling performance", *Ecological Economics*, Vol. 68, pp. 719–730.

King, A.A., Lenox, M.J., and Terlaak, A. (2005) "The strategic use of decentralized institutions: Exploring certification with the ISO 14001 management standard", *Academy of Management Journal*, Vol. 48, No. 6, pp. 1091-1106.

Kitazawa, S., and Sarkis, J. (2000) "The relationship between ISO 14001 and continuous reduction programs", *International Journal of Operations & Production Management*, Vol. 20, Issue 2, pp. 225–248.

Klassen, R.D. and McLaughlin, C.P. (1996) “The impact of environmental management on firm performance”, *Management Science*, Vol. 42, Issue 8, pp. 1199–1214.

Kleindorfer, P. R., Singhal, K., and Van Wassenhove, L. N. (2005) “Sustainable Operations Management”, *Production and Operations Management*, Vol. 14, Winter, pp. 482-492.

Kline, R. B. (2016) “Principles and practice of structural equation modelling” (4th edition), New York, The Guilford Press

Laugen, B. T., Acur, N., Boer, H., and Frick, J. (2005) “Best Manufacturing Practices – What Do the Best-Performing Companies Do?”, *International Journal of Operations Management*, Vol.25, No. 2, pp.131-150.

Lazlo, C. and Zhexembayeva, N. (2011) Embedded sustainability: the next big competitive advantage, Greenleaf Publishing, Sheffield, p. 269

Lee, M. (2008) “A review of the theories of corporate social responsibility: its evolutionary path and the road ahead”, *International Journal of Management Reviews*, Vol. 10 No. 1, pp. 53-73.

Lovins, A.B., Lovins, L.H., and Hawken, P. (2007) “A Road Map for Natural Capitalism”, *Harvard Business Review*, Vol. 85, no. 7,8, p. 172-183.

Luchs, M.G., Walker Naylor, R., Irwin, J.R., and Raghunathan, R. (2010) “The sustainability liability: potential negative effects of ethicality on product preference”, *Journal of Marketing*, Vol. 74, Issue 5, pp. 18–31.

McGee, J. (1998) “Commentary on corporate strategies and environmental regulations: An organizing framework by A. M. Rugman and A. Verbeke”, *Strategic Management Journal*, Vol. 19, pp. 377-387.

Melnyk, S.A., Sroufe, R.P., and Calantone, R. (2003) “Assessing the impact of environmental management systems on corporate and environmental performance”, *Journal of Operations Management*, Vol. 21, pp. 329–351.

Mirvis, P. H. (1994) “Environmentalism in progressive businesses”, *Journal of Organizational Change Management*, Vol. 7, pp. 82-100.

Mohrman, S.A., and Worley, C.G. (2010) “The organizational sustainability journey: introduction to the special issue”, Organizational Dynamics, Vol. 39, Issue 4, pp. 289–294.

Molina-Azorín, J.F., Claver-Cortés, E., López-Gamero, M.D., and Tarí, J.J. (2009) "Green management and financial performance: a literature review", *Management Decision*, Vol. 47 No. 7, pp. 1080-1100.

Montiel, I., and Delgado-Ceballos, J. (2014) "Defining and measuring corporate sustainability: Are we there yet?", *Organization & Environment*, Vol. 27, No. 2, pp. 113-139.

Murillo, D. and Lozano, J.M. (2006) "SMEs and CSR: An Approach to CSR in their Own Words", *Journal of Business Ethics*, Vol. 67, pp. 227–240.

Oliver, C. (1997) "Sustainable competitive advantage: combining institutional and resource-based views", *Strategic Management Journal*, Vol. 18, pp. 697–713.

Orlitzky, M. (2001), "Does firm size confound the relationship between corporate social performance and firm financial performance?", *Journal of Business Ethics*, Vol. 33, No. 2, pp. 167-80.

Orlitzky, M. Schmidt, F.L., and Rynes, S.L. (2003) "Corporate Social and Financial Performance:

A Meta-analysis", *Organization Studies*, Vol. 24, No. 3, pp. 403–441.

Paloviita, A. and Luoma-aho, V. (2010) "Recognizing definitive stakeholders in corporate environmental management", *Management Research Review*, Vol. 33, No. 4, pp. 306-16.

Pedersen, E. R., and Neergaard, P. (2006) "Caveat emptor—Let the buyer beware! Environmental labelling and the limitations of "green" consumerism", *Business Strategy and the Environment*, Vol. 15, pp.15-29.

Phillips, R.A., Freeman, R.E., and Wicks, A.C. (2003) "What stakeholder theory is not", *Business Ethics Quarterly*, Vol. 13, Issue 4, pp. 479-502.

Porter, M. E. (1990) "The competitive advantage of nations", *Harvard Business Review*, Vol. 68, No. 2, pp. 73-93.

Potoski, M. and Prakash, A. (2005) "Covenants with weak swords: ISO 14001 and facilities' environmental performance", *Journal of Policy Analysis and Management*, Vol. 24, No.4, pp. 745–769.

Rao, P. and Holt, D. (2005) "Do green supply chains lead to competitiveness and economic performance?" , International Journal of Operations & Production Management, Vol. 25, No. 9, pp. 898-916.

Rivera, J. (2002) “Assessing a voluntary environmental initiative in the developing world: the Costa Rican certification for sustainable tourism”, *Policy Sciences*, Vol. 35, Issue 4, pp. 333–360.

Russo, M.V., Fouts, P.A. (1997) “A resource-based perspective on corporate environmental performance and profitability”, *Academy of Management Journal*, Vol. 40, pp. 534–559.

Russo, A. and Tencati, A. (2009) “Formal vs. informal CSR strategies: evidence from Italian micro, small, medium-sized, and large firms”, *Journal of Business Ethics*, Vol. 85, No. 2, pp. 339-353.

Sarkis, J. (2001) “Manufacturing's role in corporate environmental sustainability Concerns for the new millennium”, *International Journal of Operations & Production Management*, Vol. 21 No. 5/6, pp. 666-686.

Sarkis, J. and Rasheed A. (1995), “Greening the Manufacturing Function”, *Business Horizons*, Vol. 38, Issue 5, pp. 17–27.

Schrettle, s., Hinz, A., Scherrer-Rathje, M., and Friedli, T. (2013) “Turning sustainability into action: Explaining firms' sustainability efforts and their impact on firm performance”, *International Journal of Production Economics*, Vol. 147, pp. 73–84.

Sharma, S., Vredenburg, H., (1998) “ Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities”, *Strategic Management Journal*, Vol. 19, pp. 729–753.

Slaper, T. F. and Hall, T.J. (2011) “The Triple Bottom Line: What Is It and How Does It Work?” *Indiana Business Review*, Vol. 86, No. 1, pp. 4-8.

Smith, N. C. (2003) “Corporate social responsibility: Whether or how?” *California Management Review*, Vol. 45, Issue 4, pp. 52-76.

Social Accountability International (June 2014) “Social Accountability 8000 International Standard”. Online. Available at: http://sa-intl.org/_data/n_0001/resources/live/SA8000%20Standard%202014.pdf, [26.5.2016]

Social Accountability International (2016). Online. Available at: http://www.saasaccreditation.org/certfacilitieslist.htm, [26.5.2016]

Sroufe, R. (2003) “Effects of environmental management systems on environmental management practices and operations”, Production and Operations Management, Vol. 12, No. 3, pp. 416-431.

Statistics Finland (2015). Online. Available at: http://tilastokeskus.fi/tup/suoluk/suoluk_yritykset.html, [13.10.2015]

Statwiki (2016). Online. Available at http://statwiki.kolobkreations.com/, [30.5.2016]

Stubblefield Loucks, E., Martens, M.L., and Cho, C.H. (2010) "Engaging small- and medium-sized businesses in sustainability", *Sustainability Accounting, Management and Policy Journal*, Vol. 1 No. 2, pp. 178-200.

Suchman, M.C. (1995) "Managing legitimacy: strategic and institutional approaches", *Academy of Management Review*, Vol. 20, pp. 571–610.

Theyel, G. and Hofmann , K. (2012) "Stakeholder relations and sustainability practices of US small and medium-sized manufacturers", Management Research Review, Vol. 35, No. 12, pp. 1110-1133.

Tilley, F. (1999) "The gap between the environmental attitudes and the environmental behaviour of small firms", *Business Strategy and the Environment*, Vol. 8, pp. 238-248.

Trump, C., Endrikat, J., Zopf, C., and Guenther, E. (2015) "Definition, Conceptualization, and Measurement of Corporate Environmental Performance: A Critical Examination of a Multidimensional Construct", *Journal of Business Ethics*, Vol.126, pp.185–204.

Turban, D.B. and Greening D.W. (1997) "Corporate social performance and organizational attractiveness to prospective employees", *Academy of Management Journal*. Vol. 40 Issue 3, pp. 658-672.

The United States Environmental Protection Agency (EPA) (2015a). Online. Available at: http://archive.epa.gov/sustainablemanufacturing/web/html/, [18.10.2015]

The United States Environmental Protection Agency (EPA) (2015b). Online. Available at: http://www2.epa.gov/ems [29.10.2015]

Vyakarnam, S., Bailey, A., Myers, A., and Burnett, D. (1997) "Towards an Understanding of Ethical Behaviour in Small Firms", *Journal of Business Ethics*, Vol. 16, No. 15, pp. 1625–1636.

Walley, N. and Whitehead, B. (1994) "It's not easy being green", *Harvard Business Review*, Vol. 72, Issue 3, pp. 46–52.

Wolf, J. (2014) "The Relationship between Sustainable Supply Chain Management, Stakeholder Pressure and Corporate Sustainability Performance", *Journal of Business Ethics*, Volume 119, Issue 3, pp. 317-328.

Yang, M.G., Hong, P., and Modi, S.B. (2011)"Impact of lean manufacturing and environmental management on business performance: An empirical study of manufacturing firms", *International Journal of Production Economics*, Vol.129, pp. 251–261.

APPENDICES

Appendix 1: Results of the factor analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,894
Bartlett's Test of Sphericity	Approx. Chi-Square	8084,069
	df	210
	Sig.	,000

Rotated Component Matrix[a]

	Component			
	1	2	3	4
FP1				,800
FP2				,819
EnvP1		,696		
EnvP2		,746		
SocP1		,658		
SocP2		,756		
SocP3		,772		
SocOP1			,508	,378
SocOP2			,662	
EnvOP1			,773	
EnvOP2			,827	
SMP1	,811			
SMP2	,740			
SMP3	,756			
SMP4	,742			
EnvMP1	,714			
EnvMP2	,775			
EnvMP3	,748			
SocMP1	,739			
SocMP2	,684			
SocMP3	,726			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Communalities

	Initial	Extraction
FP1	1,000	,649
FP2	1,000	,683
EnvP1	1,000	,527
EnvP2	1,000	,657
SocP1	1,000	,458
SocP2	1,000	,691
SocP3	1,000	,675
SocOP1	1,000	,473
SocOP2	1,000	,550
EnvOP1	1,000	,613
EnvOP2	1,000	,706
SMP1	1,000	,729
SMP2	1,000	,600
SMP3	1,000	,628
SMP4	1,000	,654
EnvMP1	1,000	,565
EnvMP2	1,000	,634
EnvMP3	1,000	,610
SocMP1	1,000	,599
SocMP2	1,000	,499
SocMP3	1,000	,601

Extraction Method: Principal Component Analysis.

Appendix 2: Construct validity

Regression Weights: (All - Default model)

			Estimate	S.E.	C.R.	P	Label
SocP3	<---	Sustainability_Pressure	,950	,039	24,133	***	
SocP2	<---	Sustainability_Pressure	1,000				
EnvP2	<---	Sustainability_Pressure	,845	,036	23,178	***	
FP2	<---	Financial_Performance	1,000				
FP1	<---	Financial_Performance	,913	,167	5,477	***	
SocOP2	<---	Operational_Sustainability_Performance	1,000				
SocOP1	<---	Operational_Sustainability_Performance	,813	,061	13,343	***	
EnvOP2	<---	Operational_Sustainability_Performance	,573	,053	10,780	***	
EnvMP3	<---	Sustainability_Management_Performance	,743	,039	19,063	***	
EnvMP2	<---	Sustainability_Management_Performance	,768	,038	20,380	***	
EnvMP1	<---	Sustainability_Management_Performance	,903	,042	21,389	***	
SMP3	<---	Sustainability_Management_Performance	,784	,039	19,899	***	
SMP2	<---	Sustainability_Management_Performance	,714	,038	18,878	***	
SMP1	<---	Sustainability_Management_Performance	,928	,038	24,356	***	
SocMP1	<---	Sustainability_Management_Performance	1,000				
SocMP2	<---	Sustainability_Management_Performance	,695	,037	18,598	***	

Standardized Regression Weights: (All - Default model)

			Estimate
SocP3	<---	Sustainability_Pressure	,809
SocP2	<---	Sustainability_Pressure	,872
EnvP2	<---	Sustainability_Pressure	,777
FP2	<---	Financial_Performance	,765
FP1	<---	Financial_Performance	,681
SocOP2	<---	Operational_Sustainability_Performance	,836
SocOP1	<---	Operational_Sustainability_Performance	,676
EnvOP2	<---	Operational_Sustainability_Performance	,477
EnvMP3	<---	Sustainability_Management_Performance	,700
EnvMP2	<---	Sustainability_Management_Performance	,740
EnvMP1	<---	Sustainability_Management_Performance	,708
SMP3	<---	Sustainability_Management_Performance	,731
SMP2	<---	Sustainability_Management_Performance	,694
SMP1	<---	Sustainability_Management_Performance	,871
SocMP1	<---	Sustainability_Management_Performance	,758
SocMP2	<---	Sustainability_Management_Performance	,686

	CR	AVE
Financial Performance	0,687	0,524
Sustainability Pressure	0,860	0,673
Sustainability Management_Performance	0,905	0,545
Operational Sustainability_Performance	0,710	0,461

Appendix 3: Results of Shapiro-Wilk test

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	company size	Statistic	df	Sig.	Statistic	df	Sig.
FP1	medium	,254	156	,000	,891	156	,000
	large	,202	589	,000	,904	589	,000
FP2	medium	,256	156	,000	,875	156	,000
	large	,222	589	,000	,900	589	,000
EnvP1	medium	,192	156	,000	,908	156	,000
	large	,199	589	,000	,903	589	,000
EnvP2	medium	,182	156	,000	,911	156	,000
	large	,194	589	,000	,907	589	,000
SocP1	medium	,195	156	,000	,907	156	,000
	large	,188	589	,000	,906	589	,000
SocP2	medium	,179	156	,000	,912	156	,000
	large	,188	589	,000	,915	589	,000
SocP3	medium	,181	156	,000	,908	156	,000
	large	,197	589	,000	,904	589	,000
SocOP1	medium	,193	156	,000	,902	156	,000
	large	,204	589	,000	,899	589	,000
SocOP2	medium	,248	156	,000	,867	156	,000
	large	,223	589	,000	,888	589	,000
EnvOP1	medium	,262	156	,000	,869	156	,000
	large	,241	589	,000	,889	589	,000
EnvOP2	medium	,233	156	,000	,853	156	,000
	large	,235	589	,000	,869	589	,000
SMP1	medium	,195	156	,000	,883	156	,000
	large	,174	589	,000	,913	589	,000
SMP2	medium	,180	156	,000	,908	156	,000
	large	,177	589	,000	,911	589	,000
SMP3	medium	,238	156	,000	,832	156	,000
	large	,178	589	,000	,883	589	,000
SMP4	medium	,220	156	,000	,885	156	,000
	large	,166	589	,000	,906	589	,000
EnvMP1	medium	,193	156	,000	,852	156	,000
	large	,207	589	,000	,871	589	,000
EnvMP2	medium	,183	156	,000	,898	156	,000
	large	,183	589	,000	,910	589	,000
EnvMP3	medium	,175	156	,000	,901	156	,000
	large	,192	589	,000	,908	589	,000
SocMP1	medium	,312	156	,000	,766	156	,000
	large	,213	589	,000	,853	589	,000
SocMP2	medium	,156	156	,000	,913	156	,000
	large	,217	589	,000	,899	589	,000
SocMP3	medium	,179	156	,000	,894	156	,000
	large	,192	589	,000	,906	589	,000

a. Lilliefors Significance Correction

Appendix 4: Mann-Whitney U test results

N=745 Variable name	Is the distribution the same for small and large companies? (Y/N)	Sig.	Mean rank medium	 large	Mann-Whitney U	Standard error	Stand. test statistic
Pressure 2013							
Environmental pressure	N	0,000	299,71	**392,41**	57376,0	2292,848	4,987
Social pressure	N	0,000	302,19	**391,75**	56988,5	2295,476	4,812
Order winners 2013							
Order winners: environment	N	0,000	317,12	**387,80**	54659,0	2294,608	3,799
Order winners: society	N	0,000	319,97	**387,05**	54215,0	2301,051	3,595
Order winners: health and safety	Y	0,084	347,42	**379,77**	49932,0	2307,282	1,729
Performance improvement 2010-2013							
Workers' motivation	Y	0,848	**375,79**	372,26	45507,5	2271,536	-0,191
Health and safety	Y	0,765	368,64	**374,15**	46622,0	2273,091	0,299
Resource consumption	Y	0,935	**374,17**	372,69	45759,5	2254,225	-0,081
Pollution and waste	Y	0,843	370,13	**373,76**	46389,0	2250,524	0,199
Performance compared to competitors 2013							
Workers' motivation	Y	0,751	368,65	**374,15**	46620,5	2141,802	0,317
Health and safety	Y	0,351	359,97	**376,45**	47975,0	2180,162	0,932
Resource consumption	N	0,021	344,23	**380,62**	50430,0	1945,864	2,306
Pollution and waste	Y	0,076	349,50	**379,22**	49608,0	2063,663	1,776
Sustainability management effort between 2010-2013							
Certificates							
Environmental certifications	N	0,000	291,89	**394,48**	58594,5	2333,859	5,421
Social certifications	N	0,000	301,79	**391,86**	57050,0	2304,312	4,821
Sustainability communication	N	0,000	299,03	**392,59**	57481,0	2322,876	4,968
Programs							
Consumption reduction	N	0,000	280,72	**397,44**	60337,0	2314,363	6,220
Waste recycling	N	0,000	301,86	**391,84**	57040,5	2318,442	4,787
Occupational health and safety system	N	0,000	300,63	**392,17**	57232,0	2309,296	4,889
Work/life balance policies	N	0,003	328,94	**384,67**	52815,5	2315,693	2,968
Suppliers							
Supplier sustainability assessment	N	0,001	324,11	**385,95**	53568,5	2315,590	3,293
Training for suppliers' personnel	N	0,000	316,31	**388,02**	54786,0	2312,922	3,824
Joint effort with supplier for sustainability	N	0,000	319,50	**387,17**	54288,0	2321,050	3,596
Sustainability management implementation level 2013							
Certificates							
Environmental certifications	N	0,000	272,67	**399,57**	61593,5	2324,904	6,732
Social certifications	N	0,000	297,85	**392,90**	57665,0	2308,046	5,079
Sustainability communication	N	0,000	275,59	**398,80**	61137,5	2326,445	6,532
Programs							
Consumption reduction	N	0,000	297,13	**393,09**	57777,5	2305,200	5,134
Waste recycling	N	0,000	310,33	**389,60**	55719,0	2310,083	4,232
Occupational health and safety system	N	0,000	309,03	**389,94**	55921,5	2293,375	4,351
Work/life balance policies	N	0,003	328,21	**384,86**	52929,0	2316,194	3,017
Suppliers							
Supplier sustainability assessment	N	0,002	326,74	**385,25**	53159,0	2310,961	3,123
Training for suppliers' personnel	N	0,000	314,47	**388,50**	55072,0	2319,212	3,937
Joint effort with supplier for sustainability	N	0,001	321,86	**386,55**	53920,5	2324,813	3,432