SUSTAINABILITY AS A SUPPLIER SELECTION CRITERION IN A MAINTENANCE SERVICE COMPANY CONTEXT

Lappeenranta–Lahti University of Technology LUT
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ABSTRACT

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Sustainability as a supplier selection criterion in a maintenance service company context

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The objective of this study was to analyse the role sustainability has in supplier selection and evaluation processes. The study was conducted as a qualitative case study, with the case company operating in the maintenance service industry. The analysis in the study aimed to determine how can sustainability be used in the supplier selection processes to enhance the performance of the organisation. In addition, the tools needed for said improvements were analysed and developed.

The data for this study was collected via interviews and discussions with the case company. Additionally, sustainability data was collected from the suppliers of the case company using a questionnaire and their written resources. The case company operates in Finland and most of the suppliers analysed in this study are also located in Finland.

The results of the study indicate that including sustainable themes into the supplier selection and evaluation processes can create additional value for organisations. It was determined that in addition to increased sustainability performance, the integration of sustainability into supplier selection processes enables different departments of the organisation to improve their performance. Additional information about the sustainability of suppliers assists the purchasing department to make more informed decisions, therefore improving the effectiveness of supplier selection processes.

TIIVISTELMÄ

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Vastuullisuus kriteerinä toimittajavalinnassa huoltopalveluyritys- kontekstissa

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Tämän pro gradu- tutkimuksen tavoitteena oli analysoida vastuullisuuden roolia toimittajavalinnassa sekä -arvioinnissa. Tutkimus toteutettiin laadullisena tapaustutkimuksena, jonka kohdeyritys toimii huoltopalvelualalla. Tutkimuksen analyysin tarkoituksena oli selvittää millaisia mahdollisuuksia vastuullisuusteemojen integrointi tuo yrityksen toimittajavalintaprosessiin. Tutkimuksessa tarkasteltiin myös millaisia vaikutuksia vastuullisuuden huomioimisella voi olla organisaation suorituskykyyn sekä millaisia työkaluja vastuullisuuden hyödyntäminen toimittajavalinnan kriteerinä vaatii.

Tutkimuksessa käytetty aineisto kerättiin ensisijaisesti haastatteluin ja keskusteluin tapausyrityksen sisällä. Lisäksi vastuullisuusdataa kerättiin tapausyrityksen merkittävimmiltä toimittajilta kyselylomakkeen sekä sekundäärilähteiden kautta. Sekä tapausyritys että sen merkittävimmät toimittajat sijaitsevat ja toimivat Suomessa.

Tutkimuksen tulokset osoittavat vastuullisuusteemojen huomioimisen toimittajavalinta ja toimittaja-arviointiprosesseissa voivan luoda lisäarvoa organisaatiolle ja sen sidosryhmille. Tulosten perusteella voidaan todeta, että kasvaneen vastuullisuussuorituskyvyn lisäksi, vastuullisuusteemojen integrointi toimittajavalintaan parantaa organisaation eri osastojen suorituskykyä. Lisäinformaatio toimittajien vastuullisuustasoista mahdollistaa hankintaosaston toiminnan tehostamisen päätöksenteon kehittämisen avulla.

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Jaakko Ikonen
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1.Introduction

In an era marked by an increasingly heightened focus on environmental and social responsibility, sustainability has taken a significant role in the assessment of organisational operations and strategic decision-making across diverse industries. It is not limited to being a passing global trend but a pressing concern. Sustainability in business environment is commonly understood as a concept of three dimensions, environmental, economic and social dimensions, also known as three P:s being people, planet and profits (Slaper & Hall 2011). Sustainability considerations are nowadays more and more a part of the daily decision-making processes in organisations. As Lieb & Lieb (2010) presented in their study, desire to do the right thing, demand from customers and a desire to improve their reputation in the eyes of the public and stakeholders are some of the key factors driving the sustainable development of organisations. With these motivators, the interest in ensuring the sustainability in both the organisations own operations as well as their supply chains has increased over the past decades.

This study addresses the theme of sustainability as a possible important supplier selection criterion in a specific industry context. The impact suppliers have on the performance of an organisation can not be disregarded when assessing the organisation. Therefore, extending the sustainability practices to other stakeholders, in this case the suppliers, can possibly benefit the company.

1.1. Background and importance of the study

In today's world, the concept of sustainability has gained immense significance across various sectors and industries. As organisations strive to minimize their environmental impact, promote social responsibility, and ensure long-term economic viability, sustainability has emerged as a crucial consideration in decision-making processes. While much attention has been given to sustainability in manufacturing and product-oriented industries, its application

and implications in the context of service companies have received comparatively less attention. This research aims to address this research gap by exploring the role of sustainability as a supplier-selection criteria in a maintenance service company context.

Despite the growing interest in sustainability and supplier selection, the literature addressing this topic within the context of service companies remains limited. Existing research primarily focuses on manufacturing and product-based industries, neglecting the unique challenges and considerations faced by service organisations. Consequently, there is a lack of comprehensive studies that specifically examine the role of sustainability as a supplier-selection criterion in service companies.

The importance of this study comes from the increasing recognition of the crucial relationship between sustainability and supplier selection processes. As service-oriented organisations heavily rely on their supply chain to deliver high-quality services to customers, the choice of suppliers becomes a critical strategic decision. By integrating sustainability criteria into the supplier-selection process, service companies have the opportunity to not only reduce their environmental footprint but also enhance their reputation, foster stakeholder relationships, and achieve long-term financial stability.

Furthermore, the study is relevant for the case company in a practical way to meet the expectations and requirements in both their new customer segments as well as existing customer base. By identifying the key sustainability factors that influence supplier selection and understanding their impact on overall organisational performance, companies can make informed decisions that drive positive environmental and social outcomes, while simultaneously ensuring operational efficiency and profitability.

1.2. Case company and industry introduction

Case company for this study is one of the key players in the Finnish maintenance service field. The company specialises in the maintenance of varying cooling solutions and professional kitchen equipment. The case company has over 300 employees and operates in Finland.

The case company already has some aspects of sustainability covered in their plans already but the current practices as well as the plans for the future are mainly focused on the operations within the company. Some examples of these sustainable actions are low emission vehicle fleet and proper recycling or disposal of the used refrigerants and coolants.

The industry the case company operates in provides the study with an interesting context. In the last few years sustainability has become increasingly important topic in a relatively traditional industry where environmental and social aspects of sustainability have perhaps not been on top of the priority lists. The industry as a whole is rapidly changing towards more sustainable operations and the case company must be leading the change or at the very least, adapting to them. Therefore, this research presents an increasingly rare opportunity to analyse the positive effect sustainable actions in the supplier selection processes can have in an industry still moving towards a sustainable way of thinking and operating.

1.3 Key concepts

Two of the key concepts utilised in this research are briefly presented in this chapter. Triple bottom line- framework is the base framework through which the concept of sustainability is assessed in this study. Stakeholder theory on the other hand provides the study with broader view instead of focusing fully on the case company.

Triple bottom line

The triple bottom line- framework, commonly referred to as the 3Ps: Profits, Planet and People, is used to develop sustainable business strategies to impact environment, society and shareholders in a positive and beneficial ways (Miller, 2020; Ding, 2020). Using triple bottom line- framework allows organisations to move towards more sustainable and regenerative business practices instead of focusing solely on their financial bottom line (UW, 2022). The triple bottom line- framework developed by John Elkington in 1994 is meant to provoke deeper thinking and development towards additional value instead of a balancing act with trade-offs (Elkington, 2018).

Stakeholder theory

Defined by R. Edward Freeman in 1984, stakeholder theory implies the importance of interconnected relationships between an organisation and its surrounding stakeholders (Freeman, 2010). According to the stakeholder theory, a company should seek to create value for all stakeholders such as the suppliers, customers, investors and communities around the organisation. The stakeholder theory suggests that collective efforts of all stakeholders, by either providing resources for the company, influencing the business environment or benefitting from the company, are crucial in value creation (Donaldson & Preston, 1995; Haslam et al. 2015).

1.4. Research questions

In this thesis the focus is on sustainability and its effect on the supplier selection and evaluation in the case company operating in maintenance service field. The goal of the study is to identify key aspects of sustainability of the suppliers and how they can be used to improve the supplier selection process of the company. To help with answering these questions, a main research question and two sub-questions have been constructed.

The main research question is:

"How can a company improve their supplier selection and evaluation processes with sustainable themes?"

The research question takes a new approach to supplier selection and sustainability where the traditional point of view seeing supplier selection as a tool to improve the sustainability is switched to seeing sustainability as a way to improve supplier selection performance. Therefore, the overall performance of the organisation is seen as the goal and sustainable business practices as a possible way in achieving improved performance.

The main question is quite broad and not very specific so two sub-questions are needed in order to answer the question properly. The goal of the first sub-question is to take the massively broad concept of sustainability in business operations and narrow it down to fit the context of the study. The first sub-question is:

"What themes of sustainability are the most crucial in supplier selection in the context of the maintenance service industry?"

The second sub-question seeks the answer for the question about the methods on how the data about the relevant sustainability themes can be made usable and useful in the supplier selection and evaluation processes. The second sub-question is:

"How can the sustainability data collected from suppliers be used to improve supplier selection and evaluation processes?"

With these research questions, the goal of understanding the relationships between sustainability themes and supplier selection/evaluation processes can be achieved and the relevant methods identified.

1.5. Structure of the thesis

The structure of this thesis is presented in this chapter and the contents of parts explained briefly.

The second chapter focuses on the theoretical discussion about the sustainability in supplier selection and evaluation. The structure of the theoretical part will follow a one of an academic literature review.

To start the empirical part of the thesis, data collection methods and analysis tools will be discussed in this chapter. This chapter will further explain how the data was collected and handled but also acknowledge the possible faults or misfits in the data to further deepen the understanding of the results.

The following section will combine the data collected with the theoretical findings to discuss the findings and seek answers to the research questions presented earlier in the paper. The structure of this chapter is still undecided and will be relying on the findings of the study.

With the findings discussed in the empirical analysis, the results will be transferred into practical managerial implications to solve the issues presented for the case company. These practical implications should be helpful to the case company but can hopefully also be generalized for broader group of service industries and maintenance industries.

Conclusions will sum up the key findings and discuss their relevancy without presenting new information. The conclusion also answers the research questions presented in the introduction section.

1.7. Limitations of the study

The scope of the study is set to focus on the supply chain management operations of the case company. These operations include mainly their supplier selection and evaluation practices and tools, their suppliers and daily decision-making processes in purchasing. The main limitation of the study is the focus on a single case company in a specific industry. The validity and reliability of the study is further examined in later parts of the thesis.

2. Literature review

In this literature review, two themes are explored and discussed. Firstly, to examine sustainability as a supplier selection criteria, sustainability and different aspects of it must be analysed. After properly defining sustainability, this literature review takes a look at the previous literature about supplier selection and evaluation with sustainability in mind.

The literature review was conducted using a systematic review process of the literature and selection criteria for the relevant articles was formed. In Table 1 below, the number of articles found in the database searches for each topic and category is presented.

Topic/search terms	Number of articles in database
Sustainability (Business, Management & Accounting)	38 971
Supplier selection	1 459
Supplier selection AND Sustainability	199

Table 1. Number of articles found in the database, source: SCOPUS

From the 38 971 articles covering the topic of sustainability in business environment, only 199 are focused on both supplier selection and sustainability. Out of these 199 articles, around 40 were determined to be useful in the context of this study based on the criteria set. In addition to the articles relevant in terms of covering both of the key concepts, additional articles and other online sources were utilised when they were found to add depth into the research process.

2.1. Sustainability and triple bottom line

Sustainability has been an ever-increasingly interesting topic of discussion in the business and business research fields over the past decades. Practices and programs to improve organisation's sustainability performance have become necessary and development towards

more sustainable operations is imminent. According to Lieb & Lieb (2010), organisations have multiple reasons for implementing a sustainability program or improve their practices. The most important ones identified in their study were a desire to do the right thing, demand from customers and a desire to improve their reputation in the eyes of the public and stakeholders. In addition to the motives found in Lieb & Lieb's research, legislation, pressure from other stakeholders, economic opportunities and overall ethical motives have been presented as motivations for improving organisation's sustainability (Bansal & Roth, 2000).

The basic principle of sustainability can be described as redesigning economic systems in order to limit the harmful impacts for surroundings in the long-term (Doppelt & McDonough, 2010). Furthermore, sustainability can also be seen as a direction of development to ensure that the limited resources we have do not diminish (Moldan, Janoušková & Hák, 2012). Sustainable business operations are actions ensuring long-term benefits for all current and future stakeholders by taking environmental, social and economic aspects into consideration (Jimenez, Franco, & Smith, 2021). On a larger scale, an economy can be considered to be sustainable when including the attention to human needs with the acceptance of the limited resources available for current and future needs. (Lorek & Spangenberg, 2013). With global and interconnected world, sustainable actions cannot be limited to the organisation's own operations. Zhu, Sarkis and Lai (2008) present that organisations should ensure the sustainable actions in their whole supply chains. Therefore, sustainability has become an increasingly popular topic in discussions and daily decision making in supply chain management.

Sustainability is not the only term often linked to environmental and social benefits gained by improving the practices of an organisation. The concepts of sustainability and corporate social responsibility (CSR) are both used to describe the actions companies take increase their performance beyond just maximizing profits. Activities such as employee benefits, environment-friendly production processes and organisation of projects helping those in need in less-developed countries can all be seen as stakeholder-oriented behaviours under the term of corporate social responsibility (Liang & Renneboog, 2017). The key difference between the terms sustainability and CSR is defined in Elkington's triple bottom line framework, which is one of the most often used frameworks when discussing sustainability.

Being sustainable has been an often-recurring theme for companies in the past few decades but the concept is fairly new. The triple bottom line (abbrev. TBL) was originally an accounting framework created by John Elkington in the 1990s (Slaper & Hall, 2011). In traditional accounting context the term "bottom line" usually refers to company's profit or loss. In 1998 Elkington specified the term by separating the three components of the triple bottom line performance, social, environmental and economic, from each other. The three dimensions and them together forming sustainability is demonstrated in Figure 1. These dimensions of the triple bottom line are also commonly called the three P: s, being planet, people and profits (Slaper & Hall, 2011). It can be said that the triple bottom line demonstrated the impact the business operations have on the planet, the people and the profits. The triple bottom line concept weights all of the three dimensions equally and creates competitive advantage when focusing on acting in a sustainable way. Vachon & Mao (2008) present that the environmental aspect of the triple bottom line- framework concentrates on reducing waste and pollution while also protecting the natural environment. The social aspect of TBL aims to enhance legal rights, human needs and overall health conditions (Molamohamadi et al., 2013)

Therefore, whereas corporate social responsibility refers to all the non-benefit seeking actions to increase the wellbeing of stakeholders, according to Elkington's triple bottom line approach, the concept of sustainability includes the financial aspect of business.

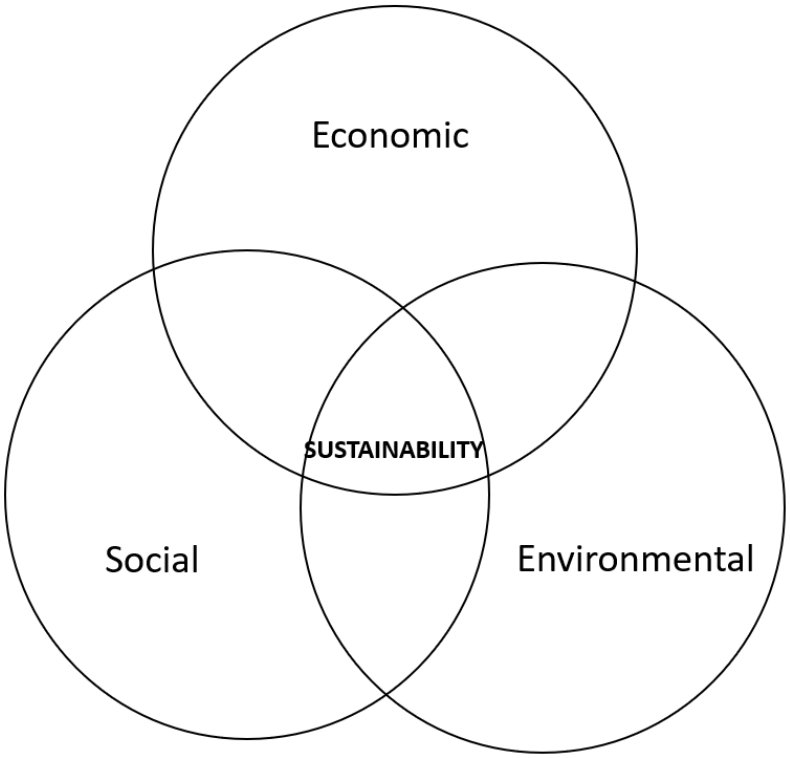

Figure 1. Triple bottom line (adapted from: Carter C. & Rodgers D. 2008)

2.1.1. Economic factors

The economic dimension of the triple bottom line- framework focuses on ensuring the economic well-being of the organisation and their stakeholders. The economic strength of the company has often been measured in the economic growth of the organisation. Elkington's focus on adding value instead of making trade-offs through TBL is especially apparent when investigating the economic aspect of sustainability. Traditionally sustainability and economic growth have been seen as a balancing act of either doing the right thing or improving the economic performance (Moldan, Janoušková & Hák, 2012).

Markandya & Pearce defined in 1988 the concept of optimal resource management to be centred around the idea of limiting the impact of the resources used today have on the real incomes in the future. This approach links multiple dimensions of triple bottom line- framework together while seemingly focusing on the monetary income. Therefore, it can be said that the traditional view of trade-offs between economic success and sustainability is limited.

Although, Moldan et al. (2012) also suggest that especially in the context of a global economy crisis, addressing the economic issues without connecting them to environmental or social aspects can be crucial.

The basic purpose of a company is to generate profits. Having a solid financial basis allows the organisations to exist and take care of their economic responsibilities (Jintao et al. 2020). The importance of profits can be seen as growth opportunities for the company and benefits for the stakeholders of the company (Carroll, 2016).

Besides the performance itself, the economic sustainability has other aspects to it. Due to legislations, organisations are responsible for actions such as paying taxes and customs. Economic actions to avoid these responsibilities can be seen as economic sustainability issues. Bribery, corruption and tax evasion are all examples of harmful economic actions (Giannakis & Papadopoulos, 2016). The effects of these economic sustainability issues can spread to affect social groups and stakeholders beyond just the organisation due to the lack of economic growth, loss of public trust and either income loss or additional costs for the public sector (Wang & Wang, 2017; Hills et al. 2009).

In terms of evaluating the economic dimension of the triple bottom line is the most likely the easiest. The economic dimension of the triple bottom line framework consists of factors used in measuring firms' financial performance. These factors include values like turnover, profits and the amount of taxes paid (Slaper & Hall, 2011). Companies traditionally track all of the financial values regardless of the amount of effort implementing the concept of triple bottom line into their practices. Examining economic factors provides the company with valuable insights into its efficiency and profitability. Furthermore, monitoring the core metrics within the economic dimension both before and after implementing changes to the company's operations can help the organisation to assess the effectiveness of these changes. Therefore, carefully measured economic factors can provide the company with important data for evaluating the company's overall performance in the context of the triple bottom line.

2.1.2. Social factors

While the economic dimension of the triple bottom line framework is focused on numerical values about the company's profitability and efficiency, the dimension of social sustainability shifts the focus into the communities inside and outside of the company (Pullman M. et al. 2009). Elkington (1994) defined social sustainability as means that the organisation takes to provide equal opportunities, encourage diversity, promote connectedness in communities within and outside of the company and ensure the quality of life. Furthermore, according to Mani, Gunaskeran & Delgado (2018) social sustainability is management of the social resources stemming from different skills and abilities of the people as well as the relationships and values of them. It could also be said that the social dimension of triple bottom line focuses on ensuring the well-being of the employees in all the processes the company is involved in. All in all, social sustainability refers to the effects the companies' actions have on surrounding people and communities.

The social dimension can be divided into impacts outside of the organisation affecting the surrounding communities and internal impacts affecting the employee's and stakeholders (Pagell & Wu, 2009). Gimenez, Sierra & Rodon (2012) also recognised the importance of both internal and external communities in social sustainability. In Table 2, some of the key aspects of social sustainability for both internal and external communities are presented.

Internal Communities	External Communities
Fair wages & Labor laws	Product safety
Diversity & Equality	Business ethics
Health & Safety	Prevention of corruption
Training programs	Local engagement
Human rights	Transparent communication
Prevention of child and slave labour in the supply chains	Accessibility
Supplier development	

Table 2. Key aspects of social sustainability.

Lee (2017) presented that social sustainability actions are meant to satisfy the ethical expectations of stakeholders by improving the social aspects beyond what is required by the law. Therefore, the social sustainability activities can act as sources of additional value for various stakeholders. The social sustainability activities of an organisation can lead to competitive advantage through innovative measures for the company as well as ultimately increases in sustainable development and international competitiveness for governmental point of view (Wagner M. 2010)

While the social dimension is harder to numerically measure than the economic factors, there are some key factors to be analysed. The average commute time, incomes of the employees, equality in labour force participation and the amount of training employees have, are some of the possible measurable factors (Slaper & Hall, 2011). The overall healthiness and happiness of the communities inside and outside of the company are clearly harder to measure but they are essential to the well-being of the communities, thus also for the social sustainability dimension of the triple bottom line framework.

2.1.3. Environmental factors

Environmental dimension of the framework is probably the most discussed in the public media outlets. The definition of sustainability used by the World Commission on Environment and Development (1987): “Development that meets the needs of the present without compromising the ability of future generations to meet their needs”, provides a good foundation on the concept of environmental sustainability. Therefore, the key for environmental sustainability for organisations is to minimize the negative impact their operations have on the environment. In a more concrete way, it can be said that environmentally sustainable companies aim to measure, report and reduce pollution (Gimenez C., Sierra V. & Rodon J., 2012). Gurel et al. (2015) highlight the significance of reducing waste and limiting the use of harmful materials to achieve environmental sustainability.

Although important, environmental sustainability is not limited to reducing pollution. Gianniakis & Papadopulos (2016) and Worrell et al. (2001) both discuss the high energy usage of production processes as a possible environmental sustainability issue organisations might face. Reducing the energy consumption of the organisation consequently can lead to reduced greenhouse gas emissions thus limiting the negative impact the organisation has on the environment. Limiting the greenhouse gas emissions also helps in the global goal of slowing down the climate change. Reducing the energy consumption in the organisations is essential since according to International Energy Agency (2023), power generation is the single largest emissions driver.

Other environmental sustainability actions organisations utilize include product development to reduce the waste and increase recyclability, production and logistics planning for minimizing the use of packaging materials and encouraging the reusability of the products (Gianniakis & Papadopoulos, 2016; Zhong & Peng, 2015).

The environmental dimension includes measurable values such as electricity consumption, the amount of fossil fuels consumed, greenhouse gas emissions or the amount and sustainability of the land usage (Slaper & Hall, 2011). In addition to these factors, the idea of tracking the carbon footprint of a product through the whole life cycle of it has been a popular topic of discussion in recent years.

2.1.4. The limitations of the triple bottom line framework

While the concept of triple bottom line framework provides a good way for companies to evaluate their performance, the implementation of the practices might be challenging. In addition, the practices must be relevant and suited for the organisation or the industry. The triple bottom line approach only adds value to the company's processes if they are planned properly for long-term and are revised or developed regularly (Juutinen S. & Steiner M-L. 2010). Therefore, it can be said that just measuring the aspects of triple bottom line is not improving the performance of the company.

In addition to possible conflicts in implementing the practices, the framework itself can be considered to be conflicting. Assessing three completely different aspects and dimensions of

business performance through one analytical framework is challenging and issues might arise in either within one dimension (e.g., differing interests between communities or groups within the social dimension) or between the dimensions (e.g., the costs of improving the environmental dimension performance versus the economic dimension). (Winter M. & Knemeyer M. 2013)

2.2 Supplier selection processes

Supplier selection is a crucial factor for organisational success. Supplier selection impacts all aspects of organisations' operations, from the cost and quality of the products or services to overall performance (Golmohammadi & Mellat-Parast, 2012). The supplier selection processes can be considered as complicated processes and there is always an element of risk involved (Chan et al. 2008). The traditional approach to sourcing has been to cut the costs of the production and according to Ghodsypour and O'Brien (1998), supplier selection processes have a major role in making the sourcing process more efficient. In supply chains, each supplier affects the performance of the whole supply chain in either a positive or a negative fashion. Therefore, having effective supplier selection processes in use can be a source of competitive advantage for an organisation.

The main goal of supplier selection is to find a supplier which both minimizes the purchasing risk and maximizes the value gained for the organisation (Taherdoost & Brard, 2019). As presented previously, supplier selection process can be very complicated process which varies depending on the situation. Drake (2012) presents a general four-step process of selecting on-going supplier relationship. The first step is to carefully define the specifications and qualities the product or service must have. The pre-qualification requirements must be set to limit the number of possible candidates in the early stages (Weele, 2004). The purpose of this step is to eliminate the inadequate alternatives to focus on the suppliers with the most potential (Mendoza & Ventura, 2006). Taherdoorst & Brard (2019) highlight the importance of adapting the requirements to the target of the purchasing instead of setting the same requirements for all products and situations. Secondly, the criteria for evaluating the possible suppliers must be exactly stated. The criteria could include factors such as price, transporta-

tion costs, payment terms or environmental factors. In this part of the supplier selection process, it is also necessary to determine the elements of the purchasing strategy considering the product or material in question. Purchasers must decide on contract lengths, buyer-supplier relationship types and goals for the purchasing process.

Thirdly, identifying the possible suppliers which meet the requirements set for successful relationship. Using different scoring tools to rank the potential suppliers, buyers can gain important information to base their decisions on (Tuzkaya, 2013). Lastly, each remaining supplier is evaluated and the best candidates selected. The process is finished by comparing the best alternatives to each other and selecting the most suitable ones (Igarashi M. et al., 2015). Figure 2 demonstrates the process in a graphic form.

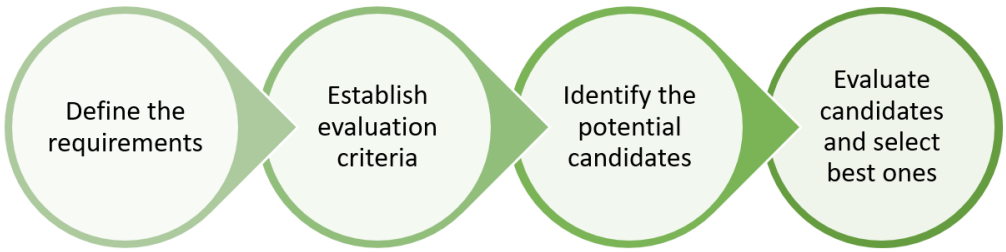

Figure 2. General supplier selection process (adapted from Drake M., 2012)

The supplier selection process may differ from the general model presented here due to various factors. One of the possible factors affecting the process is the different buying situations. Three different buying situations have been defined to describe all variations of purchasing situations. These three situations are presented as new task buying, the straight rebuy and the modified rebuy (Robinson P.J. et al. 1967). From purchasing point of view, new task situations are the most complex and risky due to the requirements for time and effort to

evaluate possible suppliers for new product or material which has not been purchased before (Leonidou, 2005). In addition, Leonidou (2005, 2) describes straight re-buy as a situation where "the buyer purchases familiar products from regular suppliers on an automatic and routine basis, with limited involvement of people, minimal information requirements, and no great consideration of alternative sources of supply". In other words, straight rebuy situation is a reorder of a previous supply of products or materials. Modified rebuy can be defined as a situation where something, quantity or appearance of product for example, changes but the buyer-seller relationship is familiar to both parties (Robinson P.J. et al 1967). In the different purchasing situations, the key factor regarding supplier selection is the amount of time invested into supplier selection or consideration. In straight rebuy situation there is almost no consideration of alternative suppliers, thus the companies have experience on working with each other and the level of risk or uncertainty is low. In modified rebuy situations even though the collaboration with existing suppliers to adapt to the changes in the purchasing orders, there is some consideration and time invested into evaluating different possible supplier candidates. The most demanding and resource consuming process, the new task situation, follows the general supplier selection process presented by Drake (2012) quite closely and therefore is the most complex for an organisation to complete.

2.3 Supplier selection criteria and sustainability

Establishing relevant evaluation criteria is an essential part of a successful supplier selection process. When the pre-requirements are met, selecting the best possible supplier relies on the criteria set by the purchasing company. A common starting point for forming supplier selection criteria is to begin with quality- and price-related criteria. Guarnieri & Trojan (2019) suggest that delivery performance, quality of the goods, financial stability and production capabilities are traditionally seen as the most important factors in supplier selection processes. In addition, Dickson (1966) presents that quality, price, delivery time, technical abilities, reputation and financial capabilities can be considered as crucial criteria for supplier evaluation. The criteria vary depending on the characteristics of the procurements and the evaluation of the suppliers is based on the expectations of the company on how well the suppliers can meet the requirements of these characteristics.

Criteria of evaluation are evolving constantly. Arpan et al. (2014) note the change from mostly quantitative criteria pre-1990s to more qualitative approach nowadays. They present culture, trade restrictions, relationships, and environmental issues as possible considerations. Whereas the traditional supplier selection processes have mainly focused on the economic and financial aspects of business operations, integrating sustainability into supplier selection through considering environmental and social sustainability can be used to form sustainable supplier selection criteria (Zhu et al. 2022)

The existing literature on supplier selection identifies the significance of integrating sustainability criteria into supplier selection and evaluation processes. Following the base of Elkington's triple bottom line framework, all three aspects of sustainability were considered and examined in the studies. Environmental factors were identified as key considerations, including carbon emissions, waste management, energy efficiency, and water consumption (Alikhani et al., 2019; Rashidi et al., 2020; Zimmer et al., 2016). Social responsibility aspects, such as labour practices, human rights, diversity, and community engagement, were recognized as vital considerations in supplier evaluation (Ada, 2022; Nugraha et al., 2019). Economic viability and risk management were identified as additional criteria in sustainable supplier selection, highlighting the importance of long-term financial stability and supplier resilience (Alikhani et al., 2019; Zhan et al., 2021). These studies underline the need to incorporate environmental, social and economic sustainability dimensions to promote responsible practices across the supply chain.

Various models and approaches have been proposed to facilitate sustainable supplier selection and evaluation. Dang et al. (2022) introduced a two-stage multi-criteria model specifically designed for the automotive industry, which addresses uncertainties and risk in decision-making. Vörösmarty and Dobos (2020) explored the application of Data Envelopment Analysis (DEA) in sustainable supplier evaluation, providing a quantitative method to assess suppliers' sustainability performance. Schramm et al. (2020) and Zimmer et al. (2016) conducted literature reviews of different models, highlighting the importance of comprehensive frameworks that encompass supplier monitoring and development alongside selection. These studies contribute to the development of effective methods for incorporating sustainability criteria into supplier selection processes.

While progress has been made in integrating sustainability criteria into supplier selection and evaluation, several challenges and opportunities for future research exist. Alikhani et al. (2019) highlighted the need for balancing sustainability and risk considerations, recognizing that focusing solely on sustainability could potentially compromise supply chain resilience. The meta-review conducted by Rashidi et al. (2020) emphasized the need for further research to refine and validate the application of the triple bottom line concept in sustainable supplier selection. Additionally, research gaps were identified regarding the practical implementation and measurement of sustainability criteria in supplier evaluation (Zhang et al., 2014). Further investigation is required to develop frameworks and tools that facilitate the effective integration of sustainability criteria. Furthermore, the context of this study focusing on supplier selection and evaluation of a maintenance service company provides a differing approach to the issue since studies on supplier selection and evaluation are mostly focused on production companies.

3 RESEARCH METHODOLOGY

The empirical part of the study consists of findings and observations based on both qualitative and quantitative research methods. Quantitative results can be used to support the qualitative findings and vice versa. Using both quantitative and qualitative research methods in determining the targets for supply chain sustainability from the case company's point of view as well as the current sustainability levels of their key suppliers is essential in achieving conclusive results.

The selected study method for this research is case study. According to Eriksson & Kovalainen (2008) despite case studies often being qualitative in their spirit, quantitative data is useful in constructing the case. Furthermore, Eriksson & Kovalainen present that using quantitative data or research methods does not create a requirement for a case study to follow the ideals of quantitative research due to the emphasisation of interpretation of meaning and understanding of the case. Therefore, in this research the quantifiable metrics, such as the overall sustainability levels of a supplier, are either constructed of or given a meaning through mainly qualitative methods and data.

The study uses mainly primary data collected from the case company and suppliers, but secondary data is used to gain more comprehensive understanding of the context. Secondary data can be defined as previously collected empirical data such as textual data (Eriksson & Kovalainen, 2008).

In this chapter, both approaches and their relevancy in this research are discussed. In addition, the data collection methods, their variations and the reliability of both the collected data as well as the analysis of said data are examined. Finally, the collected data is described and presented in this chapter before deeper analysis in the following parts of the thesis.

3.1. Data Collection

This chapter focuses on the means used in this research to obtain data relevant to the study. The data collection is split into two separate parts for this study: data collection within the case company, and data collected from other stakeholders, which in this case study refers to the key suppliers of the case company.

In these two separate parts of data collection, different phases combining qualitative and quantitative methods are identifiable and they are discussed in the following sections. Challenges in collecting the data as well as transforming it to usable form are also briefly presented to deepen the analysis of the reliability and validity of the both the findings and the data itself.

3.1.1. Data collection within the case company

The main research question of the study, “How can a company improve their supplier selection and evaluation processes with sustainable themes?”, requires a deeper understanding of the current supplier selection practices and tools available to the purchasing teams for any improvements to be made. This leads to the first step of data collection being focused on the case company itself to gather information on the current practices.

The data collection about current practices was conducted using semi-structured interviews with relevant personnel. The interviewees from the case company as well as some of the key personnel from the supplier side are listed below in Table 3.

Interviewee's identification	**Company**	**Interviewee's title**
Interviewee A	Case Company	Sourcing Director
Interviewee B	Case Company	National Key Account Manager
Interviewee C	Case Company	Procurement and Logistic Manager
Supplier contact A	Supplier 1	Quality Manager
Interviewee D	Case Company	Head of HR

Table 3. Interviewee's information

The initial stages of discussing the current practices of the case company were discussed using a group discussion methodology with elements of semi-structured interviews. Group discussions were held with Interviewees A and C in addition to open format discussions with Interviewee A to gain an understanding of the current supply chain management and supplier selection/evaluation practices.

To further understand the current situation in the case company in terms of supplier selection and how can sustainable themes improve the processes, the sustainability levels and interests of the case company must be assessed. To help with this task, the first research sub-question: "What themes of sustainability are the most crucial in supplier selection in the context of the maintenance service industry?", is introduced.

Investigations on the different aspects of sustainability, the levels to which they are acknowledged in the case company's operations and the estimated importance of each major theme were completed using open form group discussions as well as one-on-one semi-structured interviews. Between the group discussions between the Sourcing/Procurement department and one-on-one semi-structured interviews with Interviewees A and B there were major differences in how important different themes of sustainability are seen in the case company. Furthermore, the different perspectives of different teams proved to be useful when assessing the importance of different themes. The findings from group discussions on the topic and the key conclusions from one-on-one interviews are presented in Figure Y. More comprehensive discussion and analysis of said findings will follow in the later parts of the thesis paper.

The interviews were conducted mainly in-person with additional video call and phone call discussions. The findings are based on the field notes made during the discussions as well as confirmation messages. The field notes were used to collect the key points of the discussions both during and after the discussions. In the semi-structured interviews, the notes were taken to find conclusions and patterns in the answers to quite a lot of open-ended questions. Examples of the themes and findings can be found in Figure 3.

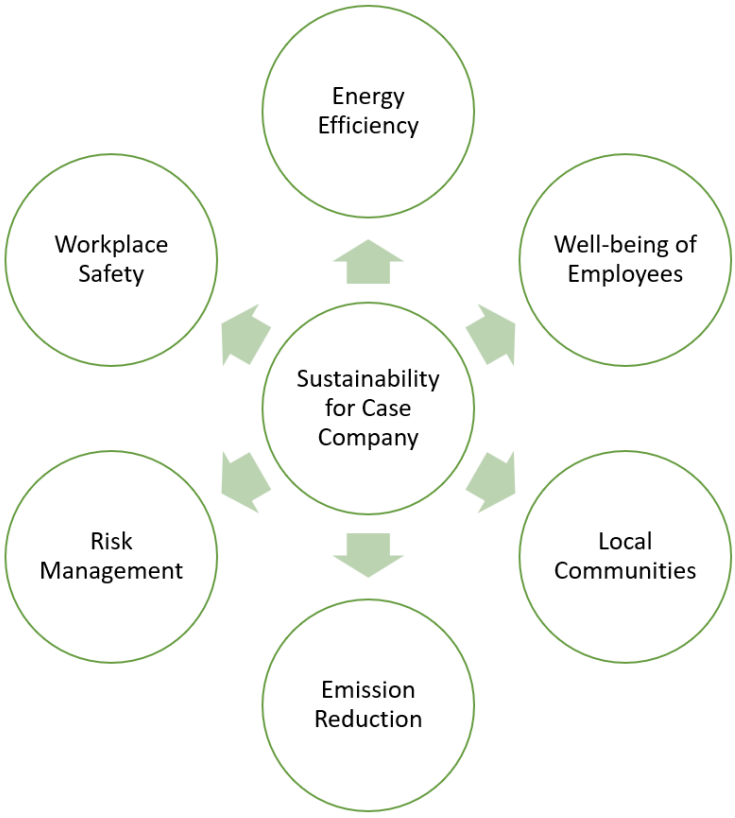

Figure 3. Current practices and important themes of sustainability in the case company.

3.1.2. Data collection from the key suppliers

To complete the collection of the primary data required for answering the research questions of this study, key suppliers were identified and selected, the collection process planned and finally executed. The different steps of the data collection process are presented in Figure 4 and discussed in the following chapter.

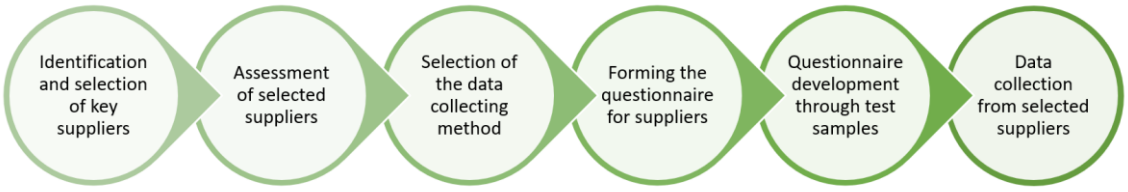

Figure 4. The supplier data collection process.

The valuable data gathered from the discussions within the case company supported the development of the plan for the data collection from the suppliers. First step of the process is to select the source of the data, which in the context of this thesis meant the suppliers of the case company. According to Aityan (2022), carefully selected data sources are essential for research success. Furthermore, Aitayan suggests that when planning the data collection, it is important to ensure the reliability and relevancy of the data. The selection process of the supplier to collect the data from focused on two important factors: their importance for the case company and the availability of the information. Based on these factors, 15 of the top suppliers of the case company were selected for this research.

Following the selection of suppliers, they were analysed using secondary data collected. The operations, approximate levels of sustainability, suitable contact persons and important themes were identified.

Based on the findings during the secondary data research, the data collecting method of a questionnaire with multiple choice- questions and a couple of open-ended questions was chosen.
Forming the questionnaire according to the findings in the data collection process from the case company and the secondary data collection from the suppliers was the next step in the process. The questionnaire used in this study consists of six multiple choice questions and two open questions focusing on the chosen themes of sustainability. The questionnaire can be found as an appendix in Appendices- section of the research paper.

The questionnaire was sent to a selected supplier of the case company as well as an employee in a key position in the case company for feedback on the questionnaire and its practicality.

No major issues were identified in either the questionnaire itself or the system it was operating through. The questionnaire was constructed using Google Forms and sent to suppliers via e-mail.

3.2. Data handling and analysis

The collected data was analysed and processed using different methods. The handling and analysis process for the data collected from the case company and the one collected from the suppliers varied vastly. Figure 5 demonstrates the analysis process for both data types.

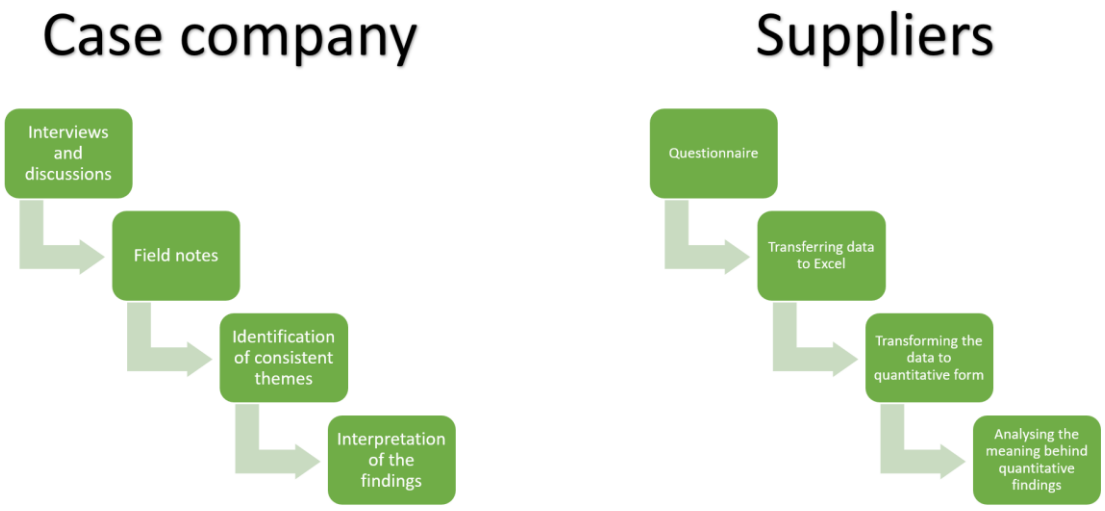

Figure 5. Data analysis processes.

When analysing the data collected from the interviews and discussions in the case company, thematic analysis approach was utilized. O'Gorman and MacIntosh (2015) present that despite thematic analysis being relatively uncomplicated method for identifying and analysing patterns (or themes) within the data, following key steps of the process is essential. Braun and Clarke (2006) identified these key phases of thematical analysis as: Familiarisation with the data, Coding the data, Search of themes, Reviewing themes, Defining themes and Reporting. These steps are simplified also in Figure 5.

The qualitative data collected from suppliers via questionnaire was transferred to a spreadsheet and transformed into quantitative form for analysis and practical purposes. When analysing the data from the suppliers of the case company, thematic approach was utilized to a certain extent in identifying patterns and reviewing them.

3.3. Validity and reliability of the research

Validity and reliability of the thesis study are requirements for a successful research project. Zohrabi (2013) presents that both the data and the instruments used to collect the data must be validated for study to be considered as believable and true. Zohrabi also lists four processes for validating the study: content validity, internal validity, utility criterion and external validity processes.

According to Carmines and Zeller (1979, 20) "content validity depends on the extent to which an empirical measurement reflects a specific domain of content". This means that for a study to be validated in the chosen context, the content of the study must reflect and effectively measure the phenomenon. In this study, the context was limited to the case company, its suppliers and the chosen themes of sustainability. Content validity in this research was achieved by specifying the context and considering all stakeholders involved in the study.

Internal validity refers to the levels of which the research findings reflect reality and to which the study analyses what was meant to be analysed (Zohrabi 2013). Merriam & Tisdell (2015) listed recommended methods/themes to be analysed for internal validation of the study. These methods include but are not limited to member checks, long term observations and researcher's bias. In this study internal validity was achieved by choosing the members, both the personnel from the case company as well as the suppliers, to ensure the quality of the study. Also, the results were analysed critically and accurately, avoiding all possible biases.

Utility criteria assesses the value or usefulness of the findings for managerial or administrative purposes (Zohrabi 2013). A research problem to answer a question such as the research question of this study: "How can a company improve their supplier selection and evaluation

processes with sustainable themes?", requires that the findings and analysis provide the company with useful information on improving their performance through new or improved practices. The validity of the study in this criterion is therefore determined by the usefulness of the findings for the case company.
Finally, the validity of the study can be measured by its applicability in other settings or with different subjects (Zohrabi 2013). Generalising the findings of the study to be applicable to different contexts is a difficult factor to assess. General managerial and administrative approaches and practices to improve the supplier selection and evaluation processes can be generalised but the more specific solutions found in the data of the case company's supplier base cannot.

In qualitative research, achieving identical results and findings between studies is quite impossible. This makes assessing the reliability of study a bit complicated since according to Merriam and Tisdell (2015, 250), "Reliability refers to the extent to which research findings can be replicated. In other words, if the study is repeated, will it yield the same results?". That is why Zohrabi (2013) suggests that the purpose of reliability in quantitative approaches is not to obtain the same results between different studies but to agree on the consistency and dependability of the used data collection and analysis methods.

The results of this research can be considered to be validated and reliably due to the selection of the personnel involved in the study, limited context of the study and the various research methods utilized to collect and validate the data from the suppliers as well as the key personnel in the case company.

4. Supplier selection and evaluation in the case company

This segment of the thesis focuses on the empirical findings of the research. The findings from the group discussions and interviews in the case company are presented and analysed,

the development and improvement of the data collection/handling tools described and finally the data collected from the suppliers analysed.

4.1. Current supplier selection practices

As described in the research methodology chapters, the data for determining current supplier selection practices was gathered via group discussions and interviews with the sourcing department of the case company. The discussions focused mainly on the currently happening change in the supplier evaluation and selection processes. The case company is at the time of writing implementing a new supplier evaluation tool to transform the data into a more quantitative form by scoring suppliers on aspects of their operations. The aspects assessed in this selection tool consist of factors such as lead-times, cost levels, technical complexity and delivery security. With the tool the suppliers are ranked with scores from 0 to 10 in each of the categories and thus giving the case company a relatively simple way of assessing the overall performance of the suppliers. The tool also allows the case company to compare different suppliers in all of the categories separately should they want to. This tool and more thorough evaluation of the suppliers transforms the supplier selection process of the case company as it is happening.

In this chapter the currently used evaluation tool is analysed more thoroughly to find new approaches for improving the supplier selection process and overall performance of the sourcing department. The tool is currently used mainly to evaluate the current suppliers of the case company since the previously used evaluation system was inadequate. In the future the tool can also be utilized as a key part of supplier selection for either selecting the best supplier from the existing supplier base to purchase a new product from or find alternative suppliers. The evaluation tool consists of 14 categories, each scored on a scale from 0-10 based on key aspects. The categories cover a wide variety of themes relevant to successful supply chain management. For this analysis, these 14 categories will be split into 3 themes: product-related factors, delivery-related factors and cost-related factors.

The product-related factors of the tool consist of themes around the quality, accessibility and overall purchasing experience of the product. One of the key factors in successful purchasing operations is to identify the most important products and the ones which are hardest to replace. The tool utilized by the case company uses the technical complexity as a feature based on which the suppliers are ranked regarding the importance and sourcing difficulty. A product with high levels of technical complexity is more difficult to find an alternative supplier for than a simpler one. However, as presented by Taherdoorst & Brard (2019), adapting the requirements to match the target of the purchase is essential. Therefore, depending on the product category, the scores may vary, and the importance could be more difficult to notice. This category also takes special requirements into consideration when assessing the overall technical complexity. In addition to the complexity of the product, the categories assess whether the suppliers have certain ISO- certificates relevant to the field the case company operates in and the quality of the product. The quality is measured by the number of deviations during different time periods. Longer time periods with less deviations equal higher scores due to the quality being consistent and predictable. Service and communications between the case company and the supplier is also seen as an important category. The scoring is relatively subjective due to the nature of the category, but some key aspects of good service include adequate response times, flexible ordering processes and willingness to improve the IT-systems for more optimized purchasing operations.

Delivery-related factors consist of aspects affecting either the delivery speed, experience or risks. Delivery speed is measured mainly by using lead-times as the evaluated category. The tool has specific guidelines for scores based on the lead-times of the suppliers. Delivery service is evaluated to identify possible issues in the delivery experience. Delivery security, and both the technical as well as the commercial flexibility are all assessed to eliminate as many delivery risks as possible. Technical flexibility in the tool refers to the willingness and capability of adapting to changes or requests in their processes. Commercial flexibility on the other hand describes the ability to adapt into changing external factors such as price changes of materials.

Finally, the cost-related factors focus strictly on the cost levels, cost reduction possibilities such as quantity discounts and the add-on costs. Assessing the cost levels of suppliers is

essential for successful supply chain management since as Ghodsypour and O'Brien (1998) stated, supplier selection processes capability to reduce the costs makes the sourcing process more efficient and thus, leading to improved performance of the organisation.

Despite the tool covering most of the key aspects of effective supplier selection and evaluation processes, some aspects of sustainability have been disregarded completely. This conclusion was confirmed via the group discussions where it was apparent that the theme of sustainability is rarely considered in the daily operations of the sourcing department. Therefore, this study discusses the potential benefits of adding selected aspects of sustainability to the criteria by which the suppliers are assessed. The selection of the themes, practical implementation and incorporation to the existing tool are presented in the following chapters.

4.2. Sustainability in the case company

Despite sustainability not being a daily topic of conversation in the sourcing department of the case company, it does not mean that the theme of sustainability is ignored. In this chapter, the ways the case company takes different themes of sustainability into consideration in their operations are presented and conclusions made. The analysis of these themes is essential in discovering ways the case company can use sustainability as a criterion in their supplier selection to improve their overall performance.

Firstly, the social aspect of sustainability in the case company is discussed. Social sustainability is arguably the most important category of sustainability for the case company in their daily operations. The company has a history of being a family-run business which is apparent in their values and actions even today. The case company is actively implementing various benefits and programs to improve either the well-being, happiness or health of their employees. Equality and lack of discrimination are key values which are reflected in fair compensation models, mutual respect and sense of a community at the workplace. Health benefits and organized activities outside of working hours have led to noticeably satisfied employees with the employee retention levels being high and exceptionally low attrition rates. In addition to the benefits provided for the employees, the case company prioritises safe working

conditions for their staff. Training programs for technicians, qualifications from the Finnish Safety and Chemicals Agency Tukes, safety certificates and accident rates way below the industry averages all ensure that the well-being of the employees stays at high levels.

The social sustainability actions of the case company are not limited to internal actions either. Due to the history of the case company being family-run and their values, the company has prioritised preserving employee's jobs even in more difficult market and financial situations. Apprenticeship training programs and interest in always training new staff members have led to countless successful career paths for previously unemployed job seekers. Working with local suppliers and companies, when possible, allows the case company to build meaningful business relationships and opportunities for surrounding communities. The values of the case company are also apparent in philanthropic activities they commit to. Regular support to charities and communities in need are part of the company's operations. The charities chosen yearly are based on the values of the company as well as suggestions from the personnel. The charities chosen in the past have focused on helping various social and age groups mainly in Finland with issues such as exclusion of young people, loneliness of elderly and healthcare expenses. Furthermore, a major part of the investments in charities has been directed towards those in need due to suffering from the Ukrainian war.

Assessing the economic factors of the case company reveal that they are currently successful in their operations. According to Kauppalehti (2023) the annual turnover of the company has grown from a bit over 10 million euros in 2019 to almost 30 million in 2022. In the same time period, the profits have almost doubled from 1.2 million euros to 2.2 million. With many corporate acquisitions and new collaborations to broaden the range of the services they offer the case company has been able to continue their growth well. The economic state of the company seems stable and sustainable.

The environmental aspect of sustainability is also important for the case company despite it not showing in the operations of the sourcing department. The consideration of environment starts with each office or establishment of the company having a designated person whose responsibility is to ensure that the environmental protection requirements for company's operations are met. The case company is committed to reducing their emission amounts and one of the latest examples for these actions is transforming the vehicle fleet of the company

towards electric vehicles. While there is some debate around the true sustainability of electric vehicles, according to an analysis conducted by Reuters (Lienert P.,2021) a fully electric vehicle surpasses a traditional internal combustion engine vehicle in terms of sustainability after somewhere between 15000 and 125000 kilometres driven. Besides direct actions to improve the sustainability performance of the organisation, a key aspect of environmental sustainability for the case company is the waste management and recycling. Proper handling of waste is essential due to the nature of the waste produced by the industry the company operates in. With the case company being one of the key players in the industry in Finland, they are also one of the only organisations able to inspect and process the industry-specific waste. Therefore, investing in the expertise to clean and reuse the chemicals is essential for both the company as well as the whole industry.

The case company also strives to reduce the energy consumption through their own actions and ensuring the energy efficiency of the equipment their customers use through extending the lifecycle of products, preserving the energy efficiency with scheduled maintenance services and fast response times to malfunctions. Offering specialised and personalised maintenance services and attending manufacturers training courses allow the case company to extend the life cycles of the customers equipment as much as possible, thus reducing waste and negative effects of production of the equipment. All the mentioned sustainability actions are listed in Table 4 below.

SUSTAINABILITY		
Environmental	**Economic**	**Social**
Low emission vehicles	Financial stability	Equality and lack of discrimination
Designated environmental protection person	Economic growth	Employee well-being
Waste management & Recycling	Employee number increase	Training programs & Employee safety
Energy efficiency	Increasing variety of services offered	Local communties
Extending life-cycles of equipment		Supporting charities and communities in need

Table 4. Sustainability actions in the case company.

With all the sustainability actions presented in this chapter and Table 4, it can be said that even though sustainability is not apparent in the purchasing operations and decisions of the company, the company has sustainability integrated into its values deeply.

4.3. Relevancy of sustainability themes for supplier selection in the case company

With the sourcing department currently lacking in terms of consideration for sustainability aspects, some prioritization of themes selected for supplier selection purposes is required. Immediately attempting to cover all aspects of sustainability would be overwhelming and a project destined to fail. As described in the research methodology- section of the study, interviews and discussions with the sourcing department lead to a decision to choose the initial themes of sustainability based on the interests and demands of one of the main stakeholder groups, the customers of the case company. Therefore, the interviews and discussions with the National Key Account Manager of the case company were conducted.

The main objective of the discussions was to find common themes in the demands and interests of different key customers and customer groups. The discussions were focused on overall sustainability themes relevant to the key customers but also took the perspectives of new possible customer segments and supply chain management into consideration. In addition, the goal of the interview was to possibly find additional value in the integration of sustainability themes into supplier evaluation criteria.

Key findings of the discussions can be categorified into mainly environmental and social sustainability themes. Themes related to economic sustainability were mainly limited to the financial stability and capability to deliver the promised services. Capability to deliver the promised services is definitely an aspect of economic sustainability the sourcing department is heavily responsible for. Understandably the ability to provide the customers with the promised services in promised time is one of the key concerns for the customer and should be ensured.

From environmental point of view, the customers of the case company are increasingly concerned about the negative effects the equipment and solutions they use have on the environment. Especially specific industries such as retail sector and hotel industry are more and more invested in ensuring the products and services, they use are sustainable to improve their overall sustainability performance. In supply chains, the overall sustainability levels of the chain are determined by the levels of sustainability the individual suppliers and the suppliers they use have. Therefore, the concerns about the sustainability performance of the customer organisations of the case company can directly be linked to both the operations of the case company as well as the actions of its suppliers. In other words, ensuring environmental sustainability actions and commitments of their suppliers can create additional value the case company can offer to its customers through the knowledge on the sustainability performance levels.

One specific theme of interest across the customers was energy efficiency. Energy efficiency was already heavily prioritized in the analysis of the case company's values and current sustainability actions. Therefore, it can be said that energy efficiency should be one of the main priorities in terms of sustainability themes to consider in the both the case company's

operations and the supplier selection process. In addition to energy efficiency and consumption, the customers are interested in using products and services with low impacts on their total emission amounts and in avoiding potential reputation harms caused by major environmental issues in their supply chains. These themes can also be regarded to be important when selecting the prioritized themes for the supplier selection process.

Social themes were mainly focused on the prevention of major issues regarding more serious themes such as human rights and equality. Therefore, with the case company already prioritising social sustainability themes in their own operations, the logical step is to investigate the downstream of the supply chain for said issues. One of the most commonly tools used to ensure that suppliers share the levels of commitment towards sustainability with the purchasing company is using a Code of Conduct- agreements. Based on the discussions had, this can be an essential part of the supplier selection processes additional value creation.

In addition to the discussions with the National Key Account Manager about the priorities of the customers, a search of common sustainability themes within the suppliers' operations was conducted. In this search the materials used were mainly the sustainability reports, webpages and other documents of the top 20 suppliers of the case company. The list of suppliers included both manufacturers as well as retailers. In the following table the most common themes and their relevancy are presented in a graphic form.

Sustainability themes	Number of mentions
Emission/environment goals	14
Supplier audits	6
Energy consumption	7
Employee safety	6
Code of Conduct	5
Delivery risks	7

Table 5. Sustainability themes from supplier material

A quick analysis of the findings shows that the themes overlap, thus it is apparent that the similar themes of sustainability affect the whole industry, regardless of where they sit in the supply chains. With this knowledge, the process of choosing the prioritized themes for this study and case company's supplier selection operations can be completed.

4.4. Creation of the sustainability tool for supplier selection of the case company

As discovered in the previous chapter, the main interests in terms of sustainability seem similar between the key suppliers and key customers of the case company. Therefore, the themes were selected to match the interests of both of them to gain an understanding of the topics crucial for all stakeholders of the case company. The selected themes for this study are presented in this chapter of the thesis. In addition to presenting the chosen themes, their importance, the practical implementation and the development of the tool used to assess the suppliers is discussed.

Firstly, the theme of energy efficiency has been apparent in all discussions and information gathering sessions during the project so choosing it as one of the main themes to build the

tool around was justified. As far as energy consumption and efficiency are concerned, the metrics for assessing the suppliers can be quite challenging to set. Since the process of implementing sustainability into the supplier selection process of the case company is only beginning and according to the discussions had, the whole industry is slowly moving towards sustainable thinking, a simple metrics were determined to be the best available option. Therefore, the theme of energy efficiency and consumption is investigated with three questions in the questionnaire used to collect the data from the suppliers for the tool. First of these questions took form of: "Has your organisation been awarded the ISO 50001 energy management standard?". As a simple yes or no- question, the question is self-explanatory and simple to answer. The second question focuses on the efforts and plans made by the supplier to reduce their energy consumption or increase energy efficiency. With a five-step answer scale ranging from "Measures for improved energy efficiency have been implemented fully" to "Energy efficiency plans have not been developed", a simple understanding of the companies' willingness to improve their practices is achieved. The third question regarding the theme of energy efficiency was an open-ended question for companies to list as many examples of the measures they have taken or are planning to execute in the near future to either improve their energy efficiency or decrease energy consumption.

The second major theme selected for examination was emission and climate goals of the suppliers. Due to the similar nature to the theme of energy efficiency, same question format was used to gain an understanding of the suppliers' positions on emission reduction plans and climate goals. The first question of the questionnaire focuses on the current state of the suppliers by determining whether they have an active plan to reduce emissions and achieve climate goals or not with a yes or no- question. The format for the second question stays also the same and investigates if the company has planned or implemented the measures to achieve previously mentioned emission reductions or climate goals and how far the process of implementing said actions is. Third question on the theme is again an open-ended question where the suppliers are encouraged to share measures taken, goals achieved and plans for the future.

Third and final theme of the questionnaire focuses on the supplier management of the suppliers. Gathering valuable knowledge on the practices of their suppliers gives the case company more comprehensive knowledge on their supply chains overall performance. Therefore, extending the knowledge gathering to one step further and examining how the suppliers

of the case company handle their supply chains can be beneficial in understanding the bigger picture. Two questions were created to gain knowledge of the theme of supplier management. Firstly, the suppliers' practices on supplier auditing were inquired. With a question of: "What is your organisation's practice regarding supplier auditing" which has four options ranging from "No supplier auditing." to "Regular comprehensive auditing system." information on auditing frequency was gathered. The second question was focused on the utilization of Code of Conduct to require the suppliers' suppliers to commit to suppliers' business principles. The question had three options: No Code of Conduct in use, Code of Conduct used for key suppliers and Code of Conduct in use for all suppliers.

The questionnaire was designed to be quick to answer, simple to manage and compliment the themes regarded to be crucial in previous stages of the research. The full questionnaire is found as an appendix at the end of the thesis.

Before presenting the managerial uses for the data collected from the suppliers, in this chapter the findings and conclusions of the data are discussed. The data was transferred into Excel and the qualitative data was transformed into quantitative form for analysis and comparison purposes. The weighting of each category was also decided, and the overall scale formed. These decisions were made based on the information gathered during the research to match the interests and expectations of the stakeholders of the case company. In this chapter, the answers from the suppliers and the scores given to them based on the answers are discussed and the main findings presented.

The overall scale for the variable "Sustainability score" consisting of all the weighted scores from the questions of the questionnaire was set to be 0-10 to match the format used in the currently utilized supplier selection tool in the case company. The average score of the 14 suppliers in the sheet was determined to be 7,0 with the lowest scoring supplier having a score of 4,4 and the highest one scoring a perfect 10,0. The high variance in the points was expected since the type of these suppliers varied heavily from international equipment manufacturers with annual extensive sustainability reports to local retailers and manufacturers only beginning to consider sustainability as something beyond additional costs. The combined answers to all the non-open-ended questions are presented in the Appendix 2. The open-ended questions and the findings behind the answers are discussed afterwards.

The weighting of the questions was decided based on the findings of the discussions with the personnel in the case company. Weighting was performed using multipliers to the scores given from each category when calculating the total score. The range of weightings varied from multiplier of 1 to 0.2. The most important category was determined to be the measures the suppliers have implemented or are planning to implement in the near future and the multiplier for those scores was 1. This area was also the one where the suppliers scored highest on average with 8 out of the 14 suppliers scoring the full points. The lowest multiplier of 0.2 was given to the yes or no- question of "Has your organisation been awarded the ISO 50001 energy management standard?". The reasoning behind the decision was to not weight the overall sustainability score towards the manufacturers since it is more likely for them to have the certification when compared to retailers.

Moving to the analysis of the open-ended questions which were not used in the scoring but provide possibly the most interesting data from the suppliers' practices. Unsurprisingly, there were common themes amongst the answers and in this chapter some of them are discussed. 7 out of the 14 suppliers in the research mentioned actions aimed specifically to reduce the emissions from their operations or reaching their emission goals. The means to achieve these goals varied from calculating the carbon footprints of their whole production lines and making it possible for customers to follow all emissions throughout the process including delivery to using low-emission vehicles and green energy sources. In addition, low-emission fuels were mentioned in multiple answers. Another common theme in the answers was recycling and circular economy regarding the production materials and industry-specific materials. As discussed in the previous chapters of the thesis, the ability to recycle and properly manage the industry-specific waste has been one of the key strengths of the case company and a source of competitive advantage. Therefore, many suppliers having implemented or are planning to implement similar practices can be seen as both an opportunity as well as a possible threat. With the suppliers improving their waste management practices, it can bring additional value for case company in terms of more sustainable supply chain overall and possibly less pressure on handling all the industry-specific waste. On the other hand, the recycling ability of the case company has been a source of competitive advantage and if multiple organisations in the same industry implement similar practices the competitive advantage diminishes.

In terms of measures taken by the suppliers to reduce the energy consumption and improve energy efficiency common themes were also identified. Most of the suppliers mentioned modernizing their lighting systems to reduce the energy consumption significantly. These modernizations included smart lighting monitoring systems and transforming the traditional lighting solutions such as fluorescent lights to more energy efficient LED-solutions. In addition, ensuring the facilities and offices have modern seals and energy efficient were mentioned in multiple answers. Heating and air conditioning solutions have also been made more efficient through modern air-source heat pumps and similar solutions.

Overall, the measures mentioned in the open answers by the suppliers were quite similar yet effective. It is quite apparent that sustainability has been an increasingly common topic of discussion in the companies, even though the industry in which the case company operates in is perhaps a bit behind the average rate of inclusion of sustainability practices. Therefore, the case company being invested in improving their sustainability practices through additional supplier selection criteria for example meets the standard of moving towards more sustainable business operations.

4.5. Managerial applications

When discussing the managerial applications of this study, the difference between managerial applications for the case company and the general applications must be clarified. The case company and especially its sourcing department is relatively new to sustainable way of thinking. Therefore, the managerial applications for the case company are quite simple and entry-level processes. The main application for the case company is the implementation of sustainability themes into their supplier selection criteria through the questionnaire and data handling tools. With these tools integrated into the supplier selection processes, the personnel responsible for procurement can make increasingly more informed decisions based on the data. The possibility of creating additional value through possibly more sustainable supplier selection and evaluation can lead to increased overall sustainability performance for the company as well as eventually even competitive advantage over other organisations operating in the industry. In terms of potential applications, the usage of sustainability as a

supplier selection criterion in the case company can provide additional tools and possibilities for marketing and account management departments due to the value added with added knowledge.

The general applications of the findings in the study can be summarised to two aspects. Firstly, sustainability as whole as a criterion in supplier selection can improve the sustainability of the organisation significantly. As it has been discussed in the research, for a supply chain to be sustainable, its suppliers must act in a sustainable manner. Therefore, using the sustainable suppliers improves the overall sustainability performance of the company. Secondly, the additional value created by improving sustainability performance can lead to competitive advantages regardless of the industry or the organisation. More sustainable actions can influence the organisation's reputation in a positive manner and even open up new possibilities, new customer segments for example.

5. Conclusions

In this final section of the thesis the findings of the study are discussed, and the research questions answered. In addition, the limitations of the study as well as the applicability of the findings are analysed.

5.1. Findings

The main conceptual framework of the study was built around the triple bottom line- framework by John Elkington. Through this framework the case company's values and operations were analysed. Seeing sustainability as a direction of development which limits the harmful impacts for surroundings and preserves the limited natural resources, like both Doppelt & McDonough (2010) and Moldan et al. (2012) discussed, can be influential for business operations. In this study the case company was determined to be already performing well in terms of sustainability, even before implementing sustainability into the supplier selection and evaluation processes.

Jintao et al. (2020) suggested that for an organisation to operate and take care of their financial responsibilities, they must have a solid financial basis. Analysis of the case company revealed that their financial situation can be described as stable and sustainable. The company has increased their turnover and profit numbers significantly in the past couple of years and are expanding their service offerings all the time. According to Carroll (2016) the effect of profits can be seen in new growth opportunities and benefits for the stakeholders. Therefore, due to the continuous growth of the case company and lack of harmful actions such as tax evasion or bribery, it can be said that the case company operates in a economically sustainable manner.

In terms of social sustainability, the case company excels. Like Pullman et al. (2009) discussed, the social aspects of social sustainability focus on the communities inside and outside of the company. It was determined that the concept of social sustainability is integrated deeply into the values and operations of the company. Well-being and happiness of the employees, excellent training programs and support to local charities have all been a part of the case company's operations for a long time. As Lee (2017) presented, social sustainability actions are meant to improve social aspects and ethical need beyond what the laws and regulations require. Based on the analysis conducted in this study, the case company can be considered to succeed in terms of social sustainability performance.

Environmental sustainability can be summarised as minimising the negative effects the operations of the company have on the surrounding nature and environment. High energy usage and pollution are some of the key issues organisations must consider (Gimenez et al. 2012; Worrel et al. 2001). The case organisation has plenty of measures implemented to ensure their environmental sustainability. Recycling processes, electric vehicle fleet and consideration of environmental protection ensure the necessary attention to environmental sustainability.

Despite the case company operating in a sustainable manner in all analysed aspects, the consideration of sustainability is mainly limited to their own operations. Therefore, implementing sustainability into the supplier selection process can improve their overall sustainability performance significantly by starting to include other key stakeholders into the sustainability consideration. As Taherdoost & Brard (2019) suggested, the main goal of supplier selection

is to minimize the purchasing risks and maximize the value generated for the organisation. This can be further extended to include other stakeholders such as the customers or customer organisations who could benefit from additional value generated through effective supplier selection processes. Arpan (2014) highlighted the constant evolution of supplier selection criteria, especially in the past couple of decades. Additionally, suitable supplier selection and evaluation criteria are necessary for successful selection process in all buying situations. The selection tool the case company utilizes is focused mainly on the traditional criteria, meaning that the priority is with the quality of the product and the total costs. While the current criteria does well to minimize the purchasing risks in most cases, they do not necessarily maximize the value for all stakeholders.

Based on the data gathered from the discussion with various employees within the case company, it can be confirmed that implementation of sustainability as a supplier selection criterion has the possibility of creating additional value for the stakeholders. Firstly, the sustainability data collected from the companies already benefits the company by providing useful information for other departments of the organisation such as sales and account management teams/personnel. Presenting the collected data in a simple form increases the number of tools and the amount of information the sales and account management teams have to offer for customers. Additional sustainability data and knowledge can generate both competitive advantage through new interested and committed clients as well as added value for customers through increased sustainability performance in their operations.

Secondly, sustainability as supplier selection criteria creates additional value for the organisation by improving the overall sustainability performance. As discussed with the HR-management, being increasingly more sustainable organisation can bring new interested talent into the organisation. Additionally, possible applicants can be more interested in the sustainability of the organisation before deciding to apply for open positions.

Finally, the case company being more invested in making their purchasing processes increasingly sustainable, can have a positive impact on the overall sustainability of the industry. The case company is a major buyer for many of the smaller suppliers and local manufacturers. Therefore, the case company showing its interest in sustainability and presenting sus-

tainability as one of the key aspects when considering the possible suppliers can have a motivating effect on the suppliers to improve their practices towards a sustainable way. As mentioned earlier, the industry as a whole has changed towards a sustainable way of thinking quite recently and with larger organisations implementing more sustainable supply chain processes, the sustainability trickles down to smaller businesses with time.

5.2. Research questions

To conclude the findings of the study, the research questions must be taken into consideration. The main research question of the study was: "How can a company improve their supplier selection and evaluation processes with sustainable themes?". To help answer this question, two sub-questions were formed.

The first sub-question, "What themes of sustainability are the most crucial in supplier selection in the context of the maintenance service industry?", was constructed to limit the research to focus on the most important factors of a broad concept of sustainability. The information to provide an answer to this question was gathered through group discussions and semi-structured interviews with the relevant personnel from the case company. In the discussions important themes were identified, multiple stakeholders taken into account and finally the most crucial themes determined. In addition, the sustainable actions as well as the core values of the case company were examined and their effect on the chosen sustainability themes for this research can not be disregarded. The most important themes were found to be energy efficiency, emission reductions, financial stability and supplier selection and monitoring. In addition, work safety and employee well-being rose as important topics when analysing the data.

The second sub-question, "How can the sustainability data collected from suppliers be used to improve supplier selection and evaluation processes?", focuses on the tools necessary to put collected data into use. The data from the suppliers was collected vie questionnaire in mainly a qualitative form and then transferred to Microsoft Excel-sheets. The qualitative data was also transformed into quantitative form to match the data format in use for current

supplier selection tools used in the case company. The newly collected data can thus be used as a part of the decision-making process when selecting and evaluating the suppliers. As it was discovered, the customers of the case company are increasingly interested in the sustainability of the organisation's operations. Thus, it can be said that integrating sustainability themes into the supplier selection processes increases the value offerings for the customers via increased sustainability performance in the whole supply chains.

Therefore, the main research question can be answered with the help of two sub-questions. In conclusion, the main ways a company can improve their supplier selection with the use of themes of sustainability is to create additional value for its stakeholders and therefore gain competitive advantage for itself. Creating additional value requires a thorough understanding of the values and principles of the company's stakeholders but can be a key factor in achieving long-term financial stability as well as economic growth.

5.2. Limitations of the findings and consideration for further research

The main limitations of the findings of this research are its focus on a single case company in a specific industry and the relatively low number of suppliers from which the data was collected for analysis. Focusing only on a single case company allowed the research topics to be personalised for the themes most important to the specific context of the study but therefore the findings of the study or the managerial applications might not be fully generalizable. Also, most of the suppliers studied were located in Finland. Only one of the suppliers was located elsewhere and therefore, the results could be considered to represent only the Finnish field.

In addition, with sustainability being relatively new and undiscovered topic in both the case company, especially the sourcing department, and the industry as a whole, the selection of themes covered in this study is limited. With more advanced sustainability practices in place, different results might be had, and different themes prioritised.

Finally, it was found that the case company and the suppliers shared a lot of the same values and interests in terms of the most crucial sustainability topics. This study did not analyse the motives and reasonings behind the most important sustainability aspects and focused mainly on the practical uses for the information. In further studies, it could be beneficial to analyse both the similarities as well as the differences in the sustainability priorities between organisations in the same industry. Furthermore, the reasonings and motivations behind these priorities and deeper understanding of the link between the values of an organisation and the sustainability priorities could be interesting and beneficial topics for more through understanding of the ways in which organisations see sustainability.

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Appendices

Appendix 1. The questionnaire for suppliers

1. The name of the company/organization *

_____

Climate goals and emission reductions

2. 1) Has your company set climate goals or emission reduction goals for the future? *

Merkitse vain yksi soikio.

- ◯ No
- ◯ Yes

3. 2) Have measures been taken in your company to achieve the aforementioned climate or emission reduction goals? *

Merkitse vain yksi soikio.

- ◯ 1. Measures have not been planned or put into action.
- ◯ 2. Preliminary plans are made.
- ◯ 3. Measures and their implementation have been planned.
- ◯ 4. Implementation of the measures is in progress.
- ◯ 5. All measures have been implemented according to plans.

4. 3) Examples of measures:

_____

Supplier management

5. 1) What is your company's practice regarding supplier auditing? *

Merkitse vain yksi soikio.

- ◯ 1. No supplier audits.
- ◯ 2. Only the most important suppliers.
- ◯ 3. New suppliers.
- ◯ 4. Regular comprehensive audits.

6. 2) Does your company require suppliers to commit to the organization's business principles (Code of Conduct)? *

Merkitse vain yksi soikio.

- ◯ No
- ◯ Only critical suppliers
- ◯ Yes

Energy management

7. 1) Has your organization been awarded the ISO 50001 energy management standard? *

Merkitse vain yksi soikio.

- ◯ No
- ◯ Yes

8. 2) Have measures been taken to improve energy efficiency in your company? *

Merkitse vain yksi soikio.

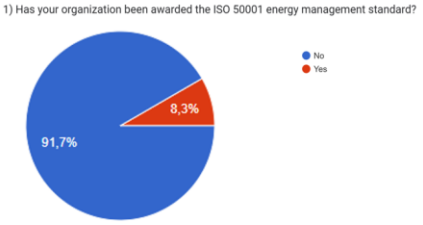
- ◯ 1. Measures have not been planned or put into action.
- ◯ 2. Preliminary plans are made.
- ◯ 3. Measures and their implementation have been planned.
- ◯ 4. Implementation of the measures is in progress.
- ◯ 5. All measures have been implemented according to plans.

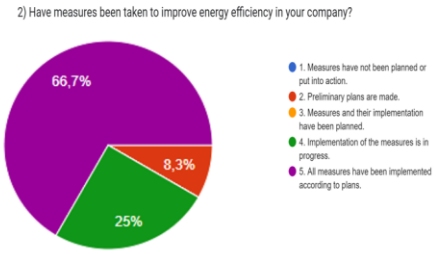
9. 3) Examples of measures:

_____

Send answers

Appendix 2a. Compiled answers to the questions for suppliers





Appendix 2b. Compiled answers to the questions for suppliers