



LUT UNIVERSITY

LUT School of Business and Management

Master's Degree Program in Supply Management

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**MANAGEMENT OF SUSTAINABILITY-RELATED RISKS IN MULTI-TIER
SUPPLY CHAINS**

Master's thesis 2021

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ABSTRACT

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Title: Management of sustainability-related risks in multi-tier supply chains
Faculty: School of Business and Management
Major: Supply Management
Year: 2021
Master's thesis: LUT University, 89 pages, 20 figures, 2 tables
Examiners: Professor Anni-Kaisa Kähkönen
Junior Researcher Kati Marttinen
Keywords: Multi-tier sustainable supply chain management, sustainability, risk, lower-tier supplier, risk management

The purpose of this master's thesis is to find out how sustainability-related risks can be managed in multi-tier supply chains. The study focuses on finding and identifying the different means and practices of sustainability-related risk management that typically exist and whether they differ between different stages of multi-tier supply chain among the focal company, first and lower-tier suppliers. The study has examined five different multi-tier supply chains and including three different stages. The comprehensive qualitative data of the study consists of semi-structured interviews. A total of 25 different case companies have been interviewed in this study. The results of this study suggest that companies face challenges in extending their sustainability-related risk management practices beyond first-tier suppliers to the multi-tier supply chain. As a result, first-tier suppliers play an essential role in ensuring sustainability-related risk management practices. In addition, companies have different motives for managing sustainability-related risks depending on their stage in the multi-tier supply chain. In addition, the risk management tools and practices that are used change depending on the stage in the multi-tier supply chain. Typically, based on this study, focal companies systematically manage sustainability-related risks with a strong desire to influence how their suppliers operate. Correspondingly, lower-tier suppliers may not have risk management practices in place at all, and they rely on mutual trust when working with different suppliers. Based on the results of this study, an approach has been proposed to how focal companies can engage lower-tier suppliers to adopt different sustainability-related risk management tools and practices in the most resource-efficient way by taking into account the characteristics of a multi-tier supply chain.

TIIVISTELMÄ

Tekijä:	Antti Kontio
Tutkielman nimi:	Vastuullisuusriskien johtaminen monitasoisessa hankintaketjussa
Tiedekunta:	Kauppateellinen tiedekunta
Pääaine:	Hankintojen johtaminen
Vuosi:	2021
Pro gradu -tutkielma:	LUT-yliopisto, 89 sivua, 20 kuvaa, 2 taulukkoa
Tarkastajat:	Professori Anni-Kaisa Kähkönen Nuorempi tutkija Kati Marttinen
Hakusanat:	Monitasoisten vastuullisten hankintaketjujen johtaminen, vastuullisuus, riski, alemmien tasojen toimittajat, riskienhallinta

Tämän pro gradu – tutkielman tarkoituksena on selvittää, miten vastuullisuuteen liittyviä riskejä voidaan hallita ja johtaa monitasoisissa hankintaketjuissa. Tutkimus keskittyy löytämään ja tunnistamaan, mitä eri keinoja ja toimintatapoja vastuullisuuden riskienhallintaa on tyypillisesti olemassa sekä eroavatko ne eri yritysten, ensimmäisen ja alemman tason toimittajien kesken. Työssä on tutkittu viittä eri hankintaketjua ja kolmen eri tason näkökulmasta. Tutkimuksen kattava aineisto muodostuu puolistrukturoiduista haastatteluista. Tässä työssä on haastateltu kaikkiaan 25 eri case-yritystä. Tämän tutkimuksen tuloksista voidaan havaita, että yrityksillä on haasteita ulottaa heidän riskienhallintansa käytänteitä ensimmäisen tason toimittajista pidemmälle hankintaketjuun. Tämän seurauksena ensimmäisen tason toimittajilla on merkittävä rooli toteuttaa vastuullisuuteen liittyvien riskienhallintaa. Tämän lisäksi yrityksillä on erilaiset motiivit toteuttaa vastuullisuuteen liittyvää riskienhallintaa sen mukaan, millä tasolla he sijaitsevat hankintaketjussa. Käytetyt riskienhallintatyökalut ja toimintatavat myös muuttuvat sen mukaan, mitä tasoa hankintaketjussa tarkastellaan. Tyypillisesti tämän tutkimuksen perusteella pääyritykset johtavat vastuullisuuteen liittyvien riskienhallintaa systemaattisesti ja vahvalla halulla vaikuttaa toimittajien tapaan toimia vastuullisesti. Vastaavasti alemman tason toimittajilla ei välttämättä ole lainkaan systemaattista riskienhallintaa käytössä, ja he luottavat yhteiseen luottamukseen toimiessaan eri toimittajien kanssa. Tämän tutkimuksen tuloksien perusteella on hahmoteltu toimintatapa, jolla yritykset voivat saada alemman tason toimittajat ottamaan käyttöön eri vastuullisuuden riskienhallinnan työkaluja tai toimintatapoja mahdollisimman resurssitehokkaasti ja huomioiden monitasoisen toimitusketjun ominaispiirteitä.

ACKNOWLEDGEMENTS

This thesis was done for LUT University as a part of a large research project. The main target of this thesis is to provide more understanding of sustainable multi-tier supply chain management, especially in terms of risk management. I would like to thank LUT University for its funding of this project.

I want to thank my advisors Professor Anni-Kaisa Kähkönen and Junior Researcher Kati Marttinen from the LUT University for their help, guidance and advices through this project.

Finally, special thanks to my wife Elma for the support and encouragement during this thesis project and with my studies.

Antti Kontio

Tuusula 24.8.2021

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LIST OF ABBREVIATIONS

BSCI	Business Social Compliance Initiative
FMEA	Failure mode and effect analysis
MT-SC	Multi-tier supply chain
MT-SSCM	Multi-tier sustainable supply chain management
NGO	Non-governmental organization
SSD	Sustainable supplier development
SSCM	Sustainable supply chain management

1 INTRODUCTION

In many industries, companies are using more and more suppliers and partner companies to be able to react to market changes and customer demand. This networked collaboration between companies will give many success factors such as reduced transaction costs, access to critical technologies or competencies, the possibility of concentrating on core skills, and risk sharing with other companies, making the networked collaboration attractive. However, this makes companies more reliant on each other and will predispose companies to the risk of other companies or suppliers. (Hallikas et al. 2004). In addition to risks, the length and complexity of supply chains create challenges for companies because nowadays, supply chains are multi-tier chains composed of many suppliers and other actors. Multi-tier supply chain length and complexity can have an impact on economic performance. The multi-tier supply chain complexity includes structural issues such as several associations and multi-way exchanges. In addition, there are other issues, for example, behavior issues of the associates related to the relationship dynamics, organization of the company, and co-operation initiatives. In addition, considerations need to be given to environmental and social factors across multiple stages of multi-tier supply chains. (Mena, Humphries, & Choi 2013)

Sustainability risks in the supply chains have raised interest, and at the same time, demand for environmentally friendly and socially responsible products and services has been increasing globally. This leads to many sustainability innovations and practices due to sustainability-related risks and opportunities. In today's competitive markets, sustainability has become a major competitive driver between companies and a way to gain leverage in the markets. (Schaltegger & Burritt 2014). In addition, different trade unions are starting to pursue obligations to companies' operations related to sustainability. European Union has prepared a legal package that deals with the sustainability of companies' operations and procurement. The law would oblige companies to assess the sustainability of their own operations and procurement related to human rights, sustainable development and the environment. The obligation would run through the entire multi-tier supply chain all the way to the raw materials used for the individual components. (European Commission 2021)

Sustainability affects many vital areas of the supply chain because supply chains have an impact on society. Therefore, there is increasingly rising interest in developing socially and

environmentally responsible supply management practices that can be implemented through the whole supply chain. This is essential because the focal company's reputation can be damaged, for example, by illegal or unethical practices with suppliers in some stage of the multi-tier supply chain. (Marshall et al. 2019). According to Elkington (1998), the role of partnerships is an essential part of developing global sustainability agenda and taking into account triple bottom line viewpoints: social, environmental, and financial in the company and the entire industry sector.

Many large companies have realized that managing sustainability-related risks in multi-tier supply chains needs to have a more comprehensive approach. It is not enough to manage the sustainability of the first-tier suppliers. Instead, these actions need to be applied through several stages of the multi-tier supply chains. This enables a reduction of possible risks and supply chain liabilities. This is central because consumers are assuming that the focal company has the end responsibility of sustainability. Typically, the most crucial sustainability issues related to environmental and social in the multi-tier supply chains occur by suppliers in the second tier or further stages in the multi-tier supply chains. (Tachizawa & Yew Wong 2014). Nowadays, companies are increasingly dependent on suppliers since many companies have a high procurement share of the firm's total revenue. It has been estimated that this trend will continue in the future, and suppliers will have even more responsibilities of the company operations. That is why supplier performance has a consequential impact on many areas of companies' activities. (Talluri, Narasimhan & Chung 2010).

Figure 1 summarizes how the interest in sustainability in the supply chain has increased during recent years, and the trend is rising. Figure 1 includes all the documents and publications related to sustainable supply chains during the specific year. This result shows rising interest in sustainability in supply chain management and a need related to this topic.

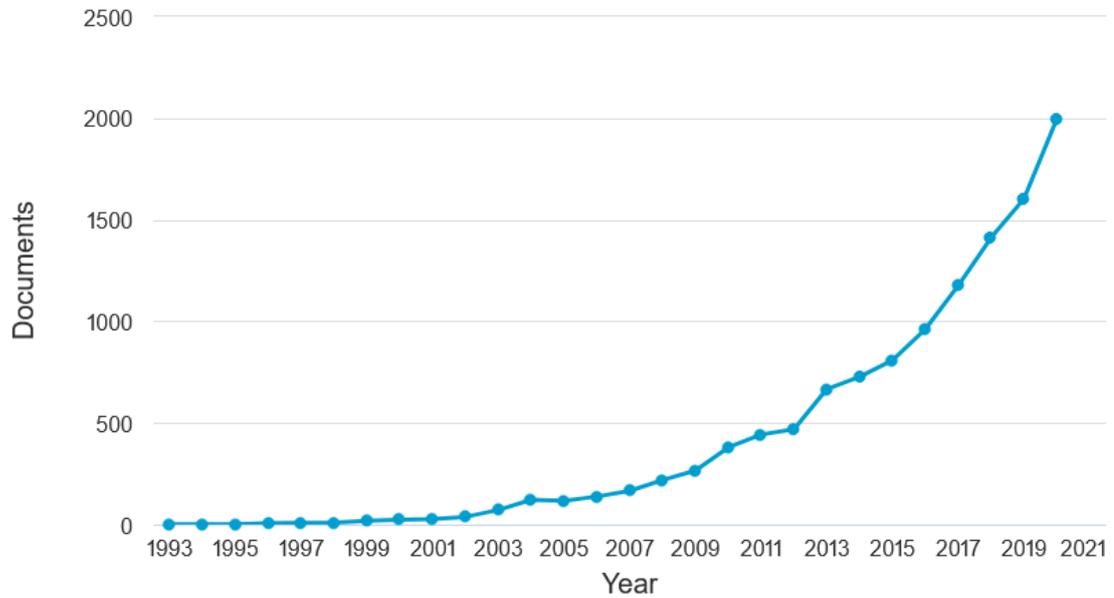


Figure 1. The search result of Scopus with "Sustainable supply chain" search term.

Supply chain management literature has mainly focused on and analyzed sustainability through dyadic relationships with first-tier suppliers or triadic structures with a focal company, first-tier, and second-tier suppliers (Tachizawa & Yew Wong 2014). Mena, Humphries & Choi (2013), examine the structural dynamics that are involved in three multi-tiered supply chain management. According to Gouda & Saranga (2018), supply chain managers face difficulties managing complicated supply chains globally even if multiple risk mitigation strategies are implemented. In addition, companies have included various practices and initiatives related to environmental and social sustainability practices to reduce, for example, carbon footprint and to improve the company's social image. Despite this increasing need to manage sustainability-related risks in the supply chain, only a couple of studies in the existing literature have studied this matter comprehensively. (Gouda & Saranga 2018)

With these aspects and research gaps, this thesis takes into consideration multi-tier supply chain management of sustainability-related risks. In this thesis, focal companies and their multiple stages of the multi-tier supply chain suppliers have been interviewed to present how sustainability-related risk management is carried out today. This thesis tries to find similarities and differences between different stages suppliers in the multi-tier supply chain related to sustainability-related risk management. The fundamental interest is to see how

sustainability-related risk management is ensured through the multi-tier supply chain. In addition, relevant and up-to-date theories have been described to get more understanding of the current practices. The rising interest in sustainable supply chains and the increased number of studies emphasize the need to provide more information and viewpoints on this study topic.

1.1 Research questions, objectives and limitations

The main objective of this study is to find out how the whole multi-tier supply chain sustainability-related risk management is performed in companies and provide insights into sustainability-related risk management practices in multi-tier supply chains. This study provides understanding and knowledge for the growing literature and answers to call for more research on the multi-tier supply chain. The studied topic is analyzed with two perspectives: (1.) In the context of a single multi-tier supply chain and secondly, (2.) With every stage between different multi-tier supply chains. Table 1 presents the main research question and its sub-questions in this research. This study includes all three main perspectives related to sustainability: social, environmental, and economic. The risk management practices related to these issues are studied in the context of a multi-tier supply chain.

Table 1. Research questions.

Main research question
1. How are sustainability-related risks managed in multi-tier supply chains?
Sub-questions
1.1 How is risk management seen in different levels of multi-tier supply chains?
1.2 What is the role of the focal firm, first-tier supplier, and lower-tier suppliers in sustainability-related risk management?

In this research, the main target is not to develop a theory for sustainability-related risk management practices in a multi-tier supply chain context. In addition, there is no analysis of the company's sustainability risk assessment practices in the company. In other words, the target is not to introduce sustainability-related assessment practices in a single company

but to focus mainly on sustainability-related risk management in the multi-tier supply chain context.

1.2 Methodology

The case study approach is utilized in this research to study and understand different phenomena in the sustainability-related risk management practices in the multi-tier supply chain context. A case study can be used to develop an in-depth description and analysis of a case and providing an understanding of cases (Creswell 2013). Data has been collected mainly through interviews and additional information sources have been utilized to verify and broaden the perspective. The interviews were semi-structured interviews that were not tied to the answers options, but the interviewees could answer by their own words to the questions. (Hirsjärvi & Hurme 2019). The semi-structured interview also emphasizes people's interpretations of things and the different meanings they give to things. The primary purpose is to find relevant information according to the purpose of this research. (Tuomi & Sarajärvi 2013)

Twenty-five case companies' interviews are analyzed in terms of this study topic. Interviewed companies include five Finnish focal companies and five multi-tier supply chains with 21 first- or lower-tier suppliers. There are a total of 45 interviews gathered for this research. With five multi-tier supply chains from different industry areas, the main goal is to see possible similarities and differences in the sustainability-related risk management practices and how different stages in the multi-tier supply chain affect this matter.

1.3 Definitions of the key concepts and conceptual framework

Sustainability

Sustainability is defined according to Elkington's (1997) definition and concept of the triple bottom line, which considers the social, environmental, and economic perspectives of sustainability in the business context at the same time. Sustainability and its development can be seen as a: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs. --provides a framework for the

integration of environmental policies and development strategies” (United Nations General Assembly, 1987, p. 38 & 41). Sustainability is more and more integrated into companies' strategic and operational decision-making processes next to other more traditional business considerations such as profit maximization and revenue growth (Thomas & Lamm 2012).

Multi-tier sustainable supply chain management

“Sustainability management and action involve consideration of environmental factors and social aspects of organizational activities, as well as their integration with conventional economic performance. Sustainability management is a process of steering the company towards its goals, and sustainable supply chain management (SSCM) looks for changes in design and configuration of supply chains to achieve this. SSCM looks to improve environmental and social performance of companies in the supply chains.” (Schaltegger & Burritt 2014, 233). Due to the increasing stakeholder pressure to increase transparency in terms of sustainability, many companies have raised the interest to focus more on second- and third-tier and lower-tier suppliers in addition to first-tier suppliers. (Tachizawa & Yew Wong 2014). Therefore, SSCM can be extended to multi-tier sustainable supply chain management (MT-SSCM) to emphasize sustainability management in every multi-tier stage.

Focal company

“Focal companies are those companies that usually (1) rule or govern the supply chain, (2) provide the direct contact to the customer, and (3) design the product or service offered.” (Seuring and Müller, 2008, p. 1699)

Lower-tier supplier

The multi-tier supply chain consists of a focal company and following with multiple stages of suppliers. The second tier or further stages in the multi-tier supply chains are characteristically named as lower-tier suppliers or sub-suppliers. (Tachizawa & Yew Wong 2014)

Sustainable supply chain risk management (SSCRM)

“Supply chain risk management approaches seek to address and manage a focal firm’s exposure to supply chain risk sources, either in a proactive or a reactive fashion” (Hoffman et al. 2014, 162). To ensure a sustainable supply chain, environmental sustainability and social equity need to be added to the economic performance, and risk management needs to cover all these areas to ensure sustainability performance (Miemczyk & Luzzini 2019).

Sustainability-related risk in supply chain

“Accordingly, we define a sustainability-related risk (in short, sustainability risk) as a condition or a potentially occurring event that may provoke harmful stakeholder reactions. Furthermore, we define a sustainability-related supply chain risk (in short, supply chain sustainability risk) as a sustainability risk within a focal firm’s supply chain. In addition to purely operational and purely sustainability-related risks, there are operational risks that have the potential to be sustainability risks at the same time.” (Hoffman et al. 2014, 168)

Figure 2 presents the conceptual framework of this study and how different relations are connected. Sustainability-related risk management is the core of the concept to mitigate sustainability-related risks. Focal company and its suppliers can utilize the risk mitigation activities downward its suppliers.

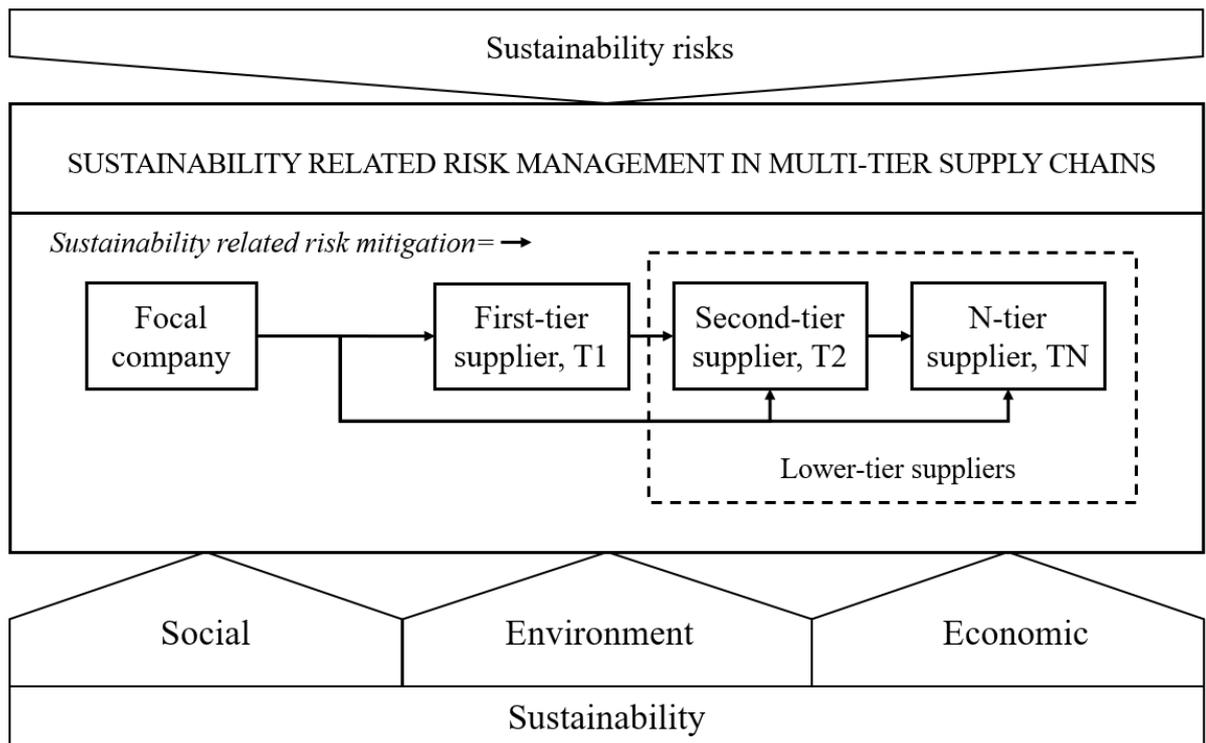


Figure 2. Conceptual framework.

In addition, a focal company can perform sustainability-related risk management with different stages of a multi-tier supply chain. The arrows and their directions demonstrate possible risk mitigation connections and within this study, these connections are studied and how different relations are working in the studied theme. Sustainability and its three aspects: social, environmental, and economical are the main principles in every step of the process and actions. This enables that all three sustainability aspects are considered at the same time.

1.4 Structure of the study

Figure 3 summarizes the main steps of this research and the different aims of specific chapters. This study begins with Chapter 1 of the introduction that includes a background of the study and the research gap is presented. In addition, chapter 1 includes research questions, limitations, key concepts, and conceptual framework. After Chapter 1, this thesis continues with theory chapters that include a theory of sustainable multi-tier supply chain management in Chapter 2. In Chapter 3, the sustainability-related risk management in multi-tier supply chains is presented.

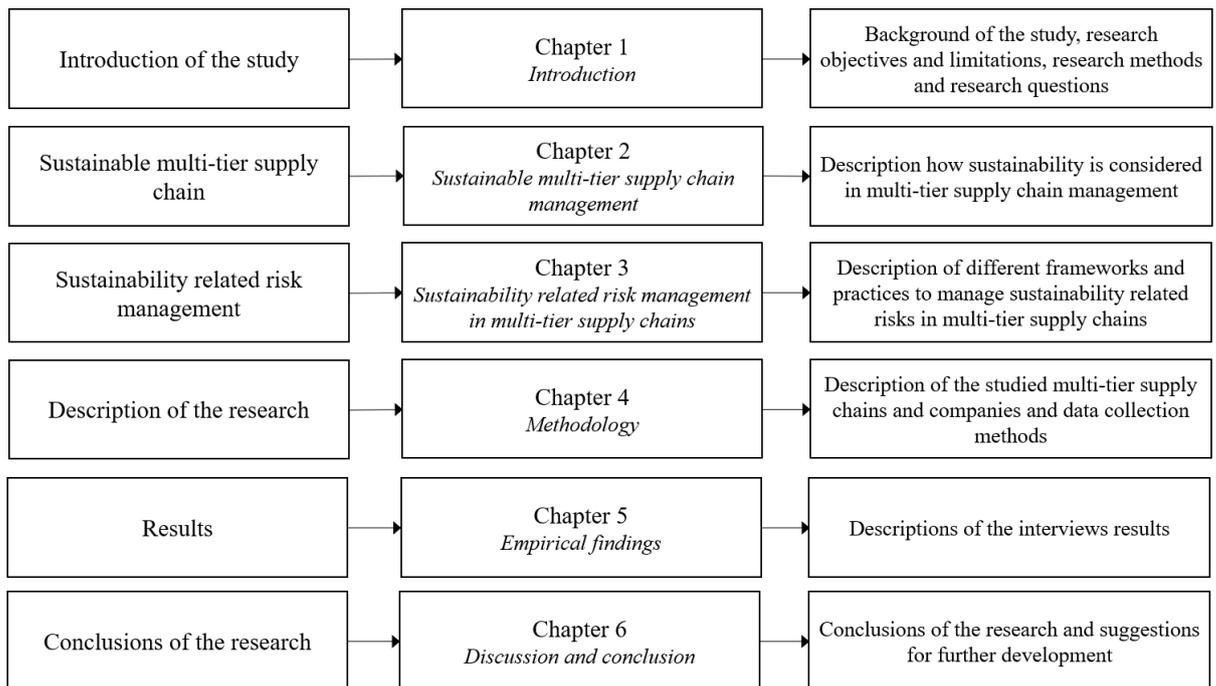


Figure 3. Summary of the inputs and outputs of this research.

After following these chapters, the research methodology is explained in Chapter 4. It consists of research design, data collection methods, and analysis methods of the data. The empirical results of this study are described in Chapter 5. Finally, the main findings of this study are discussed in Chapter 6, and conclusions are presented. In addition, the theoretical and managerial implications for the practice of this study are described, and furthermore, limitations and future research topics are presented.

2 SUSTAINABLE MULTI-TIER SUPPLY CHAIN MANAGEMENT

2.1 Sustainability in supply chains

During the last two decades, the importance of environmental and social criteria has increased in the company activities and their supply chains. The force of change is coming from legislation, pressure from numerous stakeholders, and customer demand. This is affecting companies to consider social and environmental criteria in managing the supply chain and its suppliers. (Azadnia, Muhamad & Kuan 2015). Companies need to take into consideration several stakeholders such as shareholders, employees and other companies in the supply chain to meet customer demand. In addition, stakeholders can be seen more widely by including society and the natural environment. (Carter & Rogers, 2008). The growing number of scandals related to suppliers, such as environmental and social violations, has placed focal companies' reputations at risk. Many customers consider that the focal company is accountable for these violations even if the violations or breaches have occurred in first-tier or lower-tier suppliers' operations. To influence this matter, sustainability requirements are more and more pursued through the entire supply chain with different levels of suppliers. (Villena 2019). In addition, this increases the need for companies to be more transparent of their operations in the supply chain related to economic, environmental, and social matters because information travels fast at the global level. Therefore, problems cannot be thought of as local complications. Transparency provides cost savings and helps to manage reputation if sustainability-related risks occur. (Holiday et al. 2002)

Sustainability can be defined according to Elkington's (1997) definition and concept of the triple bottom line, which considers the social, environmental, and economic perspectives of sustainability in the business context at the same time. Another viewpoint for sustainability is to consider three sustainability dimensions: profit, people and planet, as known as the 3Ps (Elkington 1997). This approach can be utilized to pursue and engage suppliers in the company decision-making process to develop "green, responsible and ethical" products, services, and processes (Villena & Gioia 2018).

Sustainability is one of the key factors that is influencing supply chain management. According to Carter and Rogers (2008, 368) definition by utilizing triple bottom line approach, sustainable supply chain management is “the strategic, transparent integration and achievement of an organization’s social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains.” Sustainability can provide a competitive advantage and it has become one of the key factors influencing supply chain management. Therefore, interest in sustainability in supply chains has increased. (Mena, Humphries, & Choi 2013). Krause, Vachon and Klassen (2009, 18) argue, that “a company is no more sustainable than its supply chain. As such the purchasing function becomes central in a company’s sustainability effort”. According to Marshall et al. (2019), adopting ethical practices into the supply chain increases financial performance and can improve employee working conditions through supply chains. Schaltegger & Burritt (2014, 233) argue that “Sustainability should be integral to the management of supply chains.” According to Giannakis & Papadopoulos (2016), sustainability strategies in supply chain management should consider future uncertainty and social environments and include the investment costs needed to make supply chains more sustainable. To truly pursue sustainability in the supply chain, focal firms need to expand their collaboration with different key stakeholders, such as competitors and nongovernmental organizations. It is essential to take into consideration collaboration with multiple stakeholders to understand and develop sustainable supply chains. (Villena 2019)

Several studies highlight that the dyadic relationship is the key relationship that impacts the implementation of sustainability practices in the supply chain since the company may not influence the other stages of multi-tier suppliers other than its first-tier suppliers. Therefore, a single powerful company is not typically able to take sustainability practices into use across the supply chain. (Marshall et al. 2019). Typical factors affecting sustainable supply chain management are power, stakeholder pressure, industry, material criticality, dependency, distance, and knowledge resources (Tachizawa & Yew Wong 2014). Typically, focal companies require first-tier suppliers to meet their environmental and social requirements but also to pursue these exact requirements to first-tier suppliers supplier. However, this kind of approach does not usually provide the wanted outcome to implement sustainability through the entire supply chain. The main reasons are that the process is not properly

managed and communicated, the focal company has not provided resources and/or there is no true collaboration with different stakeholders. (Villena 2019). According to Villena & Gioia (2018), lower-tier suppliers passively consider labor and environmental issues than first-tier suppliers because they recognize a low risk of getting penalties if they do nothing. According to Seuring & Müller (2008), typical barriers to implementing SSCM are higher costs even though joint efforts with all supply chain parties can help control costs, coordination complexity and/or effort, and insufficient or missing communication in the supply chain. Carter and Rogers (2008) argue that some companies are unwilling to implement longer-term investment commitments after implementing the quickly adopted low-hanging fruit actions in the SSCM.

2.2 Multi-tier supply chain management

Multi-tier supply chains have been described as networks with vertical and horizontal linkages among different actors in the supply chain (Choi & Hong 2002). Sustainability is one of the key factors influencing multi-tier supply chain management (Mena, Humphries, & Choi 2013). There has been much focus on sustainable supply chain management related to first-tier suppliers. It has been realized that globalization and complex supply chains combined with increasing demand from the different stakeholders' pressure to increase transparency and more responsible and sustainable actions from the company. This has elevated interest towards second and third-tier suppliers' impact on sustainability. (Tachizawa & Yew Wong 2014). Investments and resources are needed to manage multi-tier supply chains to have an influence across multiple tiers and achieve stability and control. Therefore, there is a need for supply chain managers to evaluate where to allocate resources to gain the desired outcome of the specific part of their multi-tier supply chain. (Mena, Humphries, & Choi 2013). The attitude of managers and directors in the company can define the success or failure of a company's effort to pursue operate in a more sustainable way (Thomas & Lamm 2012).

Lower-tier suppliers have some main characteristics that cause difficulties to focal companies to manage their sustainability. Typically, focal companies have less information on the lower-tier suppliers. Secondly, focal companies do not have sufficient effect or ways to manage over lower-tier suppliers. This can be the outcome of a lack of power towards

lower-tier suppliers. Thirdly, lower-tier suppliers do not have the same pressure from society as focal companies have. This is because many lower-tier suppliers are small and medium enterprises, which are not well-known to the end customers or the public. In addition, these companies are typically located in countries where environmental and social regulations are not demanding. The role of lower-tier suppliers is typically unstable because lower-tier suppliers can be easily changed and therefore, they do not have a stable relationship in the supply chain with other associates. (Tachizawa & Yew Wong 2014). The complexity of implementing specific control to lower-tier suppliers causes focal companies to rely on first-tier suppliers to manage their lower-tier suppliers (Grimm et al. 2014).

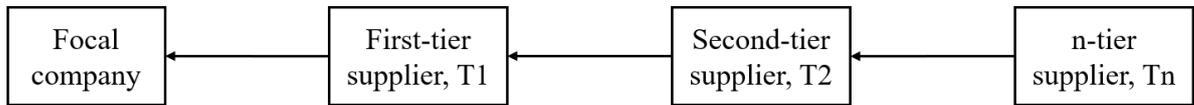
According to Mena, Humphries, & Choi (2013), multi-tier supply chain management has several key features. Firstly, the resource-based power balance and associates related to that will shift when the structure of a multi-tier supply chain changes. The shift of power balance is not dependent on the resources provided by each associate in the multi-tier supply chain. Secondly, a buyer or focal company that wants to affect key product characteristics needs to act directly with its different stages of multi-tier suppliers who are responsible for critical resources. Thirdly, the structure of the multi-tier supply chain affects the interdependencies among its associates. The transitions from an open structure to a closed structure in the multi-tier supply chain will increase the interdependence with each of the involved associates. (Mena, Humphries, & Choi 2013)

According to Tachizawa & Yew Wong (2014), there are four governance mechanisms *Direct*, *Indirect*, *Work with third parties*, and *Don't bother* to manage the multi-tier supply chain and its lower-tier suppliers. A focal company can utilize these approaches simultaneously, or every approach can complement each other. Therefore, there is a need to find the right approach for every situation to achieve the desired outcome. In the *Direct* approach, focal companies have direct access to lower-tier suppliers without the need to go through the whole multi-tier supply chain step by step basis, Figure 4. This approach enables focal companies to directly monitor, manage, and co-operate with lower-tier suppliers to improve their sustainability performance, such as environmental or social performance. In this approach, it is assumed that focal companies have the capability to build connections between different associates in the multi-tier supply chain and have a better understanding of end customers. Therefore, focal companies can attain power in the multi-tier supply chain.

Typical practices in the direct approach include direct sourcing, monitoring suppliers by using visits, audits, and surveys, providing training to suppliers and demanding requirements to lower-tier suppliers through codes of conduct. (Tachizawa & Yew Wong 2014). This approach can be defined as a “closed” multi-tier supply chain. The focal firm and its lower-tier suppliers have a mutual relationship that is managed formally, such as contracts or informally, by meeting regularly. The target is to share information and best practices with each other. This approach can be useful when a focal company needs to have a greater influence on lower-tier suppliers, such as quality, safety, cost, and sustainability. In addition, a focal company needs to act directly with suppliers that have specialized capabilities if a focal company wants to affect key product characteristics. (Mena, Humphries, & Choi 2013). According to Wilhelm et al. (2016b), non-compliance related to social sustainability is not easy to detect and it is less visible. Thus “closed” multi-tier structure can be the most suitable structure to mitigate this risk.

In the *Indirect* approach, contact with lower-tier suppliers is done indirectly by using another supplier, Figure 4. Typically, focal companies require or utilize power over first-tier suppliers to manage, monitor or co-operate with lower-tier suppliers. The key reason for this approach is that it is difficult for one company to manage whole multi-tier supply chain sustainability. Therefore, collaboration is needed across different stages of a multi-tier supply chain. Typically, focal companies require sustainability actions from first-tier suppliers. An essential practice in this approach is standards that enable co-operating with lower-tier suppliers and reducing the lack of information connections and transaction costs. Utilizing standards and certificates by a focal company and first-tier suppliers help to spread sustainability requirements towards lower-tier suppliers. In addition, focal companies can provide requirements to first-tier suppliers by using, for example, a code of conduct. (Tachizawa & Yew Wong 2014). According to Mena, Humphries, & Choi (2013), this approach can be defined as an “open” multi-tier supply chain where a focal firm does not directly connect to lower-tier suppliers. Therefore, the focal firm can give the responsibility to manage its lower-tier suppliers to its first-tier suppliers. This represents the typical supply chain where information and product flows are linear and there is no interaction between supplier’s supplier and buyer. (Mena, Humphries, & Choi 2013). According to Wilhelm et al. (2016b), the complexity of lower-tier suppliers can increase the focal company dependency on first-tier suppliers, leading to an “open” multi-tier supply chain structure.

“Open” multi-tier supply chain or “Indirect” approach:



“Closed” multi-tier supply chain or “Direct” approach:

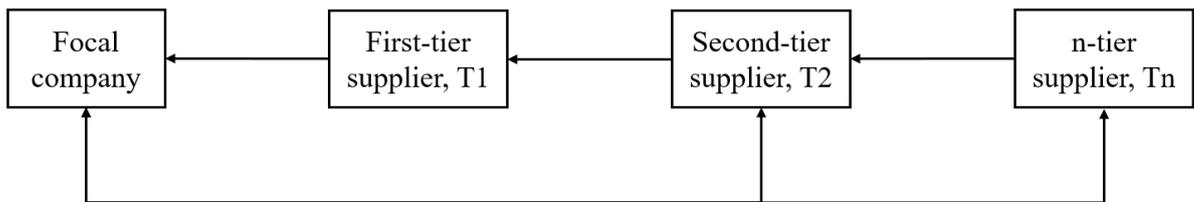


Figure 4. Theoretical multi-tier supply chain structures utilizing Mena, Humphries, & Choi (2013) and Tachizawa & Yew Wong (2014).

If the multi-tier supply chain structure is changed, it affects the interdependencies with the companies. In a situation where a multi-tier supply chain structure is changed from an open to a closed structure, it will increase “the sense of interdependence among its members” in the multi-tier supply chain. The key characteristics of a “closed” multi-tier supply chain structure are common understanding and trust between each other companies in the multi-tier supply chain. Companies clearly understand each member's value-adding contributions and understand different companies’ challenges in the multi-tier supply chain. (Mena, Humphries, & Choi 2013, 71)

In *work with third parties* approach, focal companies utilize co-operation or delegate responsibilities to third party organizations such as Non-governmental organizations (NGOs), competitors, other firms in the industry, and standard institutions. With the third parties, the target is to impact the whole industry, such as preparing and developing sustainability standards, implementing industry self-regulation, and utilizing voluntary standards. Focal companies can give inputs and oversights to third-party organizations and push certifications further. In addition, focal companies can form coalitions with competitors and other industries to increase negotiation power towards lower-tier suppliers. This enables the introduction of sustainability initiatives and participation with lower-tier suppliers. Third-party organizations can provide databases that include different sustainability factors such as environmental and social aspects to monitor lower-tier suppliers in the multi-tier

supply chains of the focal companies. (Tachizawa & Yew Wong 2014). According to Wilhelm et al. (2016b), the high level of complexity at the lower-tier suppliers increases the use of other external parties. Therefore, this leads to utilizing the “work with third parties” approach and this is typical in situations when institutional distance is high.

In the *Don't bother* approach, focal companies focus mainly on first-tier suppliers. They do not have information related to lower-tier suppliers, and a focal company does not intend to affect them. This approach is typically used by focal companies that do not have enough power in the multi-tier supply chain and focal companies have difficulties having exact structures or frameworks for lower-tier suppliers after selecting the first-tier supplier. This approach is suitable for focal companies that follow leading companies' actions after new practices are successfully tested by leading companies or focal companies are using the same first-tier suppliers as leading companies. One of the key features of the focal companies utilizing this approach is that they are often small in size and have less technical and financial resources. A typical situation from focal companies using this approach is that the focus is on first-tier suppliers and there is no information about lower-tier suppliers. (Tachizawa & Yew Wong 2014). According to Wilhelm et al. (2016b), the increased power asymmetries towards upstream in the multi-tier supply chain raises a risk that the first-tier suppliers reject the responsibility related to the assigned responsibilities and start to utilize a “don't bother” approach in the multi-tier supply chain management. In addition, first-tier supplier sustainability management capabilities affect how the company is managing its suppliers. First-tier suppliers' less-developed sustainability management capabilities increase the risk of utilizing the “don't bother” approach in multi-tier supply chain management. (Wilhelm et al. 2016b). Figure 5 summarizes different approaches and structures related to sustainable multi-tier supply chain management and contingency variables.

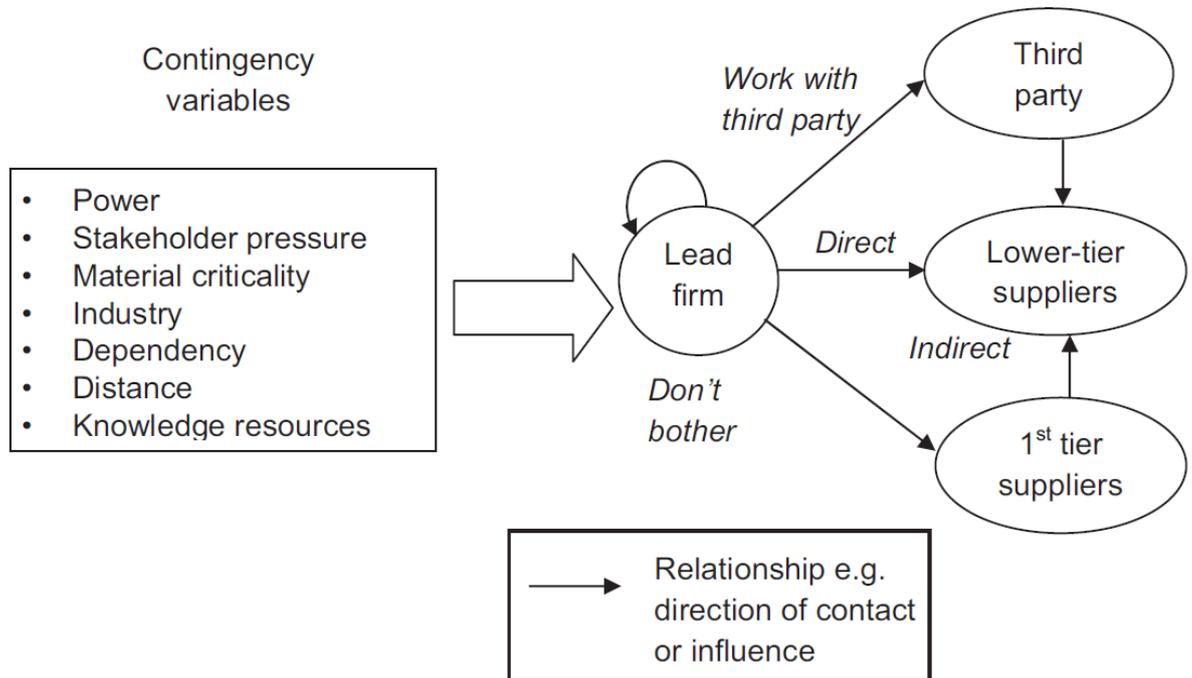


Figure 5. Multi-tier sustainable supply chain management framework according to Tachizawa & Yew Wong (2014, 657).

According to Mena, Humphries, & Choi (2013), a “closed” multi-tier supply chain structure offers better resilience, but it requires more additional management resources. This is coming from the fact that companies have better information about each other. Therefore, there is less opportunism and adversarial behavior. The main challenge for supply management practitioners is to decide where and when to invest their resources to influence specific parts of multi-tier supply chains in the closed structure. Vice versa, the “open” structure requires fewer management resources, but the multi-tier supply chain is less stable. Any company can make one-sided actions in the multi-tier supply chain, which can have unexpected costs and outcomes to different members of the multi-tier supply chain. This educational approach enables first-tier suppliers to widespread the consequences of sustainability in the multi-tier supply chain. (Mena, Humphries, & Choi 2013). According to Wilhelm et al. (2016b), none of the focal companies has enough power and resources to manage the entire multi-tier supply chain. However, a focal company can do exercise control by using different measures and authorities.

2.2.1 The role of the focal company

Focal companies have been required to consider the environmental and social issues existing throughout their entire supply chain. Focal companies can have several roles to ensure sustainability in their supply chain:

1. *Promote triggers for SSCM.* Typically, when the focal company is pressured, it usually extends its pressure on suppliers. In addition, focal companies are increasingly demanding their suppliers to perform according to the guidelines that are following environmental and social standards.
2. *Supplier evaluation and management for risks and performance.* This is an internal perspective to develop the focal company's supply chain and its suppliers. Management systems have an essential role, and therefore, these systems must include environmental and social standards which set minimum requirements. This is done to prevent possible risks related to all three dimensions of sustainability. In addition, the overall supply chain performance needs to be improved by focusing on the relationship between environmental and economic performance.
3. *Supply chain management for sustainable products.* In this role, the focal company aims to improve the environmental and social quality of the product or service. The target is to satisfy customers and generate a competitive advantage in the market.

In addition, focal companies have a role in managing external pressures and incentives from governments, customers, and stakeholders. These pressures and incentives can lead to action and proactive measures by focal companies. (Seuring & Müller 2008)

According to Wilhelm et al. (2016b), the sustainability management capabilities of first-tier suppliers affect delegation of authority from a focal company. A focal company needs to evaluate if the first-tier supplier has enough resources and capabilities to take the responsibility of sustainability management to the lower-tier suppliers. This evaluation influences the multi-tier supply chain management structure and how sustainability has proceeded through a multi-tier supply chain. If a first-tier supplier has low sustainability management capabilities, a “closed” multi-tier supply chain structure is recommended to use. This enables to control of risks among the multi-tier supply chain. This structure is resource-intensive and therefore, it can be more suitable to invest in long-term relationships

with selected first-tier suppliers and systematically develop their sustainability management capabilities. This educational approach enables first-tier suppliers to extend awareness of sustainability in the multi-tier supply chain and take the responsibility to manage lower-tier suppliers' sustainability. (Wilhelm et al. 2016b)

2.2.2 The role of the first-tier supplier

Focal companies are facing challenges in managing their lower-tier suppliers' sustainability because focal companies have insufficient information related to the lower-tier suppliers (Choi & Hong 2002). In many situations, focal companies do not have any contractual relationship with lower-tier suppliers. They need to trust their first-tier suppliers to manage lower-tier suppliers properly. (Grimm et al. 2014). It has been estimated that lower-tier suppliers have produced the most severe environmental and social issues instead of first-tier suppliers. There is a possibility that focal companies act directly on lower-tier suppliers if the first-tier supplier is not performing well according to focal company needs. (Plambeck 2012)

The first-tier supplier can make critical decisions that have critical considerations throughout the whole supply chain. These decisions can include suppliers' selection process and adaptation of processes based on the customers' demand. Therefore, it is essential to understand the simultaneously ongoing balancing with different tradeoffs between efficiency and legitimacy in first-tier supplier's operations. This can raise the risk that a first-tier supplier is not interested in fulfilling the focal company's requirements or perfectly adheres to the focal company's sustainability requirements. (Wilhelm et al. 2016a)

The socially responsible procurement practices enable to increase in the performance of the first-tier supplier who utilizes these practices with its second-tier suppliers. Thus, the first-tier supplier has a central role in involving the second-tier supplier to adopt sustainability practices into use. Commonly, first-tier suppliers are more willing to implement socially responsible practices into procurement if the focal company provides expertise, training, and knowledge related to sustainability values. Focal companies that provide ethical leadership and adopt innovation in products and processes of sustainability will gain a better competitive advantage through first-tier suppliers. (Marshall et al. 2019). First-tier suppliers

can have power over the focal company due to the structural position of the multi-tier supply chain between the focal company and second-tier suppliers. This position can be described as a “super middleman” that can full fill the “structural hole” which refers to a situation in which there is a lack of connections between companies that are not directly connected. (Mena, Humphries, & Choi 2013)

3 SUSTAINABILITY RELATED RISK MANAGEMENT IN MULTI-TIER SUPPLY CHAINS

3.1 Risk and sustainability-related risk in the multi-tier supply chains

Risk has multiple definitions in the literature. Risk can be seen as a combination of the probability of an event and its consequence. The other viewpoint related to the risk is that it is a deviation from the normal or expected. If the risk is considered as a numerical matter, it is an outcome of the probability of an event appearing and the result of the event. (Bharadwaj Silberschmidt & Wintle 2012). The risks are forming from uncertainty in the networks formed by companies. The primary sources of uncertainty are coming from two sources to the company's operation: customer demand and customer deliveries. It is not guaranteed that the increasing demand of the end customers will mean favorable business for a supplier. (Hallikas et al. 2004). Zsidisin (2003) presents that risk has three dimensions: outcome uncertainty, outcome expectations and outcome potential.

Wieland & Wallenburg (2012) argue, that commonly in the supply chain risk management, the goal is to find a compromise between risk assessment and management actions to improve supply chain performance by utilizing management resources in the right focusing areas. This enables to minimize disruptions in the supply chain. Typically, supply chain risks are seen as a supply risk, procurement risk, logistics and transportation risks, supply chain relational risk, demand risk, infrastructure and system risk, which can cause disruptions in the supply chain. Supply risk can include quality issues, supplier liquidity problems, supplier dependency, delivery delays, and supplier inability to make product design or needed changes in a schedule for new products (Chopra & Sodhi 2004; Zsidisin 2003). In the procurement-related risks, there can be risks related to exchange rates, inventories and stockouts (Hallikas et al. 2002). Demand risk is related to demand volatility and accuracy of forecasts, lack of information and possible stock growth because of the bullwhip effect (Sinha et al. 2004). According to Zsidisin et al. (2004), relational risk can be formed from moral hazard and hold up risk. Zsidisin et al. (2004) introduce that infrastructure and system risks involve the breakdowns and dysfunctions of systems and equipment.

According to Faisal (2009), supply chain risks can be divided into two main groups: endogenous risks triggered by companies' activities and exogenous risks that initiate from the external environment where the companies operate and interact with each other. Sustainability risk can occur in different stages of multi-tier supply chains. For example, a social risk that can be out of control of the purchasing company, such as poor employment conditions in an offshore location, can initiate intense stakeholder reactions that may negatively impact the focal company. This does not mean that the supply chain will have disruptions at the same time. (Giannakis & Papadopoulos 2016). Multi-tier supply chain risks and disruptions can be caused by various external events such as strikes and natural disasters but also internal events such as accidents, theft, and sabotage. This type of disruption influences the company's reputation and customer satisfaction but also the company's financial performance. (Gouda & Saranga 2018). Figure 6 presents different types of sustainability-related risks in the supply chain.

Environmental	
Endogenous	Exogenous
<ul style="list-style-type: none"> ▪ Environmental accidents such as fires ▪ Pollution related for example air, water and soil ▪ Non-compliance with sustainability laws ▪ Emission of greenhouse gases, ozone depletion ▪ Energy consumption ▪ Excessive or unnecessary packaging ▪ Product waste 	<ul style="list-style-type: none"> ▪ Natural disasters for example hurricanes, flood and earthquakes ▪ Water scarcity ▪ Heatwaves, droughts
Social	
Endogenous	Exogenous
<ul style="list-style-type: none"> ▪ Excessive working time ▪ Unfair wages ▪ Child labour or forced labour ▪ Discrimination related for example race, sex, religion, disability, age and political views ▪ Healthy and safe working environment ▪ Exploitative hiring policies for example lack of contract or insurance ▪ Unethical treatment of animals 	<ul style="list-style-type: none"> ▪ Pandemic ▪ Social instability ▪ Demographic challenges for example ageing population
Financial	
Endogenous	Exogenous
<ul style="list-style-type: none"> ▪ Bribery ▪ False claims or dishonesty ▪ Price fixing accusations ▪ Antitrust claims ▪ Patent infringements ▪ Tax evasion 	<ul style="list-style-type: none"> ▪ Boycotts ▪ Litigations ▪ Energy prices volatility ▪ Financial crises

Figure 6. Examples of sustainability-related supply chain risks, according to Giannakis & Papadopoulos (2016, 457).

According to Hoffman et al. (2014), in addition to sustainability-related risk, there are also operational risks that can turn into sustainability risks simultaneously. Sustainability-related risks are many ways different than traditional supply chain risks. Sustainability-related risks include such as the natural ecosystem, company reputation, financial responsibility and compliance with laws instead of only focusing on supply chain disruptions. The financial dimension includes the monetary risks from the financial environment. The environmental dimension presents the need to satisfy the requirements towards a shared ecosystem. The social dimension references the delivery of responsibilities towards employees, customers, business partners, governments, and societies. (Giannakis & Papadopoulos 2016)

3.2 Risk management in network relationships

According to Carter and Rogers (2008,366), supply chain risk management can be summarized as “the ability of a firm to understand and manage its economic, environmental, and social risks in the supply chain.” Supplier-related risk management is not the same as credit risk management. For a long-term supplier relationship, a quick credit check is not the most suitable solution. Nowadays the contracts with suppliers are getting more extended than in years past. The changed approach and mindset between the company and supplier relationship have increased the need for deeper and more comprehensive supplier risk management. Today the increased reliance on suppliers causes that the co-operation with the supplier is much deeper than earlier. Suppliers are taking some of the company risks to their responsibility. However, this will arise new risks for the company to manage. The most important thing is to increase the company's knowledge of the supplier to reduce supplier-related risks. (Östring, 2004). According to Hallikas et al. (2004), typically used strategies in risk management consist of risk transfer, risk-taking, risk elimination, risk reduction, and further analysis of individual risks.

The increased co-operation of companies causes a shift of risks between the companies and suppliers. It means that the risks decrease with some companies and respectively increase with others. The deep co-operation with companies typically aims to share or shift the risks from one company to another. This can lead to a positive effect and the total risk of the companies' co-operation decreases if the company taking the risk can endure with it better than the company transferring it. The recommended strategy is to achieve balance with

earnings and risks between companies. In addition, companies should avoid having a too high dependency on a supplier or other organization (Hallikas et al. 2004). Supply chain risk management typically seeks a compromise between risk assessment and risk management, which can provide better supply chain performance by utilizing management resources in the main focusing areas to minimize disruptions in the supply chain. (Wieland & Wallenburg, 2012)

According to Hallikas et al. (2004, 52), the generally used processes for risk management include “risk identification, risk assessment, decision and implementation of risk management actions and risk monitoring.” Cagnin et al. 2016 present a risk management process based on the ISO 31000 standard that includes principles and risk management guidelines in general, Figure 7.

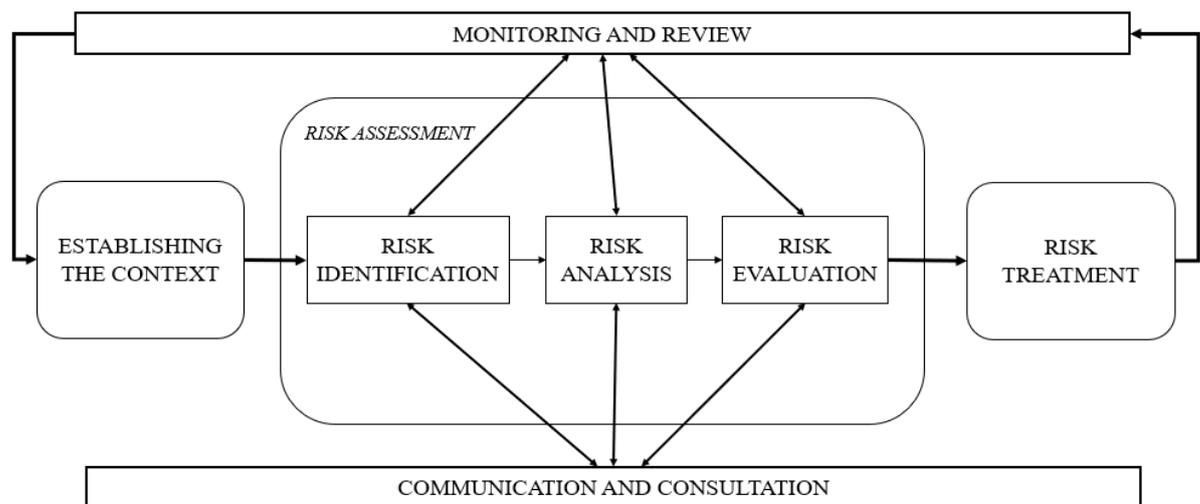


Figure 7. The risk management process according to ISO 31000 and following Cagnin et al. (2016).

When a company uses multiple suppliers or other organizations to manage its business, it forms a network environment. Therefore, the network environment needs to have its own risk management process. Hallikas et al. (2004) introduce a risk management process in a network environment, Figure 8. It consists of the same context as the general risk management process, but more additional aspects exist. The companies and suppliers in the network must define their own risks and utilize proper risk management processes. The deep co-operation in the company’s network needs to be utilized to manage the risks due to

network relations. It is crucial that every company's risk management process is completed by a collaborative process combined with the common risk management process and monitoring practices. (Hallikas et al. 2004). This framework can be applied in the multi-tier supply chain management context. Multi-tier supply chains form complex and diverse networks with different companies, and each has its own goals and visions. Therefore, it is essential to have a framework to manage different types of risks from the companies' operations and the relationships between several companies.

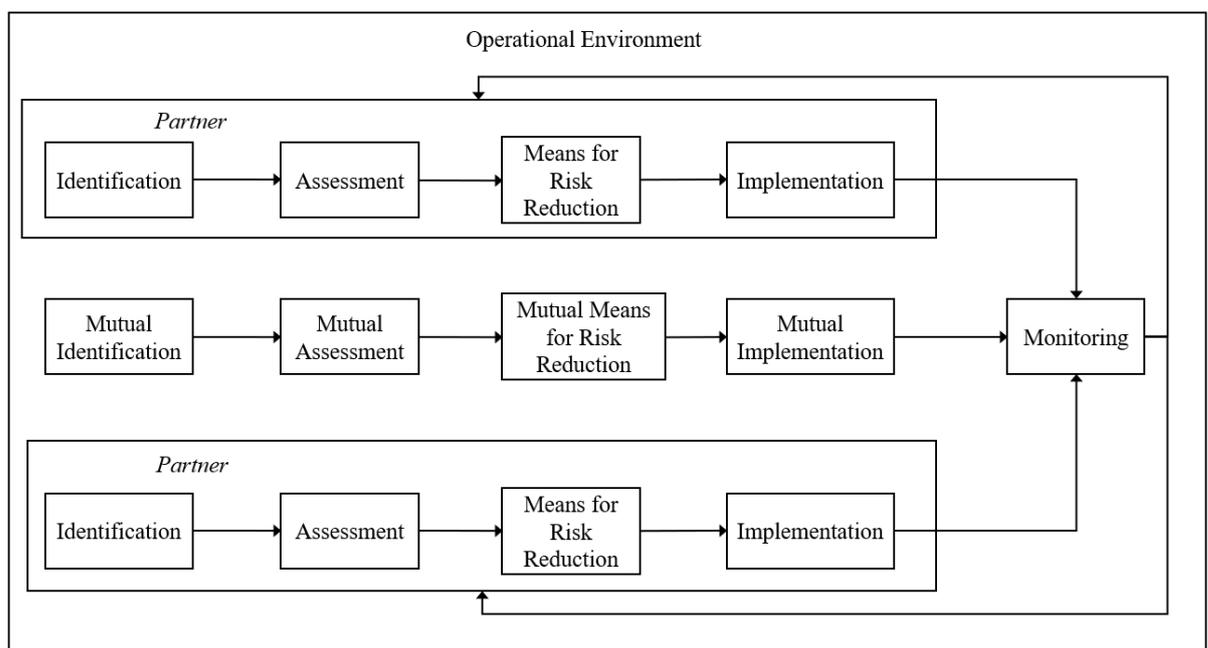


Figure 8. Risk management process in a network environment, according to Hallikas et al. (2004, 55).

The most important part of the risk management process of a network is risk identification. This is because the risks in networks could initiate from complex chains that are difficult to detect. In addition, the change of dynamics in companies' relationships generates an additional challenge. Therefore, it is essential that companies in networks need to share their viewpoints on risks. This will help to recognize and understand joint opportunities and threats in a more comprehensive way. Eventually, the increased understanding helps companies to make better decisions and, at the same time to decrease the risks of a single company and the whole network. (Hallikas et al. 2004). Wang-Mlynek and Foerstl (2020) argue that insufficient information sharing and communication, including only the closest

supply chain suppliers, decreases the performance of risk management practices through the entire multi-tier supply chain.

3.3 Risk management of sustainability-related risks

“Both, sustainability-related and ordinary supply chain risks emanate from risk sources within or in direct proximity to supply chains. -- Since they constitute a potential damage originating from supply chain operations, sustainability-related supply chain risks need to be classified as risks, just as ordinary issues. Hence, both ordinary and sustainability-related supply chain risks should be addressed by supply chain risk management” (Hoffman et al. 2014, 167). Focal companies can be involved in a situation where there is a need to spend more attention on sourcing minor components to mitigate possible risks related to sourcing in the global supply chain. This generates the need and combination of sustainable supply chain management with risk management. (Seuring & Müller 2008)

Sustainability-related risk management is dealing with mitigating the adverse effects of these risks on the company's different stakeholders. Vice versa, the main target is not to minimize the cost of supply chain disruptions in sustainability-related risk management. Sustainability-related risk can negatively affect different stakeholders such as shareholders, customers, governments, and society. These abstract terms related to sustainability management are more challenging to evaluate and measure. Previous research has shown that sustainability performance influences financial performance. Sustainability-related risk management can be seen as a value creation activity and it can initiate to development of a more sustainable supply chain. (Giannakis & Papadopoulos 2016). Seuring & Müller (2008) argue that there is a need to consider a broader range of issues in sustainable supply chain management, which requires considering a longer part of the supply chain from the risk management perspective and the reason to do so does not be merely economical. Typically, the main focus has been on the environmental aspect of sustainability risk management, but there is rising interest in social issues. (Miemczyk & Luzzini, 2019)

Giannakis & Papadopoulos (2016) introduces a risk management framework for sustainability-related risks that include the same principles and follow the same logic as the typical supply chain risk management process. Figure 9 presents the whole framework and

all the needed stages that are affecting the risk management process. The main stages of sustainability-related risk management are risk identification, assessment, analysis, treatment and monitoring (Giannakis & Papadopoulos 2016). This same framework can be applied in the multi-tier supply chain context. However, there is a need to consider the risks forming from different stages of the multi-tier supply chain. There is a need to evaluate how “far” and which stages of the multi-tier supply chain should be considered in sustainability-related risk management.

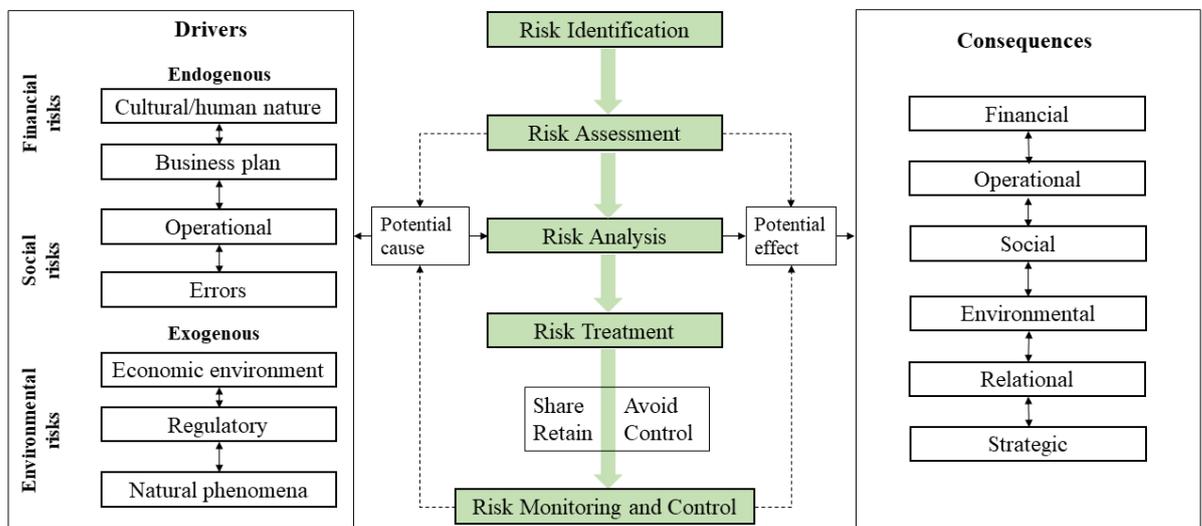


Figure 9. Risk management framework for sustainability-related risks according to Giannakis & Papadopoulos (2016, 459).

In the first place, risk identification needs to be carried out to identify all possible sustainability-related risks in the supply chain by utilizing different tools, such as risk mapping and risk checklist. After risk identification, risks need to be evaluated. In the risk assessment, risks are typically determined according to their impact on supply chain performance and what is the probability for the risks to occur. Commonly used methods to evaluate this matter are intuitive, such as brainstorming, inductive, checklists, preliminary hazard analysis, fault tree analysis and failure mode and effect analysis (FMEA), or deductive approaches to investigate accidents and perform experiments. (Chapman 2006)

According to Giannakis & Papadopoulos (2016), risk analysis is one of the most crucial steps in the risk management process. This same argument is presented by Hallikas et al.

(2004) in the Risk management process in network environment framework. This is due to the fact that the company needs to understand the root causes and potential effects of the risk. This enables the company to choose the most appropriate action to mitigate the risk. Risk analysis can have several types of analysis such as correlation analysis, simulations, root cause and sensitivity analysis and controlled experiments. Risk treatment has four fundamental principles: (1.) *avoid* to utilize evasion of activities that can have a risk for the supply chain performance, (2.) *control* includes activities that try to reduce risks occurrence probability, (3.) *share* consist of co-operation activities with suppliers to reduce overall risks in the supply chain and (4.) *retain* involves the acceptance of the potential damage from the occurring risks because the cost of other risk mitigation strategies would be higher than the total cost of the potential damage. Every one of these approaches needs to be connected with the drivers of sustainability-related risks and be sure that solutions to mitigate risks align with the company's sustainability values. Finally, risk monitoring includes continuous evaluation of the strategies, risks, changes in the supply chain or the regulations and operating policies, and developing current actions and new solutions. (Giannakis & Papadopoulos 2016). Carter and Rogers (2008) argue that it is crucial to understand that some sustainability initiatives can fail like any other business initiative. Therefore, the most important thing is to learn from these failures and develop methods to avoid the most common failures.

3.4 Typical risk management practices in multi-tier supply chain management

Supplier management

Typically, first-tier suppliers have been managed by monitoring and collaboration actions (Tachizawa & Yew Wong 2014). "Sustainable supplier management (SSM) triple bottom line performance, evaluation can be used for multiple purposes such as sustainable supplier selection, sustainable supplier development and sustainable supplier monitoring." These actions can be seen according to Zimmer, Fröhling & Schultmann (2015, 1413) "as independent but interrelated core processes in SSM."

Supplier selection

One of the risk management processes is that many industries, such as the automotive industry, have utilized different techniques for selecting suppliers to achieve better supply chain control and manage risks related to the suppliers. The main tasks for selecting suppliers mean that the potential risks need to be identified in advance, which the suppliers may cause to the organization. The main target is to avoid any interruptions that the suppliers can generate to the supply beforehand. (Cagnin et al. 2016). The chosen supplier must fulfill the company's needs and requirements in different areas (Kayis & Karningsih 2012). It has been presented in the literature that the companies have obtained low profit and low product quality if there has not been a supplier selection process in use. In addition, these companies have a smaller amount of possible long-term strategic suppliers than companies that have utilized appropriate supplier selection practices. (Ittner et al. 1999). Yigin et al. (2007) argue that supplier selection and choosing the weight factors for this process are one of the most crucial supply chain management actions. Most of the criteria presented in the literature include quality, cost, and time factors. These factors stand for the company's overall situation, but on the other hand, criteria might consist of technological, human resources, and other aspects of suppliers. (Yigin et al. 2007). Seuring & Müller (2008) presents that social aspects have been less developed and considered than environmental ones in supplier management. Sustainable supplier selection helps companies in the transaction towards a more sustainable way to do business (Azadnia, Muhamad & Kuan 2015).

Supplier development

According to Seuring & Müller (2008, 1706), "There is a much increased need for cooperation among partnering companies in sustainable supply chain management. --This does not just extend to first-tier suppliers, who are often the focus of conventional supply chain management."

All the activities done by a company to improve and develop its suppliers' capabilities and performance are going under the supplier development theme. Supplier development initiatives can, in the best cases to help identify suppliers for strategic partnerships. The main goal of supplier development is to enhance supplier performance such as process capacity,

delivery capabilities, product development skills, quality, and costs, which will lead to extensive benefits for the company in the long term. Because supplier development requires a company to invest resources and assets into suppliers' operations, it is actually a selective investment process. Therefore, supplier development can be seen as a strategic measure that demands long-term commitment and resources from the company to achieve favorable outcomes. (Talluri, Narasimhan & Chung 2010)

There are quite many options and approaches to implement supplier development processes into company use. The efforts can be divided into two groups: limited efforts and extensive efforts. The limited efforts consist of, for example, supplier's less extensive evaluation and target to increase supplier performance. The more advanced and extensive efforts in the supplier development can be training the suppliers' staff and invest in the supplier's operations. (Krause 1997). Supplier development can be expanded to sustainable supplier development (SSD) that influences sustainable supply chain management. SSD includes multi-stakeholder collaboration. There are three main external roles in the SSD: (1) Drivers, which are different organizations that pressure and/or provides incentives towards start SSD practices. (2) Facilitators are organizations that offer knowledge and possible resources for SSD and finally, (3) inspectors that give a neutral and scientific basis for SSD. (Liu et al. 2018)

Transparency

According to Hart (1995), local communities and external stakeholders demand that companies' activities are more visible and transparent to sustain legality and build a reputation. Transparency can be seen as a part of organizational sustainability. Transparency does not mean only reporting to different stakeholders but actively engaging stakeholders and utilizing their feedback and comments to improve supply chain performance instead. Transparency can be developed through collaboration by vertical coordination entire supply chain but also as horizontal coordination across networks. These activities can be, for example, commonly approved auditing procedures implemented by an industry coalition. This enables a single and effective audit to evaluate supplier sustainability. In addition, this increases suppliers' transparency and sustainability and lowers transaction costs for several

parties such as suppliers and multiple buying companies interested in doing business with the supplier. (Carter & Rogers 2008)

Code of Conduct

Codes of conduct have been implemented in the companies to mainly influence social issues in the supply chains, such as poor working conditions and loose environmental standards (Egels-Zandén & Lindholm 2015). Many global companies have started to implement codes of conduct in their operations to influence the working practices of their suppliers. Code of conduct provides a baseline of expected standards from the buying company such as international labor standards, setting guidelines for different types of issues, health and safety measures and environmental practices. (Mamic 2017). According to Seuring and Gold (2013), pressure from stakeholders, reputation management and legal risks are seen as one of the main reasons to implement codes of conduct. Mamic (2017) argues that managers struggle to implement codes of conduct at the focal company and supplier levels in many cases.

4 METHODOLOGY

4.1 Research methods

According to Yin (2014), a case study is an empirical research that studies a current phenomenon within its real-life context. A case study is a suitable research method when no apparent boundaries exist between phenomenon and context (Yin 2014). A case study can develop an in-depth description and analysis of a case and provide an understanding of cases. Data can be collected from multiple sources such as observations, interviews and documents. In the case study, it is possible to analyze data through descriptions of cases and themes but also within and cross-case analyses. (Creswell 2013). The case study approach is utilized in this research to study and understand different phenomena in the sustainability-related risk management practices in the multi-tier supply chain context. The case study approach is suitable because there are no clear boundaries in the risk management practices and there is a need to study risk management practices in the real-life context. In addition, complexity and industry differences in the multi-tier supply chain require several case studies to study this matter comprehensively. The same approach is utilized in Mena, Humphries, & Choi (2013) research in the multi-tier supply chain research context to form a multi-tier supply chain management theory.

Data has been collected mainly through interviews and additional information sources have been utilized to verify and broaden the perspective. The interviews were semi-structured interviews that answers were not tied to the answers options, but the interviewees could answer the by their own words to the questions. It is typical for semi-structured interviews that the themes and perspectives of the interview are determined beforehand. However, there is still a possibility of adding and discussing the topics raised during the interview. (Hirsjärvi & Hurme 2019). A semi-structured interview is also called a thematic interview. This means that the interview proceeds according to a particular key and pre-selected themes and additional specific questions related to the topic. The pre-selected themes are based on the research framework, in other words, what is already known about the phenomenon under study. The thematic interview also emphasizes people's interpretations of things and the different meanings they give to things. The main purpose is to find relevant information according to the research purpose or the problem set. (Tuomi & Sarajärvi 2013).

4.2 Case companies and multi-tier supply chains

In this study, five different multi-tier supply chains are studied and twenty-five companies participated in this study. There are five focal companies and their multi-tier supply chains are studied. Focal companies operate in different industries, such as textile, transport, retail, accommodation, and food service. Table 2 and Figure 10 presents all the companies, industries and different companies' roles in the multi-tier supply chain. Studied case companies operated in different roles in the multi-tier supply chains such as a manufacturer, raw material provider, retailer, service provider or wholesaler. Figure 10 shows how multi-tier supply chains are formed and how different companies are related to each other. Some of the case companies are independent companies, part of a larger company group or cooperative society. Studied case companies are of different sizes in terms of revenue and size of the supplier base. For example, focal company (A) has around 50 suppliers and focal company (B) has over 5 000 suppliers. Some of the case companies are globally present and some companies are located in only one country where they operate. Most of the companies are situated in Finland and some of the case companies are placed in Europe. The studied multi-tier supply chains consist of five focal companies, 14 first-tier suppliers and 16 lower-tier suppliers. Some of the companies are part of several studied multi-tier supply chains. For every company, sourcing and supply chain management is critical to success in the company's business operations and therefore, every company is reliant on its supplies' performance.

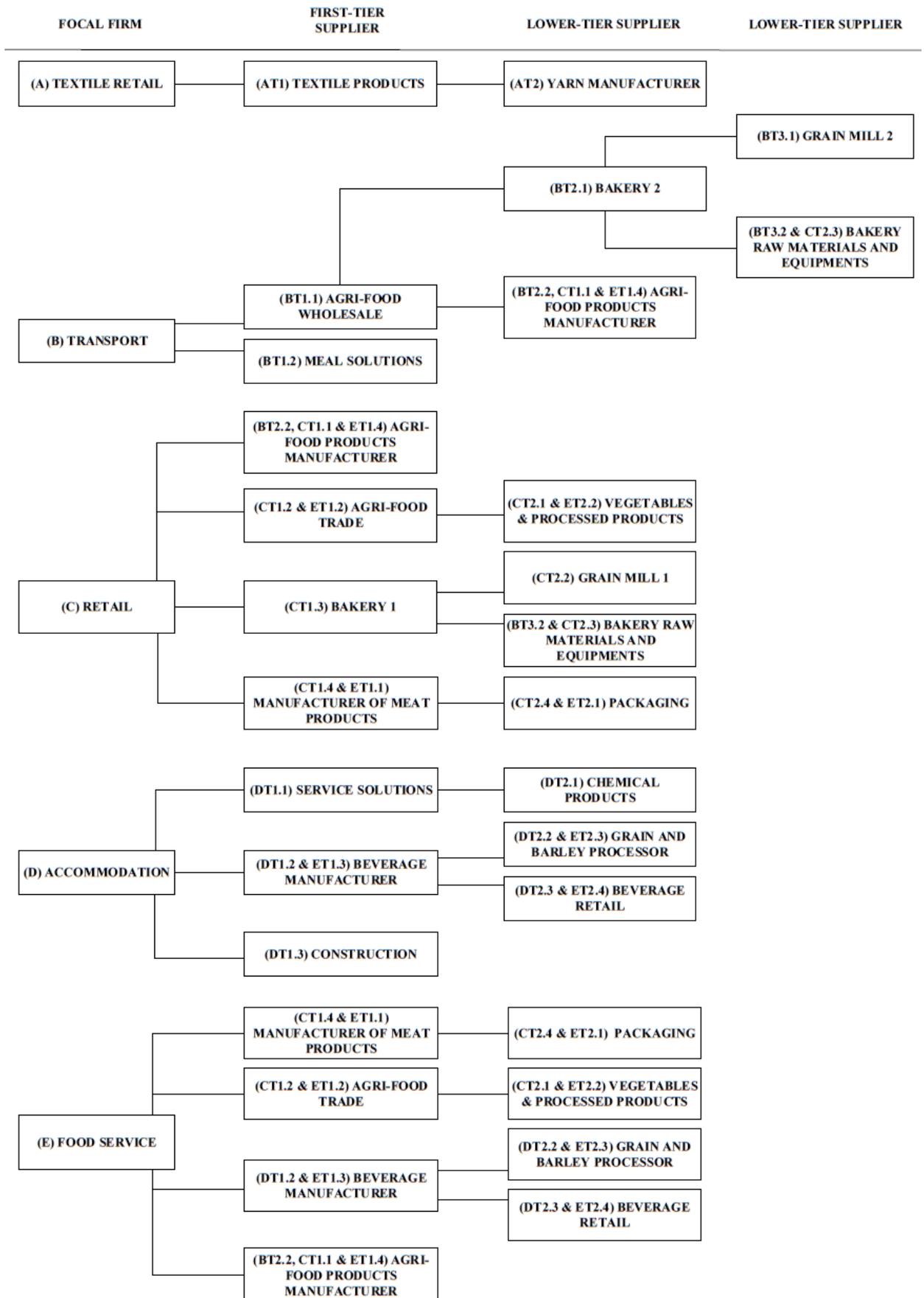


Figure 10. The five studied multi-tier supply chains.

4.3 Data collection and content analysis

In this study, five focal companies are interviewed and their first-tier supplier and also lower-tier suppliers. There are twenty-five companies interviewed for this study, and 45 interviews were performed to collect data. Table 2 summarize case companies' details related to the industry, the number of suppliers, company location and number of suppliers and employees. Case companies are selected based on their notable interest to implement sustainability into business strategy and therefore selected case companies to do sustainable sourcing and supply chain management in their operations. Selected focal companies see sustainability as an essential part of the business. These focal companies have been developing sustainability actions for many years or over a decade in the company operations. The interviewees are selected based on their knowledge of purchasing, supply management, supply chain management and sustainability to provide the best possible answers to the company's situation for the studied topic. Typically, interviewees worked as supply chain managers, purchasing directors, or sustainability coordinators. Thus, they have a responsibility to implement and manage sustainability in the procurement activities in the company. Table 2 presents details related to the interviews with every case company. The interview language was mainly in Finnish, but some interviews were conducted in English with international suppliers.

The interview followed the same structure with every company, but some questions were specified with different companies according to their position in the multi-tier supply chain. For example, some questions were asked from the focal company, but it was not suitable for lower-tier suppliers. Interviewees can add and comment on different questions based on their knowledge and willingness to share information. The interview consists of nine different themes, for example, sustainability practices in the company, risk management of sustainability-related risks and other supply management-related themes. This enables a comprehensive overview of the company's sustainable supply management and how sustainability-related risks are considered and managed in the company and through a multi-tier supply chain. All the questions were sent beforehand to the companies, but companies did not need to prepare before the interview. All the interviews were recorded and afterward turned into written transcripts to increase different possibilities to make qualitative data analysis and increase the transparency of the empirical data. Written transcript enables other

researchers to utilize data afterward and make it easier to return to the interviewee responses whenever needed.

Table 2. Details of the interviews and case companies.

Company	Industry	Suppliers	Employees	Country	Interviewees' areas of expertise	F2F/ Skype	Duration [min]
Focal company: (A) Textile retail	Wholesale and retail trade	<100	101-1000	Finland	Sustainability	F2F	51
					P&SCM	F2F	40
Focal company: (B) Transport	Transportation and storage	1001-10,000	1001-10,000	Finland	P&SCM	F2F	57
					P&SCM	F2F	44
Focal company: (C) General retail	Wholesale and retail trade	>10,000	>10,000	Finland/ China	P&SCM	F2F	44
				Finland	P&SCM	F2F	77
Focal company: (D) Accommodation	Accommodation and food service activities	101-500	>10,000	Finland	Sustainability	F2F	74
					P&SCM		
					P&SCM		
Focal company: (E) Food service	Accommodation and food service activities	101-500	<100	Finland	General/ P&SCM	F2F	97
					General/ P&SCM		
(AT1) Textile products	Wholesale and retail trade	<100	101-1000	Belgium	P&SCM	Skype	65
					Sales		
(BT1.1) Agri-food wholesale	Wholesale and retail trade	501-1000	101-1000	Finland	Sustainability/ P&SCM	Skype	93
					Sales		
(BT1.2) Meal solutions	Accommodation and food service activities	101-500	101-1000	Germany	General/P&SCM	Skype	94
(CT1.3) Bakery 1	Manufacturing	<100	101-1000	Finland	P&SCM	F2F	95
					P&SCM		
(BT2.2, CT1.1 & ET1.4) Agri-food production	Manufacturing	101-500	1001-10,000	Finland	P&SCM	F2F	92
					P&SCM		
(CT1.4 & ET1.1) Manufacturer of meat products	Manufacturing	>10,000	1001-10,000	Finland	Sustainability	F2F	71
					P&SCM		
(DT1.1) Service solutions	Administrative and support service activities	<100	1001-10,000	Finland	General/ P&SCM	F2F	38
					General/ P&SCM		
(DT1.2 & ET1.3) Beverages	Manufacturing	<100	101-1000	Finland	P&SCM	F2F	124
					P&SCM		
					Sales		
(DT1.3) Construction	Construction	1001-10,000	1001-10,000	Finland	General/ P&SCM	F2F	49
					Sales		
(BT2.1) Bakery 2	Manufacturing	>10,000	>10,000	Finland	P&SCM	F2F	57

Table 2. Details of the interviews and case companies.

(CT1.2 & ET1.2) Agri-food trade	Wholesale and retail trade	N/A	<100	Italy	General/ P&SCM	Skype	43
(AT2) Yarn	Manufacturing	<100	<100	Belgium	P&SCM	Skype	74
(CT2.2) Grain mill 1	Manufacturing	101-500	<100	Finland	P&SCM	Skype	57
(BT3.1) Grain mill 2	Manufacturing	1001-10,000	101-1000	Finland	P&SCM	F2F	90
(BT3.2 & CT2.3) Bakery products	Wholesale and retail trade	101-500	<100	Finland	P&SCM	F2F	84
(CT2.4 & ET2.1) Packaging	Manufacturing	<100	101-1000	Finland	P&SCM	F2F	120
					Sales		
(DT2.1) Chemical products	Manufacturing	101-500	101-1000	Finland	P&SCM	Skype	64
					P&SCM		
(DT2.3 & ET2.4) Beverage retail	Wholesale and retail trade	501-1000	1001-10,000	Finland	Sustainability	F2F	76
					P&SCM/ Sustainability		
(DT2.2 & ET2.3) Grain and barley processor	Manufacturing	101-500	101-1000	Finland	General/ P&SCM	F2F	53
					P&SCM		
(CT2.1 & ET2.2) Vegetables & processed products	Manufacturing	N/A	101-1000	Italy	General/ P&SCM	Skype	56

It is essential that research data describes the studied research topic. With qualitative data analysis, the main target is to increase the value of the information because qualitative data analysis aims to form pleasant, precise and uniform information from the scattered data. Content analysis pursues to organize the data compact and written format without losing the information from the data. Data is divided into different themes in the content analysis to see how themes are divided in the qualitative data. (Tuomi & Sarajärvi 2013). In this research, content analysis was utilized to form a comprehensive picture of the studied topic and how themes were occurred in the data to understand the sustainability-related risk management in the MT-SSCM context.

Qualitative data analysis NVivo 12 software was utilized to code and analyze the interviews in the content analysis phase. All the interviews were turned into transcripts to make the content analysis phase efficient and transparent. Interview data were coded based on different themes related to this research topic. After coding the data, data analysis was performed to find similarities and differences between different themes related to stages of companies' position in multi-tier supply chains. In addition, utilizing five different multi-tier

supply chains is used to compare within each other and evaluate industries related to sustainability-related risk management practices. In addition, the frequency of mentions related to different themes in the coding was studied. This enables to see how the companies of different stages of multi-tier supply chain see different themes related to the sustainability-related risk management context. In addition, the findings of the interviews were introduced by adding straight citations from the interviews to give a comprehensive picture of the findings.

4.4 Reliability and validity

A researcher needs to provide enough details on how the study was conducted and with a detailed description, readers can evaluate the reliability and validity of the study (Tuomi & Saarijärvi 2013). Validity can be described as an evaluating process if the stated pieces of evidence are valid. In addition, reliability is focusing on ensuring that the stated evidence is correct. (Seuring, 2008). To increase this research's reliability and validity, the Methodology chapters provide a comprehensive description of the study and its data collection and analysis methods. Yin (2014) argues that reliability and validity are verified by a clearly structured research process that includes construct validity, internal validity and external validity in the case study research. Consequently, in this research background of the study, main theories, methodology and empirical findings are deeply explained to form a clear and easy to follow structured research process.

According to Seuring (2008), increasing the validity and reliability of the research can be increasing by involving two or more researchers to search and analyze data. Therefore, to increase the reliability, all the interviews are done by another researcher and the data analysis is done by another researcher. This reduces the possibility of adding the researcher's viewpoints to the data analysis and form conclusions. However, a single researcher has done the coding, i.e., data analysis, which raises the possibility that the results are based on a single opinion and results can vary little based on the researcher making the data analysis phase. Nevertheless, this does not form a critical defect due to the nature of this research to find and recognize themes concerning the research questions. To be transparent, the data has been transcript and coded to allow other researchers to look and analyze the data. To increase the validity of this research, the methodology of this study is presented deeply in the previous

chapters and details of the interviews and interviewees are presented. In addition, different types of companies from different industries and sizes were interviewed to increase internal validity and construct validity is ensured by one or more interviewees who have attended the interviews from the companies.

5 EMPIRICAL FINDINGS

5.1 Reasons to do sustainability-related risk management

Companies have multiple different reasons to do sustainability-related risk management. There are exogenous risks, endogenous risks, reputation risks and sustainability-related risks which companies pursue to mitigate in their operations and through multi-tier supply chains. Companies are evaluating risks through their operations and business environment. In addition, the industry area has a role in doing sustainability-related risk management in the first place. For example, in the food industry, product safety has a significant role. Therefore, many companies have focused on sustainability-related risk management to ensure food safety, purity and mitigate food fraud of the product. First-tier supplier (DT1.2 & ET1.3) argued: *“While we are talking about sustainability concerning raw materials. What is important in food and what goes above all else is product safety and the purity of the products and the fact that the origin is what is being said. These things must be in order.”*

Figure 11 summarizes that mentions related to the “Reasons to do sustainability-related risk management” theme are divided relatively evenly between different stages of companies in the multi-tier supply chains. It can be seen that focal companies and first-tier suppliers have the highest percentage of the answers to do sustainability-related risk management. This can come from the awareness of sustainability and how it affects company operations and company strategy.

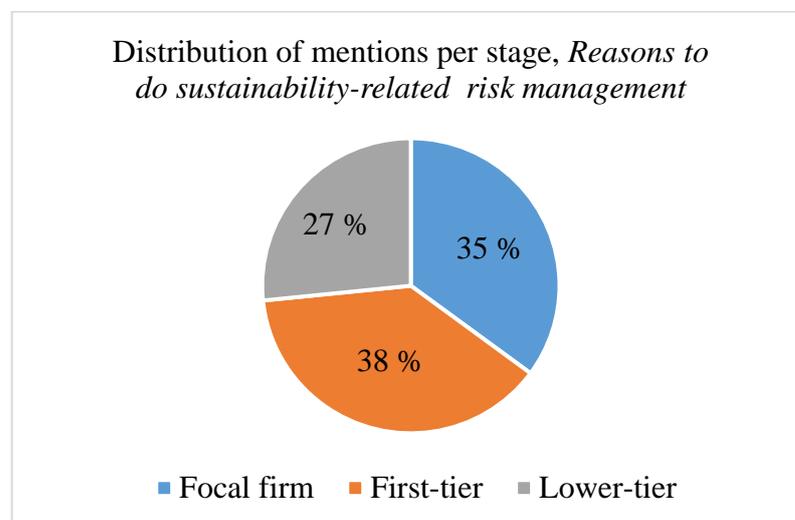


Figure 11. The total number of mentions in the reasons to do sustainability-related risk management theme.

Figure 12 presents how the mentions are divided between different topics related to this theme. Many companies see that sustainability can provide a competitive advantage for the company. Hence, companies need to ensure sustainability through proper risk management. This requires extending sustainability-related risk management to take into account the triple bottom line of sustainability and consider the whole multi-tier supply chain. Lower-tier supplier (DT2.1) explained that sustainability-related risk management requires resources and long-term perspective to consider all the sustainability aspects in the risk management: *“The state of mind is that it is our environmental impact - or impact in general, not just on the environment, but the social impact, is minimal as possible. On the other hand, care is taken to ensure that sustainability also covers social responsibility. We manage our obligations at the company level, but yes, sustainability also tries to reduce risks. As a company, we have done this thing quite a lot before - we have already invested in these things before, and through that, we also want a long-term competitive advantage.”*

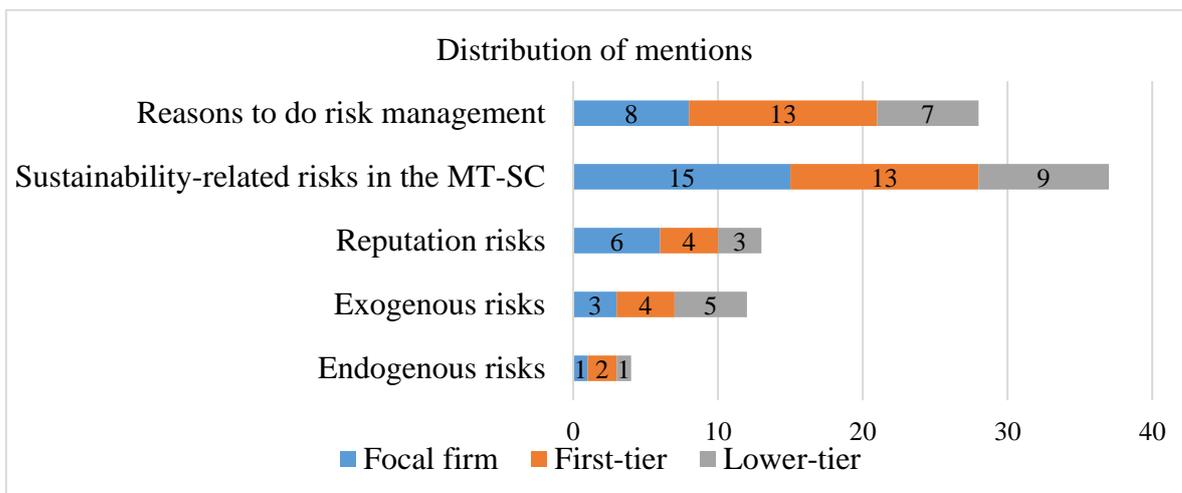


Figure 12. Distribution of mentions per different topics in the reasons to do sustainability-related risk management theme.

Different stages of companies in the multi-tier supply chain see differently why they need to perform sustainability-related risk management. Focal companies argue that one of the main reasons for sustainability-related risk management comes from the company strategy. Focal company (B) argued that sustainability is an essential part of the company strategy. Therefore, sustainability-related risk management in the multi-tier supply chains needs to be done, in addition, to mitigate typical supply risks: *“Of course, the first is to implement the*

corporate sustainability strategy as a whole - sustainability is one of the cornerstones of our (purchasing) strategy, and then to avoid these reputational and supply risks.” and continue that sustainability-related risk management needs to be proactive and consistent “But now it (risk management) has become more proactive that we want to be at the forefront before even anything becomes apparent or no reputational risks become apparent. We want to verify and explore our own supply chain and thus know more.” In addition, focal companies recognized several possibilities where the risk can occur in the focal company's multi-tier supply chain. Therefore, sustainability-related risk management practices need to be implemented, for example, focal company (C) recognized how the complexity of multi-tier supply chains affects the sustainability-related risk management: “The risk increases when you go five or six “tier” backward - or forwards, depending on which direction you look at it.” Some of the first-tier and lower-tier suppliers see that they need to respond to the customer demand, i.e., upper stage companies’ demand in the multi-tier supply chain. Therefore, they need to implement sustainability-related risk management practices into use to fulfill the customer requirements. This can be seen from the first-tier supplier (DT1.1) answer: “The customer has all kinds of requests (sustainability-related), i.e., how to get involved with us in that activity and help. Yes, all these things have an effect.”

Companies have recognized various endogenous and sustainability-related risks that they need to prevent as a company but also together as a whole industry area. For example, producers and manufacturing companies are working together in the meat industry and utilizing third-party collaboration to prevent spreading the plague through animals. This industry understands that the plague has a significant risk for all the companies. Therefore, there is a common consensus to have sustainability-related risk management practices in place through the whole multi-tier supply chain to mitigate risks. First-tier supplier (CT1.4 & ET1.1) summarized: “All companies in the sector have co-operated with Finnish meat producers. In addition to this, systematic work has been done for it with Evira and Customs and the Ministry of Agriculture and Forestry since 2013.” In addition, companies have noticed how climate change can have a long-term impact on the company’s business and all the other aspects of sustainability. Focal company (A) described that “Of course, there are these social risks in the supply chain that are human rights issues: child labor, forced labor, overtime, inadequate pay. -- Then, of course, all the environmental issues: drought, emissions and pollution of waterways, which is a lot in the textile industry when water is

used in processes. Moreover, climate change and drought will again affect the availability and price of cotton, and the fact that the farming area under cotton will not increase, but will probably decrease, so what will it do for price and so on". From Figure 12 can be seen that focal and first-tier companies recognize sustainability-related risks better than lower-tier suppliers. It can be seen that number of mentions related to sustainability risks in the multi-tier supply chain context decreases when further stages of multi-tier supply chain companies are studied.

Reputation risk is one of the main reasons for sustainability-related risk management in the multi-tier supply chain context. Focal company (C) summarized that *"Then, of course, there is always this reputational risk that you need to be careful about. We cannot go public to say we are doing something if we are not doing it"*. Companies understand that reputation and brand image need to be managed and customer awareness has increased towards companies' actions. Therefore, sustainability-related risk management needs to be in place, especially for the focal companies. From Figure 12 can be seen that all the companies in different stages of multi-tier supply chain recognized that reputation risk is significant and it encourages the implementation of risk management practices in the company. First-tier supplier (BT1.1) characterized the role of reputation risk: *"And, of course, that reputation risk has reached a whole new scale in the last five and ten years. -- That is why we have all these risk assessment practices in place. We try to think about and prevent them beforehand."* Based on the case companies' answers, none of the suppliers in different stages of multi-tier supply chains did not mention that they are worried about their focal companies' reputation. Every company considers the reputation risk through its operations and how it will affect on own reputation.

5.2 Utilization of risk management processes

This chapter studies the utilization of risk management processes in different stages of a multi-tier supply chain. From the answers, it can be seen that focal companies have a proactive approach in sustainability-related risk management. Focal companies' answers underline that their risk management practices are not only focusing on mitigating supply risk but also other possible risks that may occur in the multi-tier supply chain. Focal companies have implemented comprehensive risk management practices and a process-

oriented mindset by continuously doing risk management activities. For example, focal company (D) summarized their activities: *“In addition, we conduct annual risk analyzes of suppliers and products. Not just for their financial side but for all their activities”*. Some companies have implemented sustainability-related risk management practices as part of the companies' operations, enabling companies to mitigate risks continuously. Typically, suppliers need to fulfill their customer requirements such as reports or audits, which forces them to use sustainability-related risk management practices. For example, a first-tier supplier (AT1) described their attitude towards risk management: *“At the end of production, we must obtain a release permit for the shipment using a quality report before shipment. -- Some customers request an external quality report. It is not a problem. Then our staff will be there and an external auditor will also be there as we work together”*. Many companies explained that some industries have commonly utilized risk management practices to prevent counterfeits and delinquency in the multi-tier supply chain, such as in the food industry. Companies can have several approval processes from different parties within the company before choosing a supplier to ensure quality and business continuity. First-tier supplier (BT1.1) described that they are testing products in a laboratory to ensure quality and find possible mistakes in the multi-tier supply chain: *“ASP, which is the assessment of food counterfeits, for example, that there is some counterfeiting going on somewhere in the supply chain and therefore certain analyzes have been done in our product research unit or by external laboratories. We research those products regularly to make sure they are really what has been promised”*. Many lower-tier suppliers do not have the resources to do comprehensive sustainability-related risk management with their suppliers. However, some of the companies try to mitigate risks in the purchasing phase and ensure sustainability in their operations, such as lower-tier suppliers (AT2) presented: *“If you buy as much as possible locally, if the product is available, then you can control it better because the control systems in Europe are already very much defined.”*

Figure 13 shows that focal companies have distinctly more mentions of the utilization of risk management processes than other stages of multi-tier supply chain companies. The deviation of mentions between focal companies, first-tier suppliers and lower-tier suppliers predict that focal companies have a challenge to cascade sustainability-related risk management practices through the whole multi-tier supply chain to the lower-tier suppliers.

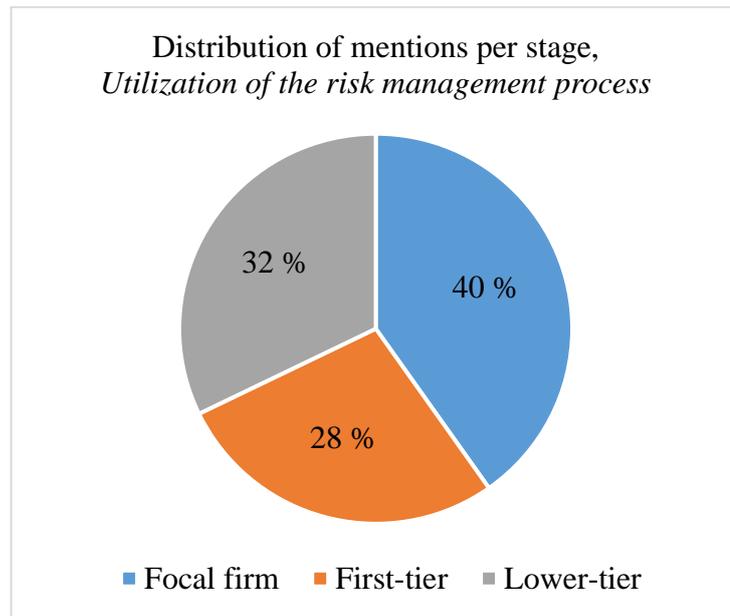


Figure 13. Distribution of mentions per stage in the utilization of the risk management process.

Topics of this theme are presented in Figure 14. There can be seen that risk management practices not utilized systematically have the highest number of mentions with the lower-tier suppliers. In addition, it can be seen that from Figure 14 that lower-tier suppliers have the highest number of mentions in the risk management practices not utilized systematically than focal companies and first-tier suppliers. The role of the first-tier supplier to ensure sustainability-related risk management practices with its suppliers can be recognized in the answers. Companies pointed out the role of their first-tier suppliers in pursuing sustainability-related risk management practices towards their suppliers. However, there is still a challenge to how far sustainability-related practices can be implemented in the multi-tier supply chain. This can be recognized in the lower-tier (BT2.1) answer: *“There are big global companies here putting pressure on that first-tier suppliers. Yes, over time, it will also start to work genuinely. They are forced to start taking better care of their next stages suppliers. However, still, there is the challenge that then there will be the next stage suppliers. The development is slow due to the multiple stages of suppliers in the multi-tier supply chain.”*

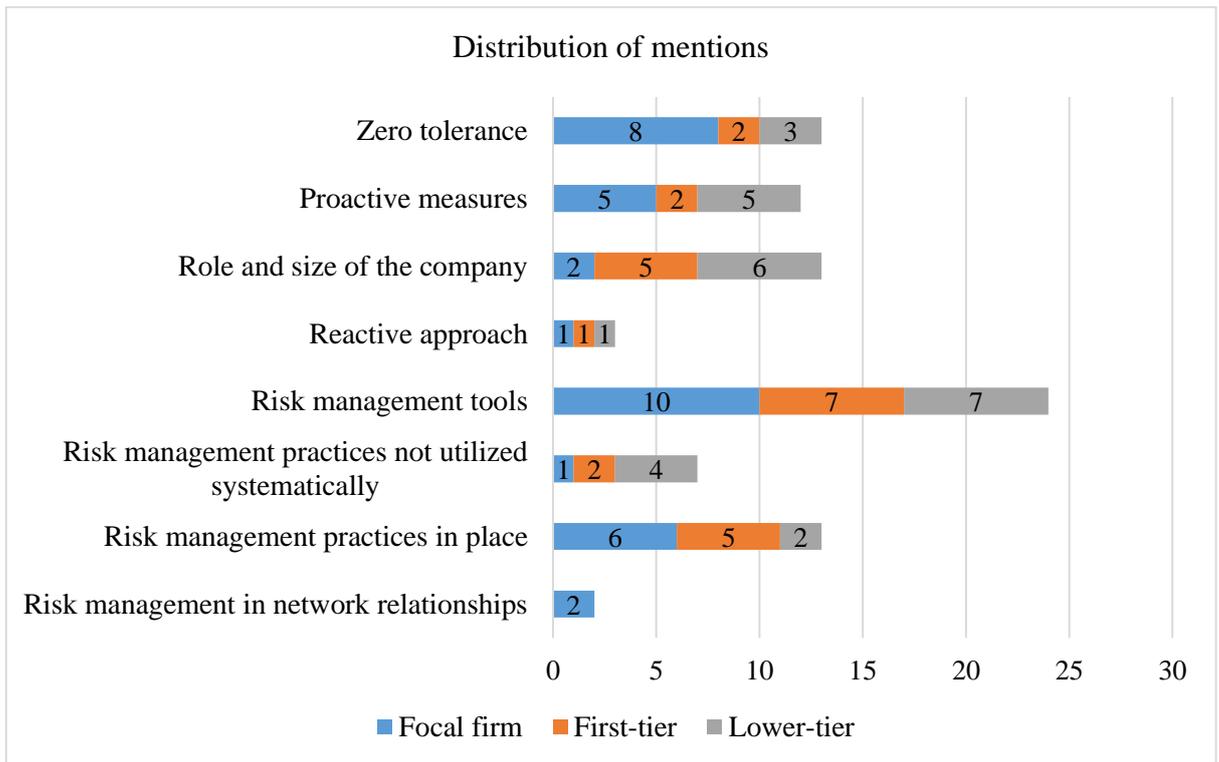


Figure 14. Distribution of mentions per different topics in the utilization of risk management process theme.

Many companies understand their company role and size in the multi-tier supply chain. From the answers, it can be seen that many companies evaluate their position and possibilities to affect other companies' actions. Based on that, companies pursue different risk management practices towards their suppliers in the multi-tier supply chain. For example, focal company (A) described that they are a pretty small company in the textile industry. Therefore, they do not have leverage over other companies in the industry: *"Yes, and just that we are a small player. We may not have the leverage to make demands for the suppliers"*. In addition, many companies evaluate how and where to put their resources in sustainability-related risk management because they are globally active and there are suppliers in many different countries. This raises the need to think what the best way is to perform risk management practices since they can have, for example, over ten thousand suppliers to manage such as a lower-tier supplier (BT2.1) described: *"-- if we begin to look even more broadly risk management; it has auditing and sustainability and then it has supplier relationship management. It is an insanely big effort - 11,000 suppliers and even if it took its sharpest tip from there, it is still many hundreds of suppliers. There are no such resources anywhere*

available to manage all the suppliers. Therefore, we started to think what the smartest way is to do that work.”

It can be seen that focal companies have risk management practices in place and controversy all lower-tier suppliers are not utilizing risk management practices on a daily basis. This can be seen from Figure 14 mentions related to this topic. Every focal company in this study has some kind of risk management practices in place. For example, focal company (E) presented *“we evaluate suppliers with a grade for delivery reliability and quality.”* focal company (C) summarized their activities *“Of course, we conduct a risk analysis every year and there are hundreds of risks that need to be managed.”*, focal company (D) described that *“It is done annually and reported to headquarters. We review suppliers who exceed a certain amount of euros on a per-supplier basis and carry out a risk assessment for them”*. In some industries the product safety is critical and that forces companies to utilize comprehensive risk management practices through multi-tier supply chain regardless of the stages in the multi-tier supply chain such as a first-tier supplier (CT1.4 & ET1.1) pointed out in the meat industry: *“Actually, in almost every place, we know exactly what feed it eats, how it grows, whether it is medicated, etc. We have the whole animal history in our hands and we keep a close eye on it all the time. - We have all the feeding and health information and slaughter information for each batch of cattle, pigs and poultry in the system. We are following it closely.”*. Some of the focal companies are paying attention to the network relationships and try this way to mitigate risks in their multi-tier supply chain by setting clear goals for every relationship such as focal company (B) presented their approach: *“With the Supplier Relationship Management model, we aim for regular cooperation and monitoring. Of course, for every supplier, co-operation goals are defined and they are often more strategic and operational goals.”* Many lower-tier suppliers are not systematically utilizing risk management practices and they are relying on mutual trust, contracts, and certifications. However, many first- and lower-tier suppliers follow commonly known reports and news to be aware of the risks and risk countries. These findings related to sustainability-related risk management practices are described more deeply in chapter 5.3.

In Figure 14 can be seen that all the companies in different stages of multi-tier supply chains have some sort of risk management tools in use. However, there is a variation in the type of the risk management tools and how those are utilized. From the answers can be seen that

focal companies have risk management tools in place, which can be quite advanced and comprehensive. First and lower-tier suppliers' risk management tools are more superficial or based only on common information sources. Among lower-tier suppliers, some companies have no risk management tools at all in use. Some companies are utilizing self-developed tools and keep them up to date by their own efforts. For instance, focal company (A) brought out their tools *“But we do not have such a systematic risk management system, but currently it is pretty Excel-based. --- There are also responsibility forms and ready-made Business Social Compliance Initiative (BSCI) audit reports that are utilized in the risk management work”*. Focal company (B) has developed its own risk management tools and practices to utilize in the daily work: *“We have a supplier risk assessment tool that includes about 60 questions from different risk areas. After fulfilling the questions those are then always discussed with these key partners to understand, how likely that risk is and how it could be prevented”*. Some of the focal companies utilize firstly general risk management tools before taking into use own risk management tools such as focal company (C) presented: *“Yes, we define what the big risks are. The definition also includes commercial risk, i.e. not just that there is a risk of child labor or anything. The BSCI has made an extensive list of their risk countries based on seven different criteria that are global. There it is possible to identify which country is at high risk. After that, we as a company will conduct a risk assessment”*. In addition, companies are utilizing common databases to get information from the suppliers, making the supplier selection process more manageable and mitigating possible risks related to the suppliers. This also reduces double work in the auditing process. One example of utilizing databases related to the suppliers was described by the focal company (B): *“SEDEX stands for Supplier Ethical Data Exchange. It is a bit like Facebook for suppliers and buyers that include A and B members. B-member is a supplier that registers account, and fills in a self-assessment survey of about 100-200 questions and then there are A-members, i.e. buyers to whom the suppliers then give access to see that information. Finally, then there is a kind of risk assessment tool that shows on a heat map how, based on those responses and the industry and location of its supplier, that sustainability risk appears on the map as to whether it's red, yellow, green --- And then the buyer can make a decision if they want to go for an audit and in the database (SEDEX) it is possible to store these audit reports as well. The supplier will be able to share the same information and the same audit reports with all its customers (i.e., buyers, A-members). This reduces this kind of double hassle when all customers have different requirements and supplier needs to deal with them separately.”*

There is variation in the lower-tier suppliers' answers related to the risk management tools. Some of the lower-tier suppliers are not utilizing any risk management tools such as (CT2.2) described *"We do not actually have any risk management tool in place."* Some of the lower-tier suppliers recognize the need for a better risk management tool to manage different multi-tier supply chains and its suppliers, for example, lower-tier supplier (DT2.1) said: *"After all, we do not yet have a comprehensive system that can maintain this entire mass of data from all multi-tier supply chains."* Some of the lower-tier suppliers utilize commonly known information sources to understand the risks in different countries by following different indexes. There can be much damage when risks occur without it has been recognized in the indexes or databases, such as a lower-tier supplier (DT2.3 & ET2.4) described *"The main challenge of all the tools is that before that index is updated and the data is verified, then much time has passed. Those are pretty slow. Alternatively, before we get that auditor there on the spot, it easily takes months from when we have that decision made before someone is there on the spot. That is just pretty slow. Unfortunately."* However, some lower-tier suppliers are more proactive towards risk management and have developed their own risk management tool to manage risks such as a lower-tier supplier (BT3.2 & CT2.3) described: *"We do this kind of product risk assessment – There is the probability and significance of the risk and then what needs to be done. From there, certain areas of risk emerge and through that, we are basically prepared for certain things."*

Focal companies have the highest number of mentions in zero-tolerance situations, Figure 14. Focal companies argue that they have pain points that can cause zero-tolerance situations. However, if these situations happen, many focal companies are willing to co-operate to find the cause and repair that instead of ending the relationship. From the focal companies' answers, it can be seen that many companies are evaluating the long-term impacts more than the short-term perspective. Focal company (A) summarized that *"if there were any such zero-tolerance issue, then we would not immediately be breaking that co-operation. Then we will figure out the root cause of what has happened and how it can be fixed. Then if that partner does not want to fix that, then there is a different thing. Putting supplier directly under a boycott is not a long-term solution."* Lower-tier suppliers have a more straightforward approach in zero-tolerance situations because they do not have leverage over their suppliers. Therefore, they try to find the best possible suppliers for their operations. For example, a lower-tier supplier (CT2.2) presented that some of its suppliers had quality issues.

Therefore it needs to be changed because *“As I have said, the price differences are so small for those raw materials that it does not matter.”* Lower-tier suppliers do not have the interest to find out the reasons behind quality issues and it is easier for them to change suppliers if that is possible for them. The difference between focal companies and lower-tier suppliers approaches can come from the fact that focal companies have put much effort into choosing their suppliers. Therefore, focal companies are more willing to develop their suppliers in zero-tolerance situations than lower-tier suppliers.

5.3 Sustainability related risk management practices in multi-tier supply chains

In this chapter, different sustainability-related risk management practices are introduced and how those are divided between different stages of a multi-tier supply chain. Figure 15 summarizes how risk management practices are mentioned between companies. It can be seen that companies in different stages of multi-tier supply chains are utilizing some risk management practices. Figure 16 shows the topics and practices that have come up in the interviews and how companies have mentioned them.

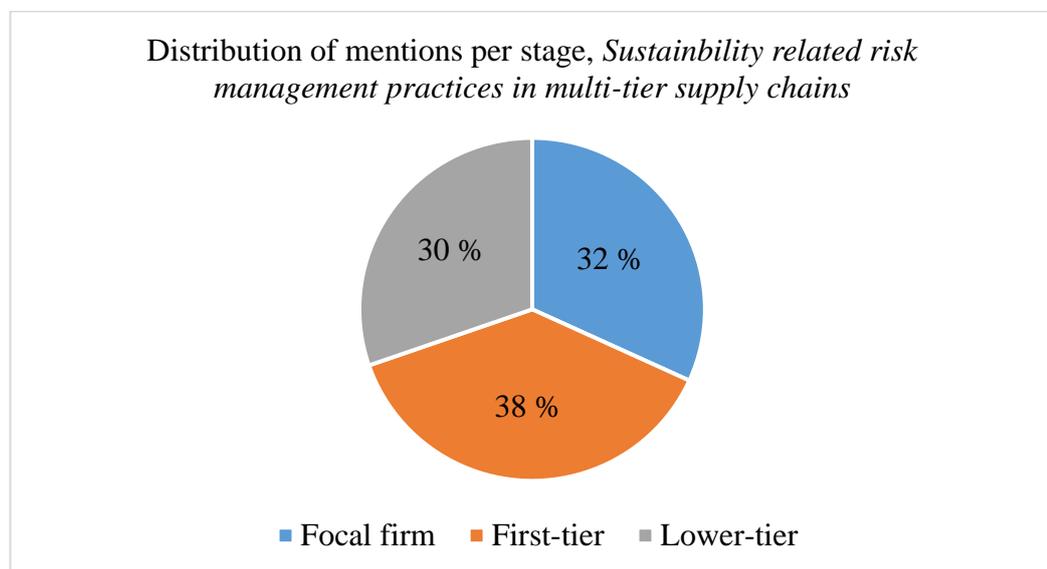


Figure 15. Distribution of mentions in the sustainability-related risk management practices in multi-tier supply chains theme.

Figure 16 shows that focal companies focus more on supplier base management than first and lower-tier suppliers. Focal companies have their own strategies for managing their

supplier base, and by this, they are pursuing to mitigate sustainability-related risks. The supplier base is continuously monitored and managed. Focal companies have specified requirements such as scorecards for suppliers and they are following that suppliers are fulfilling those requirements. Focal company (E) focused on using local suppliers as much as possible to mitigate sustainability-related risks: *“We have few suppliers from risk countries because we tend to buy a lot from domestic suppliers. The degree of domestication is over 60 % of all raw materials or purchases”*. In addition, focal company (C) described their proactive approach by choosing the suitable suppliers and managing its suppliers’ base: *“Active measures and precisely that we have certain specifications for suppliers, with whom we work and with whom we do not supply and by following this we aim to minimize all risks. -- we make a quarter rating of our suppliers, where we go through the status of each supplier and they get a score from us according to a scorecard. If there is something wrong that the action is not at the level we are required to have then, we will go through it right away. If this continues, then, in the worst-case scenario, we will end that supplier relationship. Supplier base management is constantly monitored.”* First-tier and lower-tier suppliers have a more straightforward approach in supplier base management. They are trying to make sure to have backup suppliers and make sure that suppliers meet the requirements. However, the lower-tier suppliers do not have such a process-oriented mindset in supplier base management. First-tier supplier (BT1.2) described their approach related to supplier base management: *“We try to prevent this initially with a proper relationship and a proper analysis of each supplier. We also try to have at least two strategic suppliers for a strategic product. So, if one supplier breaks down– not only because of safety, health issues or something but also for economic issues.”* The Same mindset was seen in lower-tier supplier (AT2) response: *“We need to check everything, make sure that we have backup suppliers if needed.”*

Supplier selection is utilized to mitigate sustainability-related risks. Figure 16 presents that first and lower-tier suppliers are focusing more on supplier selection than focal companies. First and lower-tier suppliers recognize that supplier selection is critical for them and their multi-tier supply chain performance since they may not have the leverage to affect their suppliers’ operations. Therefore, there is a need to choose suitable suppliers. In addition, first and lower-tier suppliers recognize that there is a high risk if the chosen supplier is not performing well or there are, for example, social or environmental issues in the company’s

operations. Also, customer requirements affect how companies select their suppliers, such as a first-tier supplier (CT1.2 & ET1.2) presented, *“We select suppliers based on the goals of our customers. It may depend on quality, technology and pricing. -- Sustainability has become a significant part of the business - more than a significant part, it has become one of our evaluation points for both raw materials and processing plants.”* and lower-tier supplier (CT2.1 & ET2.2) had the same viewpoint towards supplier selection: *“Over the last three years, sustainability has become a very important and critical point. -- we cannot accept very small suppliers who do not have a guarantee of ethics since we have the responsibility of it to our customers.”* In addition, lower-tier suppliers recognize that choosing trusted and well-known suppliers helps them mitigate sustainability-related risks. There is no point in focusing only on the lowest price since it can cause many risks. Lower-tier supplier (CT2.2) presented that *“When working with and cooperating with these reliable suppliers. So, no sustainability-related risks occur or - they are so small then.”* and lower-tier supplier (CT2.4 & ET2.1) summarize their grounds for supplier selection: *“But we are not looking for low-cost suppliers by any means at the expense of quality and sustainability, because it is visible immediately and, at worst, specifically to consumers.”* Companies are using different types of backup plans to ensure multi-tier supply chain performance. Figure 16 shows that focal companies have more mentions related to plan B than first- and lower-tier suppliers. This can be subject to the focal companies' resources that they can use for supplier selection and create risk management practices than first- and lower-tier suppliers. A typically used backup plan for the companies is to have 2-3 alternative suppliers if it is possible, such as a first-tier supplier (BT1.2) argued, *“We also try to have at least two strategic suppliers for a strategic product.--- But when we have strategic suppliers, which cannot be replaced from one to another day, there we try to have redundancy to minimize risks.”*

Product and service development of the company's business has relatively low interest among studied companies to mitigate risks. Only a few mentions were related to the product or service development to make a product more sustainable and this way to mitigate different sustainability-related risks. This risk management practice is resource-intensive and it requires a long-term commitment from the company but also its suppliers. Based on the answers, product development typically focuses on replacing risky raw materials for sustainable solutions. Lower-tier supplier (BT2.1) presented that they are utilizing product

development within their suppliers to develop more sustainable products: *“That packaging industry is especially one that raises its head a lot - or has already raised. There is constant cooperation with suppliers; what is the plastic of the future. Although we are realistic that it will not be available right now.”*

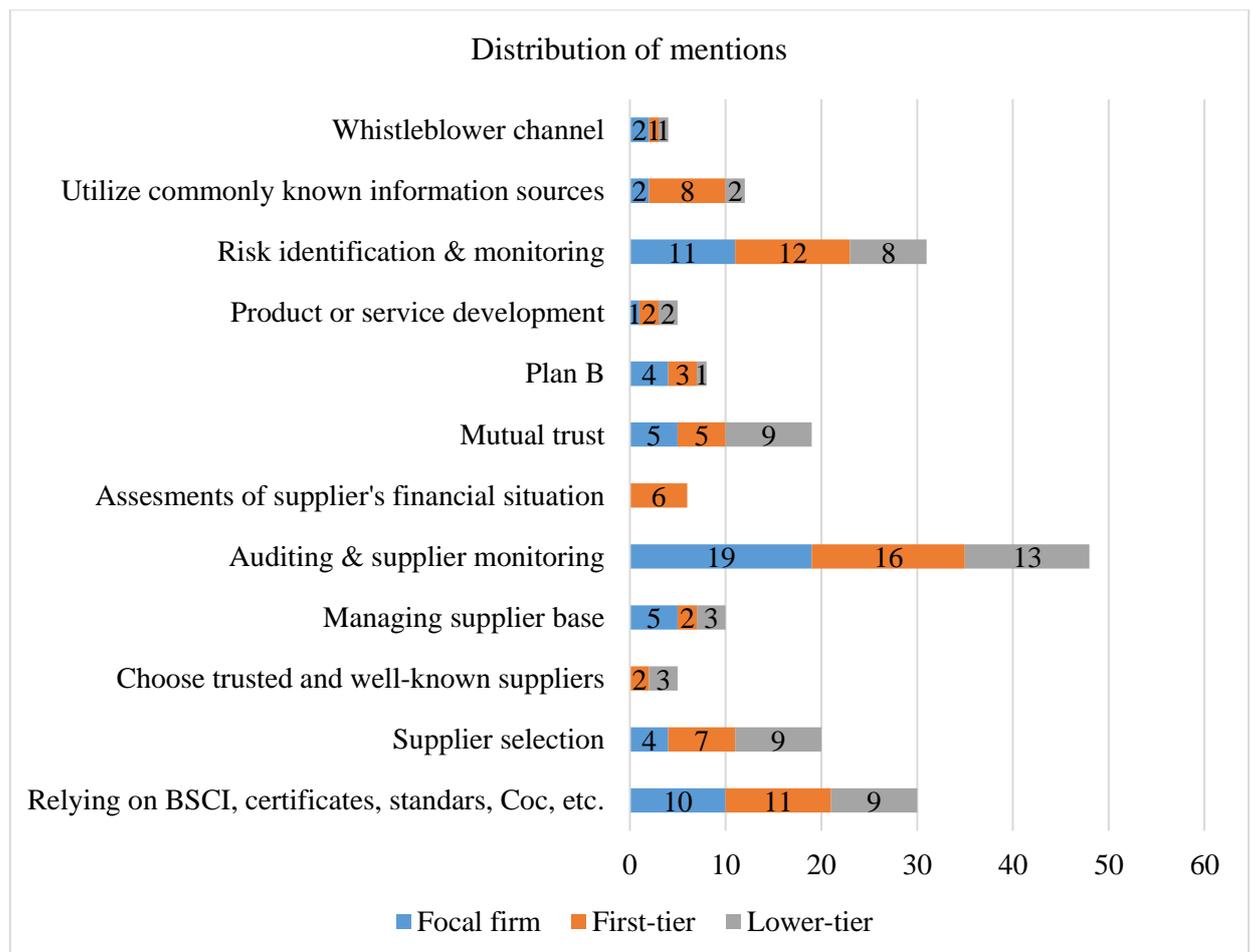


Figure 16. Distribution of mentions per different topics in the sustainability-related risk management practices in the multi-tier supply chain’s theme.

Companies in every stage of the multi-tier supply chain identify risks and pursue monitoring those risks in the company operations, Figure 16. Companies recognize that the most probable risks related to their operations are operating in risk countries and using risky raw materials. For example, focal company (A) had studied possible risks in their operation countries to avoid sustainability-related risks from occurring: *“-- research has shown that cotton is produced by forced labor. From there, children are drawn from schools and adults from workplaces to collect cotton--”*. In addition, companies see that their process includes

risks that need to be controlled, for example, hygiene in the process and used chemicals, but also customer requirements need to be fulfilled in every step. Focal company (E) presented their main risk areas and monitor methods: *“There are risks related to product safety when it comes to food. Of course, we go through critical points in audits, we demand documents, how it is documented, that there will be no hygiene risks or risks related to food quality”*. Companies have utilized different types of risk monitoring methods to ensure and control risks in their multi-tier supply chain, for example, by taking test samples in different parts of the process and following supplier performance closely as a first-tier supplier (CT1.2 & ET1.2) presented: *“Once a supplier is selected, we monitor production, quality control and deliveries.”* In some industries companies’ financial situations needs to be carefully monitored and it can form a risk that needs to be managed. Therefore, some companies are actively following the financial situation of the whole multi-tier supply chain as a first-tier supplier (CT1.4 & ET1.1) summarized: *“--if primary production is considered, then yes, the economic situation through the supply chain is the biggest question. Both we as a processing company as well as our producers are quite distressed at the moment in terms of the economy. I see it as the biggest challenge”*. Companies recognize that purchasing volumes include a risk because many companies mainly focus on big volume products, but the risk can also occur from the small volume products. Typically, companies have utilized sustainability-related risk management practices based on the volume. There can be a situation where a company has a good overview of its primary purchasing goods. However, smaller units are purchased without proper risk assessment. First-tier supplier (CT1.3) presented the dilemma: *“I see the risks that purchasing has traditionally focused really much on that spend and we are focusing our doing on that big spend. In risk management, one should take the whole palette into account. -- After all, the risk does not look at volume.”*

Auditing and supplier monitoring are commonly used risk management practices in every stage of the multi-tier supply chain companies. From Figure 16 can be seen that mentions are divided evenly between different stages of the companies. Companies see that supplier auditing can provide a comprehensive overview of suppliers’ situation regarding sustainability-related risk and supplier performance and help ensure that suppliers fulfill their agreed obligations. Focal company (E) described that *“Sustainability can also be just a buzzword if it is only written in the invitation to tender and we send the requirements. -- if it is not monitored or verified in any way. In other words, it will not happen. We try to prevent*

this by auditing our suppliers, even if we are not an official auditing party.” Some of the companies are utilizing different types of audits and investing resources to evaluate its suppliers such as focal company (B) described their attitude *“We are utilizing different audits, for example, for food safety concerning the quality of the practices that there are occupational safety practices in place with the supplier. Then we have operational audits and environmental audits separately.”*

However, companies recognize that auditing and supplier monitoring are resource-intensive. Therefore, global companies cannot utilize it with every supplier due to a large number of suppliers in the supplier base. Thus, companies need to evaluate how and when to audit their suppliers. In addition, companies understand that if the auditing is carried by a trusted company or by third-party collaboration, it does not guarantee that there are no sustainability-related risks related to that company. Suppliers can hide its issues or, in worst-case scenarios to perform crimes related to its operations. For example, a first-tier supplier (CT1.3) presented the issue by a case example from previous years: *“There are a lot of potato peelings in Finland. There had been several companies, such as focal company (C), auditing this supplier, but then it became public afterward that the supplier had been convicted of environmental crimes. That environmental crime was such that in some forest they had a pile of potato peelings, from which the starch was poured into some small ditch, from where it was poured into a larger ditch, from where it was poured into a river, from where it was poured into the sea. There were fish farms along that river and those small fish boys started to get slimy from that starch. This is how it was discovered. -- How do you check large areas of forest in connection with an audit?”* Companies see that it is better when suppliers make most of the work alone and do not utilize multiple suppliers. This enables that auditing can provide a better overview and longer part of the supply chain. Furthermore, it helps to increase transparency in the supply chain since auditing includes more process steps. Focal company (A) summarized that *“-- the more they have manufacturing operations in their own hands, the better it is for us.”* Companies also see that auditing can also provide informative viewpoints such as the development of the industry and specific countries' working cultures. Thus, auditing and supplier monitoring can increase a company's knowledge through suppliers' operations as a first-tier supplier (AT1) presented *“Some audits are performed more in terms of increasing awareness.”*

Companies are utilizing commonly available auditing reports and this information is seen as informative and helpful to monitor their suppliers. This is a case especially for companies that are not having enough resources to perform additional audits. Figure 16 presents that first-tier suppliers have most of the mentions related utilize commonly known information sources than focal companies or lower-tier suppliers. This indicates that first-tier suppliers are pursuing to fulfill their obligations to focal companies and gather information from its supplier within their company resources. Companies that do not have enough resources perform audits to their suppliers when it is mandatory to do such as a lower-tier supplier (AT2) presented *“We follow a lot of reports, a lot of contacts with the suppliers, but there are no audits, except for those that are linked to GRS certification or BCI certification or other certifications.”* In addition, Figure 16 presents that first-tier suppliers are monitoring their suppliers through a financial situation such as a first-tier supplier (DT1.1) described *“We monitor companies' financial data all the time, specifically, how they do overall and what it means to us.”* First-tier companies see that financial figures give a trusted overall picture of lower-tier suppliers situation since if the supplier cannot fulfill its financial obligations, such as taxation, the supplier is not likely performing well in other sustainability-related aspects.

Mutual trust is seen as one of the main principles in sustainability-related risk management practices by lower-tier suppliers. Figure 16 shows that lower-tier suppliers have more mentions in terms of utilizing mutual trust than focal companies or first-tier suppliers. Lower-tier suppliers believe that they are transparent and open related their actions. Therefore, they are relying on that their suppliers are following the same principles. For example, lower-tier supplier (DT2.2 & ET2.3) summarized: *“Trust, of course, it is also one of our values, i.e., we trust and want to be transparent. I believe that trust has been built through it.”* Many first and lower-tier suppliers said they have agreed with their suppliers that those will announce if there are some changes in the multi-tier supply chain to track and ensure sustainability. However, lower-tier suppliers recognize that they are not getting all the information that they want by trusting its suppliers such as a lower-tier supplier (DT2.1) presented: *“We have demand to be notified, but not necessarily then. The supplier may think that this is not such a significant change that they should notify us.”* From the answers it can be seen that first and lower-tier suppliers are utilizing mutual trust and collaboration to decrease the sustainability-related risk management work and dividing it between different

companies. This is due to the lack of resources in risk management. First-tier supplier (BT2.2, CT1.1 & ET1.4) summarized: *“But how can we raise awareness of sustainability issues without us doing ourselves a completely insane amount of work. --- This work is must be done in collaboration.”*

Companies in different stages of multi-tier supply chains rely on certificates and code of conduct with their suppliers to manage sustainability-related risks, Figure 16. Companies see that they can pursue and demand different actions from the supplier through contracts, certificates, and code of conduct. In addition, certificates and standards tell that the supplier performs at a certain level and its operation fulfills requirements related to the specific standard or certificate. For example, focal company (A) utilized BSCI reports when evaluating suppliers: *“I usually go through the BSCI audit reports, if that supplier is in the BSCI or if another audit report is available. If you can clearly see that no development has taken place anywhere, or if someone has been rejected, something has been found there, then we think twice possibility to collaborate.”* Companies also utilize code of conduct as a primary stage in supplier selection. Typically, companies send their code of conduct beforehand and if a supplier is unwilling to approve it, it raises questions related to issues in the supplier operations. The lower-tier supplier (BT3.2 & CT2.3) highlighted the importance of a code of conduct in sustainability-related risk management: *“Supplier CoC is mandatory for all our suppliers, both new and old. If we choose a new supplier, we will send that to it. Then we say that you have to accept this. This is done to all our suppliers and the supplier who, for one reason or another, does not accept this. It will raise a warning signal for us. Then we debate what is in it and which is not - if there are too hard points in it that they do not accept, then we cannot continue to work together. Supplier CoC includes, as mentioned, many aspects of this environmental and social responsibility and sustainable development.”* Some companies have strict mentions in the code of conduct to influence suppliers' operations in the multi-tier supply chain context. However, companies recognize that these kinds of demands are hard to follow up, such as a first-tier supplier (DT1.3) presented *“In the agreements, chaining to two stages of suppliers is prohibited. However, it still happens. We have some customers who are not allowing us to chain our operations. For one customer, it is a term that 90 % must be our own business operations.”* Some companies utilize a code of conduct to train their employees and make sure that everyone understands how the company see and wants them to take into account sustainability, such as a lower-tier supplier

(BT3.2 & CT2.3) presented their approach: *“Our employees have to and want to do this kind of Code of Conduct every year, which is online training. It is also monitored that everyone has reviewed it. It takes 45 minutes to go through it. It tells about our company ethical views and social responsibility.”* Lower-tier suppliers see that contracts and code of conduct are the best way to manage sustainability-related risks and certificates or standards are critical points when selecting suppliers. Respectively, focal companies are not strict that suppliers need to have some specific standard or certificate. Focal companies require that supplier needs to fulfill its requirements and it needs to be able to verify it somehow. If a supplier can ensure that requirements are met, collaboration can be possible. Focal company (C) summarized their viewpoints related to the standards and certificates: *“We require each of our suppliers to have a waste or environmental protection system, meaning they have a system in place to operate. Of course, we recommend that it be ISO14000, for example, but it is not a prerequisite for that collaboration. The system may also be someone else, but we make sure as a company that our suppliers have a system by which they operate.”* Many lower-tier suppliers are stricter about the standards and certificates than focal companies because they may not have the resources to check and monitor suppliers to ensure that suppliers do the right things without having certificates. In addition, lower-tier suppliers also see that it is easier for them to require these standards, certificates, and code of conduct because their customers, i.e., upper-stage companies in the multi-tier supply chain, have initially demanded it from them.

Demanding certificates and standards are an effective method to pursue sustainability-related risk management practices through a multi-tier supply chain. First-tier supplier (CT1.3) summarized their approach in the sustainability-related risk management in terms of the multi-tier supply chain: *“I would say that it helps to do sustainability-related risk management when we require different certificates from our own suppliers, so that if they do not have that, then they are forced to build their own system by which they look at their suppliers. They must then be able to prove that they are doing such things as promised. It is such a good backup.”* Companies see that certificates and standards tell that supplier is performing well and it is way to operate is more advanced than suppliers without certificates. Lower-tier supplier (CT2.4 & ET2.1) told the role of certificates in their operations with their suppliers: *“If you talk to a supplier who does not have certifications, then you discuss sustainability issues with a supplier who has them. They are on a whole different level*

because they do it on a daily basis. Sustainability needs to be reflected in suppliers' actions, just like we have. Then, you are on exactly the same page when you talk to a certified supplier. They know the risks and those standards there. It is a completely different matter at the level of sustainability because there are issues of social sustainability in a completely different and better position. Certifications are a bit of a silent gauge to evaluate suppliers."

Many companies see that one of the essential things of the code of conduct is that they enable them to have permission to go and audit their suppliers whenever needed. This brings security and certainty and its one of the criteria that need to be fulfilled in the supplier selection process such as focal company (B) presented: *"Well, first of all, we commit our suppliers to the Supplier Code of Conduct and it empowers us to conduct audits there both with our own and by third parties."* Companies see that standards, certificates, and CoC are an effective way to develop the whole industry since those set a clear vision and goals regarding how companies' actions need to be done.

5.4 Role of collaboration in sustainability-related risk management

Every company in the multi-tier supply chain sees the importance of collaboration in sustainability-related risk management. This can be seen from Figure 17 that presents the distribution of mentions per stage in the role of collaboration in sustainability-related risk management. It can be seen that all the mentions are dividing relatively evenly between focal companies, first- and lower-tier suppliers, Figure 17. Figure 18 presents different topics in this theme and how mentions are divided between different stages of multi-tier supply chain companies. Many focal companies see that by collaboration, they can develop their suppliers towards a more sustainable way but also develop the whole industry practices with third-party collaboration. Focal company (B) summarized their view related to collaboration and points out that collaboration can sometimes be complex in some countries. It is not always easy to implement: *"Of course, confidential co-operation and then just these regular meetings, so they also help to ensure sustainability issues. It also helps to detect earlier if there are any risks and we can openly discuss those issues. Sustainability is on the agenda in these meetings with our suppliers, and then it is taken into account when developing products together with our supplier. Collaboration is vital. If you think about collaboration and trust, it cannot be easy to consider in certain cultures. Then it is challenging to have an open and constructive discussion about sustainability issues."* Respectively, first and lower-

tier suppliers utilize collaboration to share information and communicate with each other to gain better supply chain performance and mitigate risk in this way. Many companies see their suppliers as partners, such as a first-tier supplier (AT1) summarized: *”When we work with suppliers, I do not use the word power, but I do instead use the word partnership. Because we have common interests when we work together”*. In addition, companies see that collaboration can provide competitive advantages and create win-win situations with their suppliers. Lower-tier supplier (CT2.1 & ET2.2) presents that *”Collaboration is maximum. It has grown a lot in the last two years. Because you show them (suppliers) that it is possible to create value and be competitive in every way, without emphasizing the points about the economic and neglect other rights such as workers and other suppliers”*.

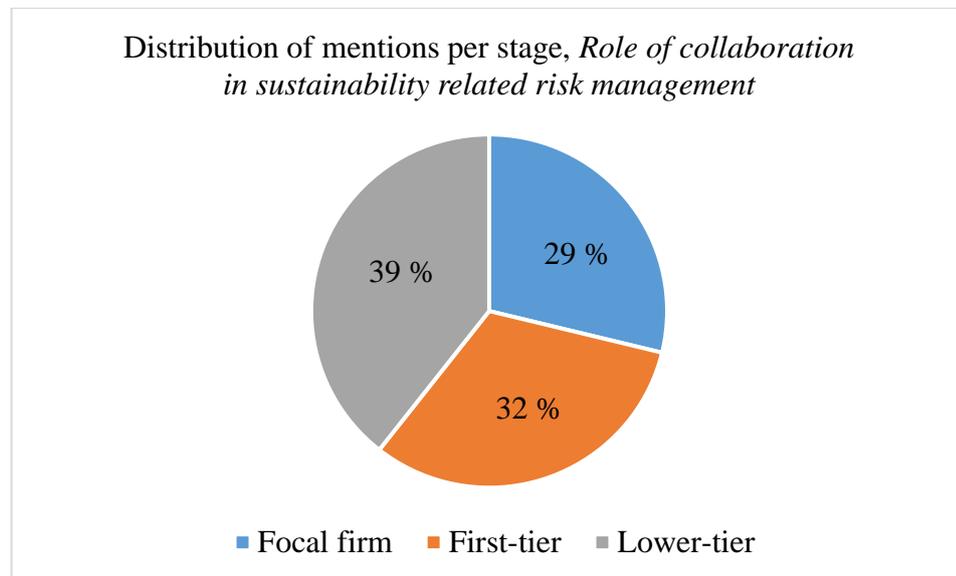


Figure 17. Distribution of mentions per stage in the role of collaboration in sustainability-related risk management.

All the studied companies utilize information sharing with its suppliers, open communication, and maintain relationships with suppliers. Figure 18 presents that this approach is the most used collaboration method and every company in every stage of the multi-tier supply chain utilizes this approach. Focal company (A) presented that they commonly trust their suppliers in every situation: *”We hope, of course, that collaboration and relationship will be such that there will be mutual trust and suppliers themselves will tell us if something radical happens.”* Focal company (B) believed that relationship management could provide an advantage in sustainability-related risk management: *”In*

general, one could say that active and co-operative supplier relationship management helps to identify risks in advance. Furthermore, in a way, the closer and better the relationship with a supplier is, the smoother it is then to minimize that impact if the risk realizes but also help to see them in advance“. Focal companies see the importance of collaboration and pursue to collaborative actions within its suppliers and actively manage relationships such as focal company (D) summarized that: *“I think it is important that our partners know that it (collaboration) is essential to us as a value and that they want to work with us on that. They know that we appreciate it”*. It can be seen that many lower-tier suppliers have focused on collaboration to perform risk management. This can be since lower-tier suppliers do not have the resources to perform comprehensive sustainability-related risk management practices. Instead, they are trusting with their suppliers and open communication and pursue to maintain a fruitful relationship. Many companies argue that collaboration is the main principle and key focusing are to perform sustainability-related risk management through a multi-tier supply chain such as a first-tier supplier (CT1.3) summarized the main approach to perform sustainability-related risk management with its suppliers is fundamentally based on *“know your suppliers”* and *“be in touch with your suppliers.”* First-tier supplier (BT1.2) argued more that: *“Collaboration is key of what we do. -- Long term relationships, a good mutual understanding of specific needs of both sides. Because this leads to very open exchange, there is no sense in hiding problems from our perspective. We prefer to address problems in a very open atmosphere and then look for mutual solutions and that is what we actually do with our suppliers. If we see risks or a problem, we address this quite openly. Furthermore, if we have selected our suppliers in a good way, they are also very open to finding a mutual solution and working on that problem. Good supplier collaboration is a key for our decision to work with a supplier in the long term.”* Every company understands that a short-term approach towards suppliers is not recommended to do to mitigate risks. It can cause different sustainability-related risks to occur, such as a first-tier supplier (AT1) explained: *“Play fair. If you are trying to cut corners or tighten at any point, then you should understand that the supplier also wants to save money”*.

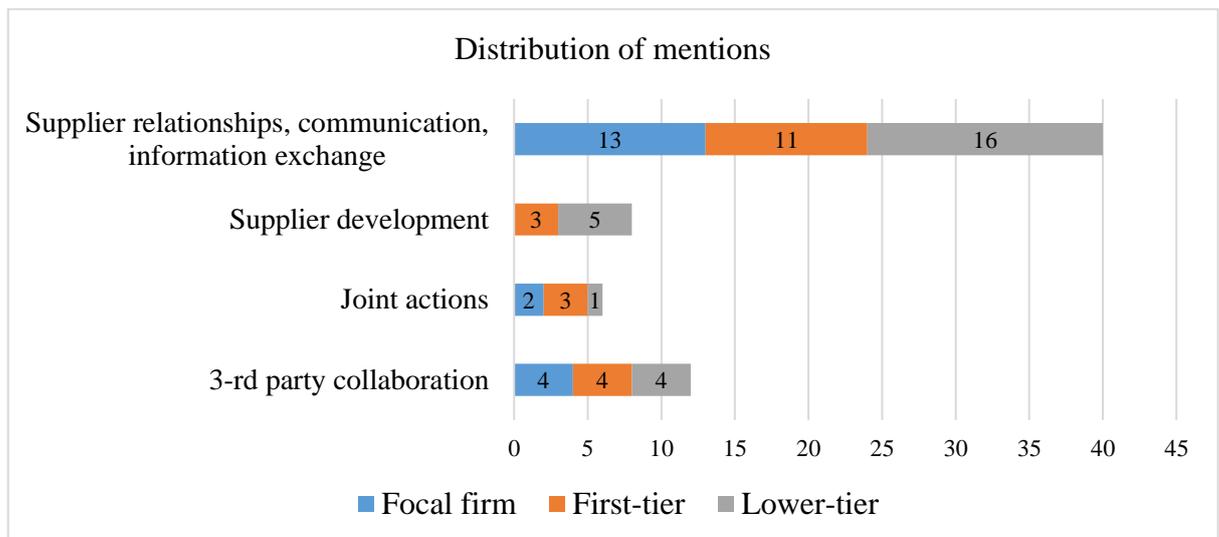


Figure 18. Distribution of mentions per different topics in the role of collaboration in sustainability-related risk management.

Many companies utilize joint actions, supplier development and third-party collaboration to manage sustainability-related risks in the multi-tier supply chain and develop its suppliers towards a sustainable way to manage their business. Some companies have implemented common monitoring systems and practices to ensure that product safety is ensured, quality standards are met and to share information openly between companies such as a first-tier supplier (DT1.2 & ET1.3) presented: *“We have a direct link with all major suppliers between our quality and their laboratory. If there are any doubts or anything suspicious that comes to light, then usually information comes to us immediately”*. Companies are utilizing joint actions with their suppliers to mitigate sustainability-related risks and have a long-term impact on their operation policies. In addition, some of the risks in different industries are significant. Therefore, companies are utilizing joint actions together although they are competitors with each other such as a first-tier supplier (CT1.4 & ET1.1) presented: *“African swine fever is a huge risk for the whole industry and that is why all the companies in the industry are working together. -- Big companies know their responsibilities”*. Companies can join together to pursue change in the whole industry to take into account sustainability-related matters. However, this kind of collaboration includes the risk that companies are careful not to give competitors competitive advantage. Lower tier supplier (BT2.1) summarized: *“It helps us if big companies put pressure on suppliers. This is a good way to work. If there are these co-operation mechanisms, such as organizations or consortia, we*

go together to talk about the matter. Everyone is talking about exactly the same things. -- Then, of course, there comes the fact that when the competitors are with each other, even if they have a common agenda, then there is always a little caution about how much cooperation can be made.”

From Figure 18, it can be seen that first and lower-tier suppliers are putting effort into developing their suppliers. Supplier development can be small efforts, for example, investing in supplier operations or provide training to develop supplier performance but also pursuing to implement whole new approaches related to sustainability in the company operations such as a lower-tier supplier (CT2.1 & ET2.2) argued: *“In addition, ethical assignments, ethical rules are requested, and annually we review the goals we ask from the suppliers. Of course, not all companies are ready for this. You need to push them forward into this new situation”*. Many companies take advantage of third-party collaboration regardless of their stage in the multi-tier supply chain. This can be seen from Figure 18 that mentions related this topic is divided evenly between different stages in multi-tier supply chains. Focal company (A) described how they utilize third-party collaboration to pursue sustainability and mitigate risks but also ensure transparency with the suppliers: *“There are also projects underway in connection with this sustainability. For example, now I have a human rights impact assessment and now we are launching a new project where we, with a startup, will directly interview our supplier's employees. There are many open activities on both sides with the suppliers. Both are interested in each other”*. In addition, companies utilize third-party collaboration to make possible to operate in the countries that are known as a risk country. Companies are unwilling to cooperate with suppliers in these countries if a third party does not verify it. First-tier supplier (BT1.1) summarized how they utilize third-party collaboration related to risk countries: *“Then there are the suppliers that are located in high-risk countries---. In these countries, we are required to have such a social responsibility certification or audit completed, as evidenced by the report. We will review the report and, after that, approve the supplier. Thus, a third-party assessment is required and contracts alone are no longer sufficient in the high-risk countries.”*

6 DISCUSSION & CONCLUSIONS

6.1 Answers to the research questions

Main research question

1. How are sustainability-related risks managed in multi-tier supply chains?

Based on this thesis's empirical findings, focal companies typically demand and transit sustainability-related risk management practices to their first-tier suppliers. Correspondingly, first-tier suppliers are using the same approach to manage sustainability-related risks in multi-tier supply chains. This approach is an “Indirect” approach according to Tachizawa & Yew Wong (2014) or “Open” according to Mena, Humphries & Choi (2013). In addition, Tachizawa & Yew Wong (2014) definitions Work with third parties and Do not bother governance mechanisms can be recognized from the answers to managing the multi-tier supply chain and its lower-tier suppliers. Empirical findings present that focal companies have sustainability-related risk management practices in place and they are actively using risk management practices. It can be seen that companies that have utilized sustainability-related risk management practices continuously are following a risk management framework for sustainability-related risks, according to Giannakis & Papadopoulos (2016). When different stages of a multi-tier supply chain are studied, it can be seen that utilization of sustainability-related risk management practices decreases when going towards lower-tier suppliers. This indicates that focal companies have difficulties cascading their sustainability-related risk management practices through a multi-tier supply chain.

Figure 19 summarizes how all the mentions are divided in every theme in this research. It can be seen that utilization of risk management practices is more common in focal companies than in other stages of a multi-tier supply chain. In addition, the role of collaboration increases when further stages of multi-tier companies are studied. The low number of mentions in reasons to do sustainability-related risk management theme within lower-tier suppliers presents that lower-tier suppliers are not keen on implementing and taking into consideration sustainability-related risk management practices than focal companies and first-tier suppliers. Moreover, the lowest number of mentions within lower-tier suppliers

related to sustainability-related risk management practices reinforces the view that focal companies have challenges implementing sustainability-related risk management practices through a multi-tier supply chain.

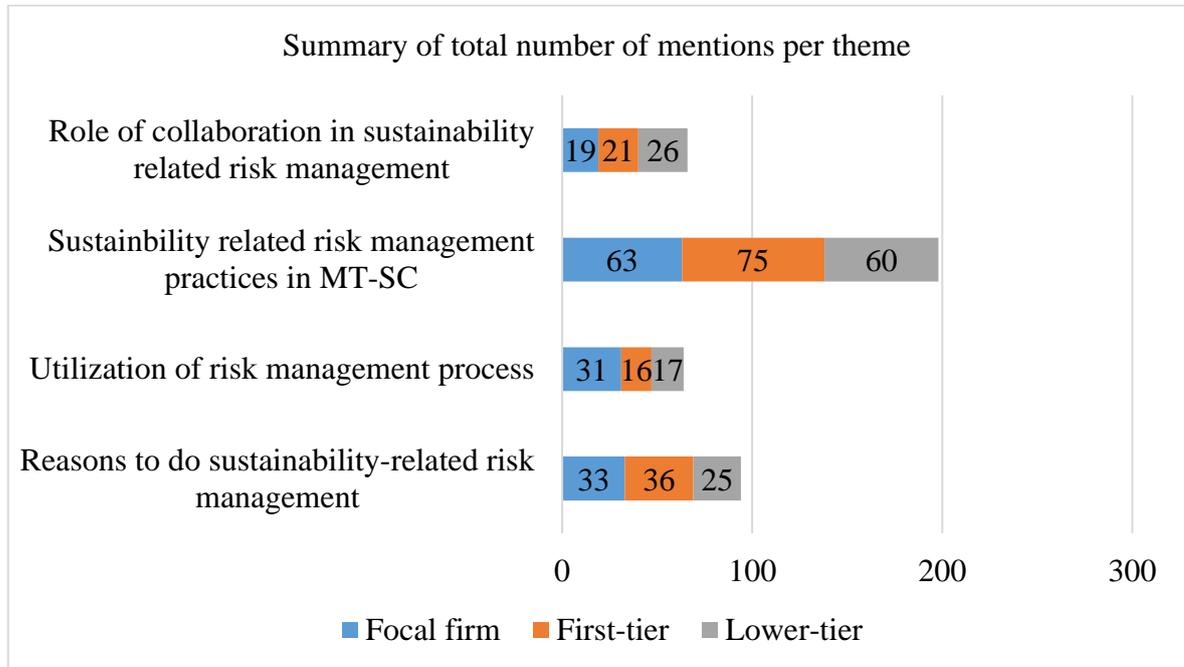


Figure 19. Summary: Total number of mentions per studied theme in this research.

The main principle of sustainability-related risk management is collaboration. Companies see that collaboration can provide competitive advantages and create win-win situations with their suppliers. All the studied companies utilize information sharing with their suppliers, open communication, and maintain relationships with suppliers. Mutual trust is the primary sustainability-related risk management practice among first- and lower-tier suppliers. Many companies utilize joint actions, supplier development and third-party collaboration to manage sustainability-related risks in the multi-tier supply chain and develop its suppliers towards a sustainable way to manage their business. Some companies have implemented common monitoring systems and practices to ensure product safety, meet quality standards, and share information openly between companies. This is close to Hallikas et al. (2004) presented in the risk management practice in a network environment where companies have mutual risk management practices and monitoring systems. Some industries, such as the meat industry, have adopted a mindset to mitigate the commonly known risk for the whole industry. This is a practical example of how complex multi-tier supply chains and

competitors with third-party collaboration can prevent sustainability-related risks together. However, there were no other proactive and comprehensive sustainability-related risk management processes in place in the studied multi-tier supply chains. From the answers, it can be recognized that industry has a role in how sustainability-related risk management practices are adopted through the whole multi-tier supply chain. For example, in the food industry, product safety and purity of products are essential and every company has this mindset in their operations. Therefore, companies have adopted sustainability-related risk management practices due to the nature of the industry requirements.

Companies in different stages of multi-tier supply chains rely on their suppliers' certificates and code of conduct to manage sustainability-related risks. Companies see that they can pursue and demand different actions from the supplier through contracts, certificates, and code of conduct. Some companies have strict mentions in the code of conduct to influence suppliers' operations in the multi-tier supply chain. However, companies recognize that these kinds of demands are hard to follow up. Demanding certificates and standards are an effective method to pursue sustainability-related risk management practices through a multi-tier supply chain. Many companies see that one of the crucial things of the code of conduct is that they enable them to have permission to go and audit their suppliers whenever needed. Companies see that certificates and standards tell that supplier is performing well and it is way to operate is more advanced than suppliers without certificates. Companies see that standards, certificates, and CoC are an effective way to develop the whole industry since those set a clear vision and goals regarding how companies' operations need to be done and developed.

Supplier base management and supplier selection are seen as vital sustainability-related risk management practices. Sustainability is seen as one of the main factors and by mitigating the risks, companies choose trusted and well-known suppliers. This will help to avoid interruptions that the suppliers can generate to the supply beforehand and this same finding has been argued by Cagnin et al. (2016). Especially, focal companies are following supplier performance closely and their suppliers are fulfilling their obligations. Companies recognize that supplier selection needs to be done carefully. Focal companies are more willing to develop and train their poorly performing suppliers, but first- and lower-tier suppliers change their suppliers quickly if possible if they cannot fulfill their obligations. This can be a

consequence of the company's resources that it can invest in managing and developing its suppliers.

Supplier auditing is seen as one of the practical and comprehensive risk management practices to mitigate sustainability-related risks in a multi-tier supply chain. Companies see that supplier auditing can provide a comprehensive overview of suppliers' sustainability-related risk and supplier performance and help ensure that suppliers fulfill their agreed obligations. However, this risk management practice was recognized as resource-intensive and challenging to implement widely if the supplier base is broad like many global companies have. Hence, companies need to evaluate how and when to audit their suppliers. In addition, companies recognized that commonly auditing does not tell anything of the suppliers' supplier and only covers the audited company. Supplier monitoring, such as financial situation evaluation, was seen as an effective way to see the overall view of the supplier's performance among first- and lower-tier suppliers. Companies that do not have enough resources perform audits to their suppliers when it is mandatory to do. Companies are utilizing commonly available auditing reports and this information is seen as informative and helpful to monitor their suppliers. This is a case especially for companies that are not having enough resources to perform additional audits. However, companies recognize that this kind of information is updating slowly and it is always retrospectively available.

Only a few companies were using the product or service development to make a product more sustainable and this way to mitigate sustainability-related risks in the multi-tier supply chain. This risk management practice is resource-intensive and requires a long-term commitment from the company and its suppliers. Based on the answers, product development typically focuses on replacing risky raw materials with sustainable solutions.

Companies recognize that purchasing volumes include a risk because many companies mainly focus on big volume products, but the risk can also occur from the small volume products. Typically, companies have utilized sustainability-related risk management practices based on the volume. There can be a situation where a company has a good overview of its primary purchasing goods. However, smaller units are purchased without proper risk assessment. This confirms the need to comprehensively manage sustainability-

related risks and take into account the supply chain perspective, which Seuring & Müller (2008) have argued in their research.

The complexity of multi-tier supply chain influence on sustainability-related risk management. This was pointed out several times in different contexts. The complexity of a multi-tier supply chain causes difficulties in implementing sustainability-related risk management practices with several stages in a multi-tier supply chain. In addition, the global business environment and different countries where companies operate cause difficulties to manage and follow sustainability-related risk management practices. Moreover, this makes it challenging to ensure the transparency of a multi-tier supply chain. Companies recognize the same importance of transparency as Holiday et al. (2002) presented their research that companies need to be more transparent of their operations in the supply chain since information travels fast at the global level. Therefore, problems cannot be thought of as local complications. Also, companies only have a contractual relationship with their suppliers but not suppliers' supplier. Due to this, it is problematic to make demands for lower-tier suppliers on further stages in the multi-tier supply chain. Part of the complexity is the companies size and role in the multi-tier supply chain. Many companies recognize that they are small in size in the multi-tier supply chain. Therefore, they do not have leverage over their suppliers to make additional demands or force them to use new practices. In addition, part of the complexity is that some suppliers consciously commit violations or crimes related to the sustainability of their business operations. These are difficult to detect and monitor. Multi-tier supply chain complexity causes that information sharing between several stages to be difficult since it takes time and the company may not know all supplier's supplier to ask and share information. Moreover, many companies do not see any benefits in sharing all the information related to their operations. Overall, it can be seen that Wilhelm et al. (2016b) and Marshall et al. (2019) statement that none of the focal companies has enough power and resources to manage the entire multi-tier supply chain are accurate, and it can be concluded from this research results.

There were no significant differences found between the five multi-tier supply chains since companies were utilizing similar practices. The main difference in using sustainability-related risk management practices depended on the industry. If the industry itself has significant risks, companies recognize them and mitigate the risks on their own. There is no

need to force them to take into use sustainability-related risk management practices. In addition, the availability of resources has a significant effect on how sustainability-related risk management practices are performed in the company and adopted among suppliers. Hence, large companies such as focal companies in this study have more resources available. Therefore, they can implement and perform comprehensive sustainability-related risk management practices and follow up with their suppliers.

Sub-questions

1.1 How is risk management seen in different levels of multi-tier supply chains?

First and lower-tier suppliers recognize that supplier selection is critical for them and their multi-tier supply chain performance since they may not have the leverage to affect their suppliers' operations. In addition, first and lower-tier suppliers recognize that there is a high risk if the chosen supplier is not performing well or there are, for example, social or environmental issues in the company's operations. Therefore, there is a need to choose suitable suppliers. In addition, lower-tier suppliers recognize that choosing trusted and well-known suppliers helps them mitigate sustainability-related risks. Focal companies focus more on supplier base management than first and lower-tier suppliers. Focal companies have their own strategies for managing their supplier base, and by this, they are pursuing to mitigate sustainability-related risks. The supplier base is continuously monitored and managed. Focal companies have specified requirements such as scorecards for suppliers and they are following that suppliers are fulfilling those requirements. This can be because focal companies have many suppliers to manage and focal companies have resources that they can use in the supplier management compared to first- and lower-tier suppliers. Auditing and supplier monitoring are commonly used risk management practices among studied companies in every stage of the multi-tier supply chain.

Empirical findings show that focal companies see that one of the main reasons for sustainability-related risk management is the company strategy. In addition, focal companies recognized several possibilities and scenarios where the risk can occur in the focal company's multi-tier supply chain. Respectively, first-tier and lower-tier suppliers realize that they need to respond to the customer demand, i.e., upper stage companies' demand in the multi-tier

supply chain. Therefore, they are implementing sustainability-related risk management practices into use to fulfill the customer requirements. Reputation risk is one of the main reasons to perform sustainability-related risk management in the multi-tier supply chain. Companies recognize that reputation and brand image need to be managed, but also customer awareness has increased towards companies' actions. This same finding is introduced in Villena's (2019) research. Therefore, sustainability-related risk management needs to be in place, especially for the focal companies. Based on the case companies' answers, none of them were worried about their focal companies' reputations. Every company considers the reputation risk through its operations and how it will affect on own reputation.

Companies in different stages of multi-tier supply chain argue that collaboration is the main principle to perform sustainability-related risk management through a multi-tier supply chain. Many focal companies see that by collaboration, they can develop their suppliers towards a more sustainable way but also develop the whole industry practices with third-party collaboration. Many companies take advantage of third-party collaboration regardless of their stage in the multi-tier supply chain. Respectively, first and lower-tier suppliers utilize collaboration to share information and communicate with each other to gain better supply chain performance and mitigate risk in this way. Companies recognize that collaboration with different stakeholders is vital to take into account sustainability in a multi-tier supply chain. The same is argued in Villena's (2019) research. The empirical findings show that first and lower-tier suppliers utilize mutual trust and collaboration to decrease sustainability-related risk management work and divide it between different companies. This is due to the lack of resources in risk management with first- and lower-tier suppliers. Companies understand that a short-term approach towards suppliers is not recommended action to do to mitigate risks. Lower-tier suppliers believe that they are transparent and open related their actions. Therefore, they are relying on that their suppliers are following the same principles. Many first and lower-tier suppliers said they agreed with their suppliers that those would announce possible changes in the multi-tier supply chain to track and ensure sustainability. However, lower-tier suppliers recognize that they are not getting all the information they want by trusting their suppliers. This phenomenon is presented by Villena & Gioia (2018), that lower-tier suppliers passively consider sustainability-related issues since they have been recognized to have a low risk of getting penalties if they do nothing.

Lower-tier suppliers see that contracts and code of conduct are the best way to manage sustainability-related risks. In addition, certificates or standards are critical points when suppliers are selected. Respectively, focal companies are not strict that suppliers need to have some specific standard or certificate. Focal companies require that supplier needs to fulfill their requirements and be able to verify them somehow. If a supplier can ensure that requirements are met, collaboration can be possible with the focal company. Many lower-tier suppliers are stricter about the standards and certificates than focal companies because they may not have the resources to check and monitor suppliers to ensure that suppliers do the right things without having certificates. In addition, lower-tier suppliers also see that it is easier for them to require these standards, certificates, and code of conduct because their customers, i.e., upper-stage companies in the multi-tier supply chain, have initially demanded it from them.

1.2 What is the role of the focal firm, first-tier supplier, and lower-tier suppliers in sustainability-related risk management?

From the empirical findings, the roles of focal companies, first-tier and lower-tier suppliers can be recognized. Focal companies are pursuing their sustainability targets to their first-tier suppliers and by this, they are pursuing to fulfill the company's strategy and customer requirements related to sustainability. There is an increasing interest in sustainability and therefore, customer demand is one of the main affecting factors to implement sustainability-related risk management practices among studied focal companies. The same findings were noticed by Seuring & Müller (2008) and Grimm et al. (2014) in their studies.

These research findings show that first-tier suppliers have a significant role in ensuring and adopting sustainability-related risk management practices among their suppliers, i.e., lower-tier suppliers. One reason is that focal companies recognize the complexity of the multi-tier supply chain, as presented by Grimm et al. (2014). Therefore, focal companies utilize first-tier suppliers as their agents to pursue wanted actions toward the multi-tier supply chain. This same finding is highlighted in several studies, such as Marshall et al. (2019) and Mena, Humphries, & Choi (2013). However, first-tier suppliers did not mention or recognize their role in ensuring focal companies' sustainability-related risk management practices based on this study results. Hence, first-tier suppliers are focusing on fulfilling their obligations

towards focal companies. This increases the need for focal companies to focus on their contracts, code of conduct and monitoring their suppliers' performance. In addition, this could help prevent and mitigate the risk if a first-tier supplier is not interested in fulfilling the focal company's sustainability requirements or perfectly adhering to the focal company's sustainability requirements. This risk is presented in Wilhelm et al. (2016a) research as well.

Lower-tier suppliers have a significant role in sustainability-related risk management. Companies argued that their most significant sustainability-related risks occur from their lower-tier suppliers. Typically, lower-tier suppliers do not have the resources to perform extensive risk management. Companies can be small in terms of revenue, and lower-tier suppliers can locate geographically far away. In addition, lack of resources can form the risk of unconsciousness related to sustainability. Moreover, the complexity of the multi-tier supply chain, lack of contractual relationship with a focal company and lower-tier suppliers force focal companies to rely on first-tier suppliers. This same finding is introduced in several studies such as Choi & Hong (2002) and Grimm et al. (2014). This indirect link between a focal company and lower-tier suppliers can cause miscommunication and make it challenging to cascade sustainability-related risk management practices towards a multi-tier supply chain. This can be seen in this research results that the utilization of risk management practices decreased when several stages of multi-tier supply chains are studied. However, some lower-tier suppliers recognized that sustainability could provide a competitive advantage. Therefore, they have implemented sustainability-related risk management practices in place to convince its customers, i.e., upper-stage companies in the multi-tier supply chain.

6.2 Implications for practice

These research findings and theoretical multi-tier supply chain structures utilizing Mena, Humphries, & Choi (2013) and Tachizawa & Yew Wong (2014) are combined to form an advanced and more realistic framework to perform sustainability-related risk management through several stages of the multi-tier supply chain. Figure 20 presents the proposed approach that can be utilized. The main principle is that the focal company has a collaborative relationship with its first-tier supplier as they typically have since it is their contractual partner. However, in addition to the first-tier supplier's responsibility to require

sustainability-related risk management practices from their suppliers, the focal company can pursue the demands of its lower-tier suppliers through contracts and code of conduct. This creates an implicit link between a focal company and lower-tier suppliers. Hence, focal companies' demands and requirements cannot be specific and comprehensive since they do not have a direct contractual relationship with their lower-tier suppliers like first-tier suppliers have. Therefore, those demands need to be more suggestions to encourage lower-tier suppliers to implement different sustainability-related risk management practices. In addition, suggestions introduce in what direction the focal company wants its suppliers to develop itself and where the whole industry is moving. This implicit link can be seen to develop and raise awareness of sustainability-related risk management practices through the multi-tier supply chain. Moreover, focal companies can utilize and include third-party collaboration and joint ventures within their competitors to influence lower-tier suppliers through the implicit link.

A proposed “Implicit link” approach is recommended to perform by focal companies since many focal companies can have many suppliers, such as over ten thousand. Therefore, there are not enough resources available to directly influence lower-tier suppliers' operations. This is not even possible in many cases because the focal company may not know all its lower-tier suppliers. The implicit contractual link influences unknown suppliers' operations since first-tier suppliers know the lower-tier suppliers and need to fulfill their obligations to the focal company.

A proposed approach:

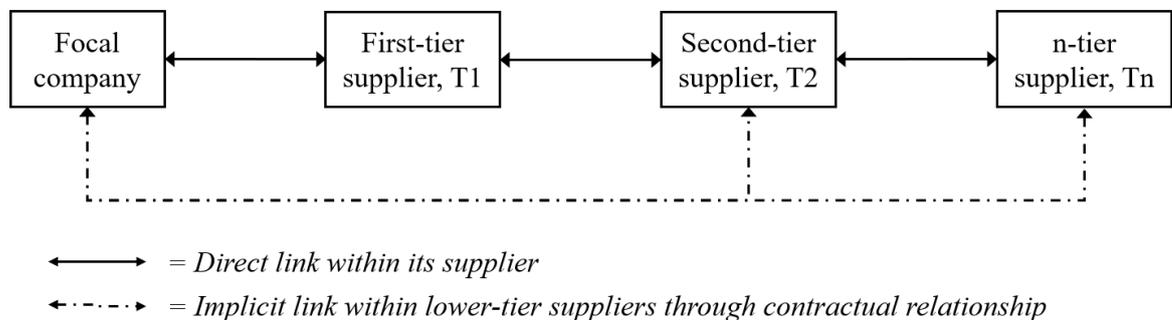


Figure 20. A proposed framework in sustainability-related risk management in the multi-tier supply chain.

From the findings of this research, it can be seen that all the companies in different stages of multi-tier supply chain see the importance of fulfilling contractual obligations to their customer. Therefore, pursuing demands through contracts and code of conduct is effective, cost-efficient and less resource-intensive to implement different sustainability-related risk management practices through the multi-tier supply chain. To successfully implement new practices, relationships with focal companies' first-tier suppliers need to be monitored and clear targets for the relationship and performance need to be taken in place. This allows to monitor the progress and put more focus on lower-tier suppliers' performance. This is vital since suppliers are at different levels in terms of sustainability-related risk management practices. Clear goals and vision help companies to develop their operations. In Figure 20, it can be seen that arrows are placed in two directions. This is important because focal companies need to be open and transparent to their suppliers in the multi-tier supply chain. This enables suppliers to develop their operations and require inputs from upper-stage companies, such as a focal company. Adopting this proposed framework, companies can consider sustainability-related risks in the multi-tier supply chain context and pay attention to their lower-tier suppliers in a cost-effective and resource-wise manner. This is essential since sustainability has become a kind of license for companies to operate in today's business environment.

6.3 Limitations of the study and future research topics

This study has limitations, such as a small number of focal companies interviewed and multi-tier suppliers, making it difficult to generalize results. However, this study includes many interviews, and it forms comprehensive qualitative data gathered from different stages of companies in the multi-tier supply chains. In addition, several industries were present in this study to broaden the perspective, but all possible industries are not included. This study is focused only on Finnish focal companies and their domestic and global suppliers. However, all the presented focal companies in this study operate globally. That is why the origin of the focal company does not have significance for the results of this study. This research provided initial insights related to this research topic. More studies are needed that would test and validate these research findings. Other research methods and data collection forms should be utilized to get a more objective viewpoint related to this studied topic. Since semi-structured interviews are not strictly structured, companies' answers can be decoded widely.

Therefore, it would be recommended to have a comprehensive questionnaire, for example, a large-scale study that companies fulfill, in addition, to the case study research approach. This enables to make more statistical evaluations and increases the possibility of finding causality with different factors since questionnaires can be formed based on the specific research topic. It would be interesting to see that if the statistical approach raises the same sustainability-related risk management practices within the studied stages of the multi-tier supply chain companies what this research has raised.

In this research, the coded data has been analyzed by analyzing mentions between different companies to find out themes and identifying patterns related to the company's position in a multi-tier supply chain. However, this does not give an excellent picture since there are many focal companies, first- and lower-tier suppliers. This will automatically give an effect to the number of mentions. For example, there are more lower-tier suppliers than focal companies. Thus, this method is an additional method to analyze interviews data and help recognize trends based on the studied matter.

Lastly, most of the interviews are done before the global Covid-19 pandemic. It would be interesting to see if there have happened any changes related to the companies' viewpoints of sustainability-related risk management approaches and how those are utilized in companies. In addition, it would be interesting to study if companies have put more effort and resources into the sustainability-related risk management practices or made changes to their multi-tier supply chains to mitigate these kinds of disruptive incidents. Moreover, it would be interesting to see if the Covid-19 pandemic influences the perspectives of global multi-tier supply chains.

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