



COVID-19'S EFFECTS ON SUSTAINABLE SUPPLY CHAIN MANAGEMENT

Finnish industrial companies

Lappeenranta–Lahti University of Technology LUT

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ABSTRACT

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COVID-19's effects on sustainable supply chain management - Finnish industrial companies

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This bachelor's thesis studies COVID-19's effects on sustainable supply chain management. The purpose of the research is to understand the phenomenon and provide insight to the changes the pandemic has caused. The aim is to provide practitioners information to help them avoid mistakes that happened during this pandemic but also utilize actions that have been proven helpful.

The research is conducted with qualitative case study that researches three Finnish industrial companies. To understand the effects of the pandemic in the three case companies, semi-structured interviews were executed with one person from each company. Secondary material, such as reports and websites, were used to increase validity of gathered information.

The research results provided practical information to utilize in companies' work. COVID-19 has changed companies' sustainable supply chain management actions but the values behind the actions have stayed the same. The pandemic has put companies' risk management to a test, and those with good base have survived the changes better. There are some new practises, such as distance audits and meeting, that have made it easier to keep the connections to suppliers and other partners. Organizations are more aware of the global risks and what kind of effects those could have. Sustainability's importance in companies' supply chain management is predicted to grow in the future, even though it has not been priority during the pandemic.

TIIVISTELMÄ

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Koronan vaikutukset kestävien hankintaketjujen johtamiseen - Suomalaiset teollisuusyritykset

Kauppätieteiden kandidaatintutkielma

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Tämä kandidaatintutkielma tutkii COVID-19 pandemian vaikutuksia kestävien hankintaketjujen johtamiseen. Tutkimuksen tarkoituksena on ymmärtää korona ilmiönä ja tarjota oivalluksia koronan aiheuttamiin muutoksiin. Työn tavoitteena on antaa ammattilaisille tietoa pandemian aikana tapahtuneiden virheiden välttämiseen, mutta myös auttaa hyödyntämään toimintatapoja, jotka ovat poikkeuksellisen aikana osoittautuneet toimiviksi.

Tutkielma on toteutettu laadullisena case tutkimuksena, jossa keskitytään kolmeen suomalaiseen teollisuusyritykseen. Kolmea case yritysten edustajaa haastateltiin puolistrukturoidusti, jotta ymmärretään pandemian vaikutukset yritysten hankintaketjujen johtamiseen. Sekundaarisia aineistoja, kuten raportteja ja yritysten nettisivuja, käytettiin lisäämään tulosten pätevyyttä.

Tutkimus antoi käytännön tietoa pandemian vaikutuksista, jota yritykset voivat hyödyntää käytännössä. Tutkimus osoitti, että COVID-19 on muuttanut yritysten kestävien hankintaketjujen johtamisen toimintatapoja, mutta toimintaa ajavat arvot ovat pysyneet samoina. Pandemia on laittanut yritysten riskienhallinnan koetukselle ja ne, joilla se oli vakaalla pohjalla ennen pandemiaa ovat selvinneet muutoksista vaivattomammin. Eräät uudet toimintatavat, kuten etäauditoinnit ja -tapaamiset, ovat auttaneet yrityksiä pitämään yllä suhteita toimittajiin ja muihin kumppaneihin. Yritykset ovat pandemian tuomien muutosten seurauksena tietoisempia globaaleista riskeistä ja niiden mahdollisista vaikutuksista yritystoimintaan. Kestävyuden merkityksen ennustetaan kasvavan tulevaisuudessa osana yritysten hankintaketjujen johtamista, vaikka se ei ole pandemian aikana ollut etusijalla.

ABBREVIATIONS

SCM Supply Chain Management

SSCM Sustainable Supply Chain Management

TBL The triple bottom line

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1. Introduction

From the end of 2019 COVID-19 spread quickly around the world bringing disruption to everywhere. World Health Organization (2021) declared it as a public health emergency of international concern, which is the highest level of alarm for WHO, in January 2020. By October 2021 there has been over 240 million confirmed cases of COVID-19 with 4,9 million deaths around the world (WHO World Health Organization, 2021). The pandemic has had substantial effects on businesses, with some industries suffering more than others. Many companies have had to ask their employees to work from home, and in industries where it has not been possible, companies have had to create new ways of working with keeping physical space and providing personal protective equipment. (Harapko, 2021.)

The pandemic has disrupted supply chains around the world, and it has created a lot of pressure to the supply chain managers and other leaders to maintain essential operations. Companies' values have been tested and their stakeholders are closely following their response to the disruption and changes. (Accenture, 2021.) To understand the effects and changes COVID-19 has had this bachelor's thesis concentrates on researching how the pandemic has affected supply chain management (SCM), especially the sustainability of supply chains.

1.1 Background

Sustainability and sustainable supply chains have obtained a lot of attention recently and it is very current topic with the climate changing and people being more aware and informed about the subject. Studies about sustainable supply chains, especially from the environmental point of view have, however, been around for decades, for example, Ayres and Kneese (1969) published a study focusing on environmental pollution problems in interorganizational activities over 50 years ago.

Sustainable supply chain management (SSCM) started from many separate topics, such as environment, diversity, philanthropy, and human rights, evolving to present-day SSCM (Carter & Jennings, 2002). Sustainability has changed from being unwanted in for-profit organizations to being expected in everyday practices. There have been many problems, like greenwashing, on supply chain sustainability, which affect the industry still to this day making it harder to distinguish the most effective practises. (Sarkis, 2019.)

The United Nations' Sustainable Development Goals (SDGs) have affected and developed sustainable supply chains, and other way around, with stating clear goals for companies, organizations, and governments to set and achieve (Sarkis, 2019). These 17 goals, that were published in 2015, consist of important topics from environmental, social, and economic field (The United Nations, 2021). These goals have helped companies and other organizations to understand the importance of sustainable supply chains as a way to accomplish environmental and social goals. With the time and growing importance of SSCM many tools and technologies have been developed to make it easier to manage and plan the sustainable supply chains. (Sarkis, 2019.)

COVID-19 is not the first pandemic supply chains have gone through since WHO has tracked 1438 epidemics between 2011 and 2018. COVID-19 has, however, been very different from the earlier outbreaks that have usually stayed in certain areas and not spread globally. Global warming has made it more likely for pandemics to spread over larger areas and because of that disturb the world's economies. (Hudecheck et al., 2020.) The effects of COVID-19 have already been widely researched, also its effects to supply chains. However, there is lack of research for sustainability management, especially social and environmental sustainability practices as well as disruption of development of sustainability. Most of the research considering COVID-19 has concentrated on food and healthcare industry due to the nature of the pandemic. (Chowdhury et al., 2021.) Nevertheless there is literature referring to SSCM as well, for example, Sarkis (2020) has studied sustainable supply chains and their resilience and Butt (2021) introduced strategies to reduce the impacts of COVID-19.

1.2 Aim of the study and research questions

The aim of this bachelor's thesis is to research SSCM through COVID-19. It is very important to understand the effects of COVID-19 for companies to avoid making same mistakes in the future but also to see if it has led to some positive changes that should be acknowledged. If this is not studied, it might lead to the new practices not taken seriously and the companies falling back to the same normal they had before the pandemic hit.

The main research question for this study is:

How has COVID-19 affected sustainable supply chain management?

The secondary research questions are:

- 1. How has sustainable supply chain management changed compared to the time before COVID-19?*
- 2. What does the future of sustainable supply chain management look like?*

The research will concentrate on three Finnish industrial companies from different fields to provide understanding of the effects of COVID-19 in Finland. Companies analysed in the work are Company X, Company Y and Company Z. The companies are based in Finland, but they all have international supply chains. These companies have sustainability as one of their main strategic priorities and are reporting their sustainability actions, developments, and goals.

The research concentrates on the years from 2019 to 2021, but one perspective of the study is also the future of SSCM. The time limitation comes naturally from the concentration to the COVID-19 and the years around it. The starting point is only one year before the pandemic started since the research concentrates on how COVID-19 has affected the SSCM and not on the general progress in the field.

1.3 Theoretical framework

Theoretical framework of the research, showcased in Figure 1, is mainly based on Carter and Rogers (2008) framework for SSCM, which has the concept of triple bottom line (TBL) developed by John Elkington (1999) in the core of the concept. TBL takes into consideration economic, social, and environmental performance in business. It guides managers to choose social and environmental activities that improve economic performance and leave out those activities that are not certainly bringing value to the company. (Carter & Liane Easton, 2011.)

According to Carter and Rogers (2008) there are four supporting facets of TBL which are strategy, risk management, organizational culture, and transparency. Strategy refers to choosing sustainability initiatives according to the company's strategy. Risk management includes contingency planning and managing supply disruptions. Sustainability should be more than just strategies; it should be part of the organizational culture and the core value of everybody working in the company. Companies should try to be transparent with their stakeholders; they should report to them but also include them in the sustainability processes and use their feedback to improve their activities. These supporting facets are not only individual but also work together, some of the actions might be, for example, part of both transparency and risk management. (Carter & Rogers, 2008; Carter & Liane Easton, 2011.)

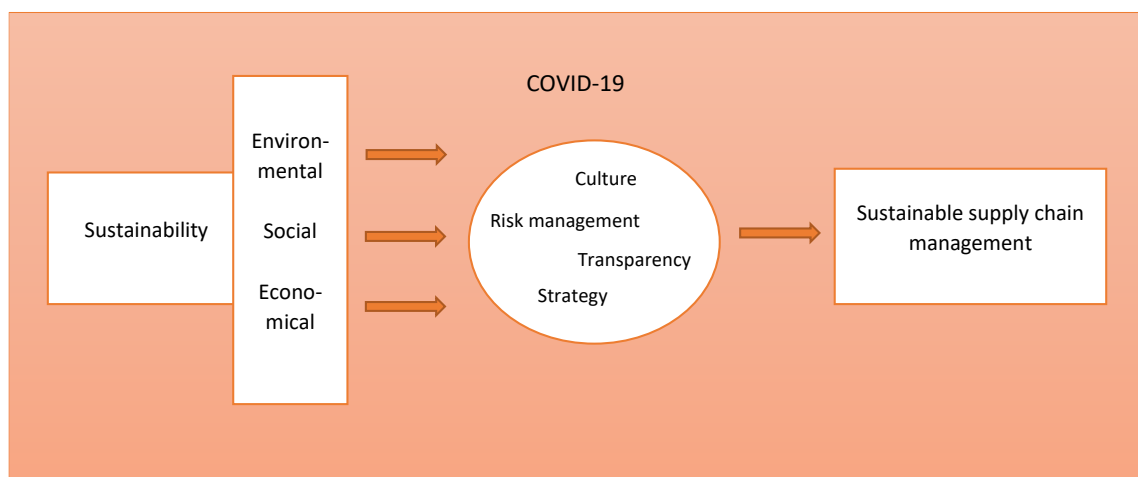


Figure 1 Theoretical framework

As Figure 1 shows the concept introduced before is adapted to create a framework for this bachelor's thesis. TBL is attached to the four supporting facets of TBL to create grounds for SSCM. TBL provides a base for the supporting facets, which take actions in all three aspects, economic, social, and environmental. The four supporting facets are utilized in the framework to broaden the view from the three aspects to more wider understanding of SSCM and to bring basis for SSCM practices. It provides clear categorization for SSCM practices, which simplifies the research. All this is researched from the COVID-19's point of view. The aim for the framework is to understand SSCM practices, that come from the four supporting facets, based on the three perspectives, and see how COVID-19 has affected those.

1.4 Structure of the study

This bachelor's thesis consists of three main sections, which can be named as theory and literature review, methodology and empirical part. Firstly, SSCM is discussed through the theoretical framework provided. Methodology provides information about the research method and data used for the research for this bachelor's thesis. It also provides information about the companies X, Y and Z. Lastly there is empirical part, which analyses the results from the conducted research and answers the given research questions. Finally, there is conclusions and suggestions for future research.

2. Sustainable supply chain management

This chapter explains SSCM and concepts around it. When defining SSCM it is firstly important to understand the concept of SCM in general, and secondly the meaning of sustainability and how it can be part of SCM. After that it is easier to see the concepts and practices forming SSCM.

2.1 Supply chain management

Every company or business is part of one or more supply chains and has a role to play in every one of them. Supply chains are part of designing, making, delivering and usage of a product or service and the changing environment of business has made companies to be more aware of their supply chains. (Hugos, 2018.) La Londe and Masters (1994) define sustainability as the flow of materials through different companies and stakeholders, it can start from a raw material producer and go all the way to a consumer. Aitken (1998) suggested that supply chain can be defined as a network of organizations that are connected and work cooperatively together to “control, manage and improve the flow of materials and information from suppliers to end users”. All the different definitions for supply chains come to similar conclusion that supply chain consist of multiple organizations or other stakeholders that work together and try to provide a smooth path for materials or information.

There are also a lot of different definitions to SCM and those continue to change and evolve to fit the changing field of global supply chains (CSCMP, 2021.) Supply chain management can simply be defined as influencing the behaviour of supply chain to get wanted results, however, this kind of definition does not provide much information (Hugos, 2018). In more depth SCM can be defined as “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole” (Mentzer et al., 2001, pp.18). Additionally, Christopher (1998, pp.5) defines SCM in his book to be “the

management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.”

SCM has earlier been viewed primarily as operational, but companies have increasingly started seeing it as a competitive advantage (Giunipero, Hooker & Denslow, 2012). Companies that have succeeded in SCM have turned it into a source of value creation, instead of only operational way to reduce costs and improve efficiency (Avittathur & Ghosh, 2020). To create value, companies try, for example, to build trust with their partners to be able to work seamlessly together and build a co-operative environment, where they can share information between organizations (La Londe & Masters, 1994; Christopher, 1998).

2.2 Sustainability

Sustainability is very wide concept and there are many different definitions for it. The World Commission on Environment and Development stated (1987) that sustainability is “development that meets the needs of the present without compromising the ability of future generations to meet their needs.” This is one of the most quoted definitions of sustainability and it provides very good base to start building understanding on the topic. Portney (2015) states that the core of sustainability is to find solutions where Earth can support the population and economic growth while not harming humans, animals, and plants. Earth’s depleting resources should be used carefully and judiciously (Portney, 2015).

Organizational sustainability can be seen to consist of three different components, which are environment, society, and economic performance. Elkington developed the concept of TBL, which considers all three of those goals and brings them together. (Carter & Rogers, 2008.) The concept creates an atmosphere where companies that have understood it correctly see creating profit through the social and environmental impacts and not as separate thing (Savitz, 2006). The concept helps to understand the broad field of sustainability and helps to find best ways to reach companies’ goals.

The economic dimension can be seen as the base for the concept of TBL. It includes variables that deal with the flow of money, which could be about income, taxes, business diversity factors or employment. The dimension of environment includes variables handling with natural resources and its viability, such as water quality, energy consumption and toxic waste. To help companies to see the impacts of environmental variables, there should be long-term trends and ideas available. Lastly, the social dimension consists of variables dealing with, for example, education, equity, and well-being. There are many possibilities for social variables, such as relative poverty and violent crimes per capita. All these variables help organizations measure and evaluate their sustainability performance. (Slaper & Hall, 2011.)

The concept of TBL is often used to explain how sustainability can be included in SCM, it provides a simple base for sustainability discussion and companies' SCM practices (Beske & Seuring, 2014). SCM often concentrates mainly on the economic dimension, while including sustainability brings environmental and social issues into the consideration and creates an environment where all three dimensions are used for designing and optimizing the supply chain (Bai & Sarkis, 2010; Harms, Hansen & Schaltegger, 2013; Seuring & Müller, 2008; Taticchi, Tonelli & Pasqualino, 2013). Practices to enhance sustainability in supply chains are often connected to the issues with quality of relationships inside the chain as well as with external stakeholders. Examples of sustainability practices are collaborating with companies in the supply chain, requiring certificates or certain standards from suppliers and creating long-term relationships with their stakeholders. (Beske & Seuring, 2014.)

2.3 Supporting facets of SSCM

SSCM is defined by Carter and Rogers (2008, pp.368) as “the strategic, transparent integration and achievement of an organization’s social, environmental, and economic goals in the systemic coordination of key interorganizational business process for improving the long-term economic performance of the individual company and its supply chains.” SSCM includes management of material and capital flows as well as information through different organizations along the supply chain (Seuring & Müller, 2008). The different organization can have varied interpretations of sustainability which creates challenges for SSCM since

cooperation between these organizations might be hard (Meckenstock, Barbosa-Póvoa & Carvalho, 2016).

Carter and Rogers (2008) introduced four supporting facets of TBL to define sustainability and SSCM. These supporting facets are risk management, transparency, strategy, and culture, which all are important part of SSCM practices. Even though the supporting facets are next introduced individually, there are many interrelationships between them, and some practices might be part of many categories at the same time. (Carter & Rogers, 2008.)

2.3.1 Risk management

Risk can be seen in various ways in different industries, but economists have defined risk as uncertainty about economic gains and losses. When considering this from sustainability point of view, companies should not focus only on short-term financial results but also to the harm their products and environmental waste bring as well as worker and public safety. (Shrivastava, 1995a.) Risks related to sustainability can be defined as potential events that might provoke harmful stakeholder reactions (Hofmann et al., 2014). Supply chain risk management can be defined as organization's ability to understand and manage its economic, environmental, and social risks in the supply chain (Carter & Rogers, 2008). The main difference between ordinary supply chain risks and sustainability-related supply chain risks is that sustainability risks are triggered by stakeholder reaction, while supply chain risks are triggered by supply chain disruptions that affect the flow of goods, financial resources, or services. (Hofmann et al., 2014.)

Sustainability-related risks in the upstream supply chains can be divided to social issues, ecological issues, and ethical business conduct issues. Social issues are related to working conditions and compensation, ecological issues include input- and output-related aspects, such as energy consumption and emissions, and ethical business conduct issues include, for example, corruption and business connections to suspicious organizations. Stakeholders' reactions to possible sustainability risks, that are noticed by either detecting permanent

conditions or noticing sudden events, are different depending on their individual expectations. Majority of stakeholders have positive expectations, and they expect excellence in company's sustainability performance. This kind of stakeholders can be local communities, customers, shareholders, and governments, that might focus on one or more issues. Stakeholders that have negative expectations expect the company to fail in social, ecological, or ethical issues. Competitors might, for example, want to gain competitive advantage, if the company fails in their sustainability performance. (Hofmann et al., 2014.)

Once stakeholders have gained information about possible risk, they could accuse company of illegitimate behaviour, which could affect the firm. Stakeholders can influence the firm directly, such as employees and suppliers, or indirectly, such as the media and competitors, they could, for example, delay deliveries or stop recommending the firm. Sustainability risks might go unnoticed or underestimated if companies use only, so called, ordinary supply chain management concepts and focus only on disruptive events, that do not always lead to sustainability risk to materialize. Some issues might not seem relevant from supply chain risk management's view but can lead to very harmful reactions from stakeholders. (Hofmann et al., 2014.)

Practices for sustainability-related supply chain risk management combines the ordinary supply chain risk management to sustainability risk management. As examples there are a stakeholder involvement function, a translator function, a supplier management function, and a stakeholder management function. Companies should identify the most important stakeholder for their business environment and understand their preferences and criteria on potentially critical issues within supply chain. The translator function processes stakeholder expectations into assessment criteria, which provides basis for the supplier management function. Suppliers are informed on the stakeholder expectations so that they can respond to them and develop their activities accordingly. Suppliers' compliance with the criteria should be enforced and monitored with regular audits, quality checks or requiring membership in compliance initiatives. The stakeholder management function refers to informing stakeholders on company's efforts towards sustainability and interaction with stakeholders. (Hofmann et al., 2014.)

2.3.2 Transparency

In the digitalized world, where information travels fast around the globe, it has become difficult and risky for companies to hide their actions and wrongdoings. Stakeholders gain information about companies' actions easily and small mistakes might be in the headlines the very next day. Transparency has been seen as positive thing as it has developed the sustainability of supply chains and given more power to the consumers and civil society. On the other hand, organizations have started using transparency to achieve their own goals which is reducing the consumer empowerment. (Mol, 2015; Carter & Rogers, 2008.) In spite of the problems, United Nations Global Compact (2015) listed transparency to be one of the most important things for companies committed to sustainability, since it builds trust between organizations and consumers.

Mol (2015) introduces four types of transparency. *Management transparency* involves a limited number of upstream economic actors in supply chains that are mainly motivated by economic interests. This includes total quality management and verification of products specifications. *Regulatory transparency*, on the other hand, refers to requirements from public authorities including policy and legislation on, for example, product requirements. Public authorities demand disclosure of information to make sure regulations are followed. *Consumer transparency* is meant to reveal information about sustainable production processes and products to consumers as well as public and private certification bodies. This kind of transparency is often conducted through public or private labelling and certification. Lastly, *public transparency*, refers to information about sustainability being disclosed in wider public domain to publicly gain legitimacy on organization's actions, and to gain competitive advantage. This information is spread through organizations in the supply chain as well as consumers and other stakeholders, for example, via television programs or public projects. (Mol, 2015.)

Transparency can be advanced by reporting to stakeholders but also actively engaging stakeholders and using their feedback and input to improve supply chain processes (Carter & Rogers, 2008). There are many tools to sustainability reporting, which can be divided to

frameworks, standards, and ratings and indices. These tools help companies to demonstrate their results by measuring progress, outcomes, and goals. As an example, Global Reporting Initiative (GRI) has created a globally applicable sustainability reporting framework, that provides guidelines for companies to build their own reports. (Siew, 2015.) Labels and certifications are another prominent transparency activity. Some of the labels and certifications are regulatory based and compulsory while others are privately regulated and pressured. These labels and certifications give information about sustainability of products or its production with a symbolic token, such as the EU Ecolabel, or detailed product tag. (Mol, 2015.) All the transparency activities can be improved with both vertical coordination in supply chain and horizontal coordination across networks (Carter & Rogers, 2008). Standardization organizations, certification bodies verification institutes, auditors and stakeholder roundtables work as intermediaries between different companies and organisations to improve sustainability as well as ensure quality, reliability and credibility of information and the systems providing information (Mol, 2015).

2.3.3 Strategy

Strategies are vital for companies; they set direction for companies and help them manoeuvre through hardships. They also bring individuals in an organization to work towards common goals as a team. Strategy defines the organization and provides people inside and outside it with meaning and information about their goals and values. (Mintzberg, 1987.) Organization's sustainability actions should be closely part of their strategy rather than separated to its own program (Shrivastava, 1995b). This brings more meaning and reliability to the organization's sustainability initiatives and makes them part of core business values.

Strategy making can be divided into planned and emergent, but strategies often have characteristics from both ways. Planned strategy means a well-structured process starting from planning and ending in implementing the strategy throughout the organization. These planned strategies are usually implemented in a top-down manner, where top management is doing the planning. (Neugebauer, Figge & Hahn, 2016.) In opposite, emergent strategies come from bottom-up or undirected, creating always changing and ongoing decision-making

process (Regner, 2003; Hendry, 2000; Neugebauer, Figge & Hahn, 2016). Companies often create spaces for cross-functional employee-driven projects to improve bottom-up strategy making (Neugebauer, Figge & Hahn, 2016).

Strategies for sustainability should be done based on characteristics of the sustainability problem. Wicked problems have many solutions that cannot be fully understood or even predicted and solving them might lead to unforeseen consequences. (Rittel & Webber, 1973; Neugebauer, Figge & Hahn, 2016.) Salient problems, on the other hand, are problems, where powerful stakeholders can influence companies to address the problem. Solving the problem is seen as desirable by the public, or problem requires immediate attention and is critical for stakeholders. (Mitchell, Agle & Wood, 1997.)

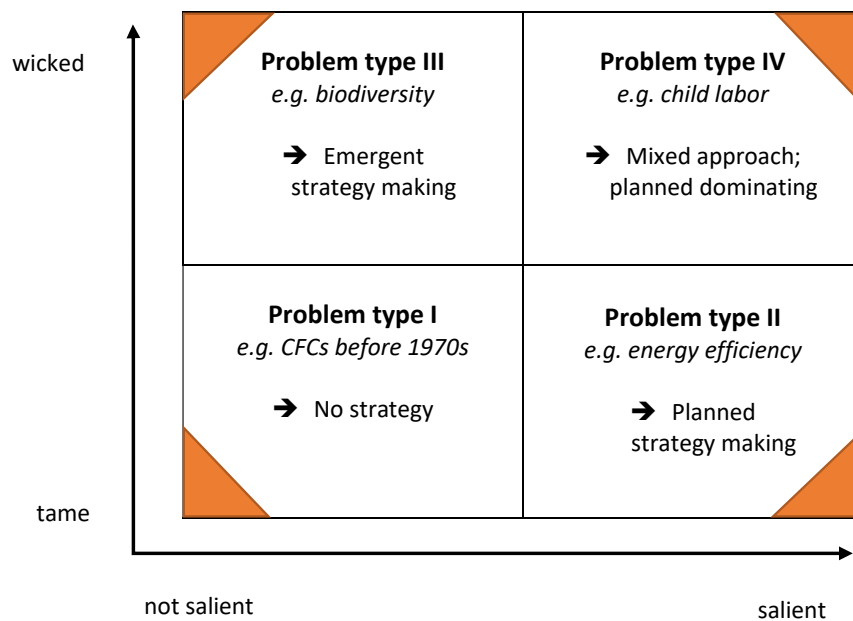


Figure 2 Sustainability problem types (modified from Neugebauer et al. 2016, pp. 332)

Figure 2 showcases two-dimensional division on different problem types made by Neugebauer et al. (2016), which show four problem types and propose strategy to use for each one. The figure showcases extreme examples since most real-world problems position somewhere in between the types. Type II, being salient non-wicked problems, are addressed by planned strategies, while Type III, being wicked non-salient problems, are addressed with

emergent strategies. Type IV, which has both salient and wicked characteristics, is likely to be addressed with both strategies, with planned strategy dominating. Planned strategies are often faster applied throughout the whole company and they might push aside possible emergent strategies being made, but there is also need for more problem-specific strategies which are often developed in emergent and local way. Type I, non-salient, problems are often not perceived as problems and strategy making is therefore not necessary. (Neugebauer, Figge & Hahn, 2016.)

2.3.4 Organizational culture

Organizational culture can be seen as set of values, beliefs, assumptions, and ways of thinking shared by organizational members, that influences employees work behaviour (Sheridan, 1992; Chatman & Jehn, 1994; Barney, 1986). Being sustainable organization isn't only about adding sustainability action on top of the old way of doing business, but rather shifting to a new mindset that alters everything done in the organization. Organizations that have clear vision, honest self-awareness, strong leadership and are thinking in long-term have better possibilities to success in sustainability. (Savitz, 2006.)

Having a clear vision of sustainability helps to see how the organization works within the larger social and natural world. Vision helps to bring the Triple Bottom Line to all the decision-making processes and activities in the whole organization. It also makes it easier for employees and stakeholders to understand and utilize the organizations sustainability goals. For companies to success in sustainability they need to be able have an environment where employees can bring up problems and those can be addressed rather than thinking that there are no problems, only opportunities. In other words, organization should be honest in self-awareness and create innovative environment where employees take initiative to develop new solutions to sustainability problems. (Savitz, 2006.)

Strong leadership comes from clear messages expressed in simple terms distributed throughout the organization and repeated many times in different ways. The top management needs

to be committed to the topic to be able to deliver sustainability goals and other messages effectively to the whole organization. Organizations need to think sustainability efforts in long-term to be able to answer to financial, environmental, and social crises that do not have easy solutions, such as global warming. (Savitz, 2006.) These long-term strategies should not be only internal but also implemented with partners and stakeholders that are part of organization's supply chains. (Fantazy & Tipu, 2019.)

2.4 Literature review on COVID-19's effects on SSCM

Even though COVID-19 is a relatively new phenomenon there is a lot of literature about its effects on SCM and how SCM could respond to it. Most of the literature considering SCM and COVID-19 are about food and healthcare industry, which comes from COVID-19's huge effect on demand in healthcare products and services as well as daily products when people moved from offices to working from home which led to high customer demand (Chowdhury et al., 2021). There have been some articles and research concentrating on SCM sustainability, which have focused on health and safety of employees and customers (Mollenkopf, Ozanne & Stolze, 2020; Hakovirta & Denuwara, 2020), responding and strategies (Butt, 2021; Sharma, Adhikary & Borah, 2020) and overall perspectives and learnings (Sarkis, 2020; Ishida, 2020). There are also articles on environmental sustainability (Barreiro-Gen, Lozano & Zafar, 2020), but it can be noted that there is lack of research especially on environmental and social sustainability (Chowdhury et al., 2021).

Sarkis (2020) argues, referring to previous crises, that the COVID-19 pandemic could lead to concentration on economic and social sustainability, while environmental sustainability might improve during the pandemic but fall after the economic rebound. These problems can already be seen in the public discussion, since emissions have gone down due to travel bans and other restrictions, but there are questions on how to prevent the rising of emissions when the world starts to go back to normal (Foster, 2021; UN Environment Programme, 2021). Many governments are proposing economic growth to be their main priority in recovering from the pandemic which leads to reducing of social and especially environmental sustainability goals. This is reflected in the companies' sustainability practices and deepens

companies' desire to put their economic goals above other goals, social practices coming as second before environmental sustainability in priority. (Sarkis, 2020; Lozano & Barreiro-Gen, 2021.)

Butt (2021) and Jabbour, Jabbour, Hingley, Vilalta-Perdomo, Ramsden and Twiggintroduces (2020) introduce strategies to build resilience and reduce the effects of COVID-19 on supply chains. Firstly, the research shows that companies should prioritize which of their production are more important for when they have shortage of direct material as well as inventory. They should also notice possible bottlenecks that could restrict the capacity and flow of production. Companies should have secondary suppliers to be able to secure production even if there are disruptions, but also focus on tier 1 suppliers with active communication and design alternative plans and strategies together. Collaborating brings resilience to supply chains and makes it easier to stay flexible. Companies can connect with their suppliers and other stakeholder in supply chains by organizing video meetings and workshops as well as by sharing expectations and progress. (Butt, 2021; Jabbour et al., 2020.) Sarkis (2020) adds that strategies and practices towards sustainability help with supply chain resilience, as an example, sustainability activities build trust in the surrounding community, and they encourage companies to have more local supply chains and 'buy local' attitude.

Organizations need to be able to transform crises, such as COVID-19, to their advantage and into an opportunity, where sustainability efforts made in the past decades are not forgotten, but rather highlighted (Barreiro-Gen, Lozano & Zafar, 2020). They should prioritise recovering and learning when forced under pressure and change the disruptions to a chance to improve their activities (Ali, Mahfouz & Arisha, 2017; Jabbour et al., 2020).

3. Methodology

This section introduces the research method used for this bachelor's thesis and data collected through it. The thesis is qualitative research which refers to a wide variety of approaches and methods used for the study of natural social life. Outcomes from analysing synthesis of data usually consist of essential representations and demonstrations of significant findings. (Saldaña, 2011.)

3.1 Research method

Research for this bachelor's thesis is conducted by using case study research, where the analysis focuses on a single unit, which can be, for example, one organization, one event or one group. A case could be chosen deliberately because it has unique characteristics, it can be chosen strategically since it represents a typical example or sometimes the case might be chosen for convenience when information is easiest to retrieve from certain case. Sometimes there can be multiple cases examined simultaneously or consecutively for comparison and contrast. (Saldaña, 2011.) Yin (2009, pp.4) states that case studies often emerge from "the desire to understand complex social phenomena." Using case study method allows researchers to maintain the holistic and meaningful characteristics of real-life events. (Yin, 2009.)

This case study is conducted with multiple-case design since it will give more compelling conclusions and results than a single case (Herriott & Firestone, 1983). The units of analysis are three Finnish industrial companies, named Company X, Company Y and Company Z, in the context of COVID-19's effects on SSCM. The cases have been chosen based on their similarity in the sense that they all work towards more sustainable world and provide industrial machines that help other companies do better in their sustainability. Cases are also chosen due to convenience since all the companies are based in Finland it is easier to retrieve information due to the geographical location. The location also forms good base for comparison since the companies operate in similar environment.

3.2 Data collection and analysis

Case study research provides data collection the opportunity to use multiple different sources of evidence (Yin, 2009). Research materials consist of interviews with three professionals, one from each of the companies X, Y and Z, working in the supply chain management field (Table 1) but also secondary material, such as the companies' sustainability reports and other material the companies have about their sustainability and supply chain management: websites and annual reports as an example. The main focus of the research is on the interviews, but other sources of material are used as addition to the information gathered. Secondary material is used in the research to increase validity, since it is used to ensure the information gathered from the interviews but also to find additional practices and focus points of companies supply chain management and response to COVID-19.

Table 1 demonstrates information about the case companies and interviewees. Company X is providing measurement solutions and is leader in the field. Company Y is manufacturing green technology as part of larger international technology company. Company Z is newly re-formed forerunner in sustainable technologies in their own field. All three of the interviewees work with supply chains in different positions on the top of the company. The interviews were semi-structured with questions decided advanced, while leaving room for clarifying questions and additional conversation about the topic. The interviewees were provided with a question frame, which consisted of nine questions (Appendix 1) providing the base for discussion of the topic of company's practices and actions in the field of supply chain management during and before COVID-19 as well as the interviewees opinions about the future of the field. This frame left room for additional questions made by the interviewer. The interviews were about 30 to 60 minutes long and were held via video meeting, which were recorded for further analysis. The interviews were then transcribed to make the analysis of material more efficient. The language used in the interviews and transcription is Finnish. The sustainability reports and other material used are from years 2019 to 2020, to focus on gaining information about companies SSCM actions before and during COVID-19.

Table 1 Company and interview information

Company	X	Y	Z
Industry	Environmental and industrial measurement	Green technology	Industrial machinery
Company size (number of employees)	About 2000	About 200	About 16 000
Company size (2020 revenue, €)	About 400 million	About 70 million	About 3 billion
Position of interviewee	Director of Demand Supply Chain Management	Vice President, Procurement	Vice President, Global Order and Data Management
Interview duration	about 50 minutes	about 25 minutes	about 20 minutes

To analyse the material, it is first coded to reduce the collected data to be more accessible for analysis and increases the quality of analysis as well as the findings. It allows more deep and thorough insights from the data while ensuring the transparency and validity of the research. Analysis uses deductive coding method and firstly reaches codes from theoretical framework, but in second and third cycles of coding the deductive codes are refined and categorized in different ways. (Skjott Linneberg & Korsgaard, 2019.) In the beginning the data is explored, as shown in Figure 3, through four codes derived from the theoretical framework, which are risk management, transparency, strategy, and organizational culture. After which the data is divided into more narrow codes inside these wider concepts. In addition, analyse finds information about the future of SSCM and general effects of COVID-19. In the end the four main codes mentioned earlier are divided in SSCM before COVID-19 and SSCM during COVID-19 categories to compare the data from different interviews and find results for the research questions.

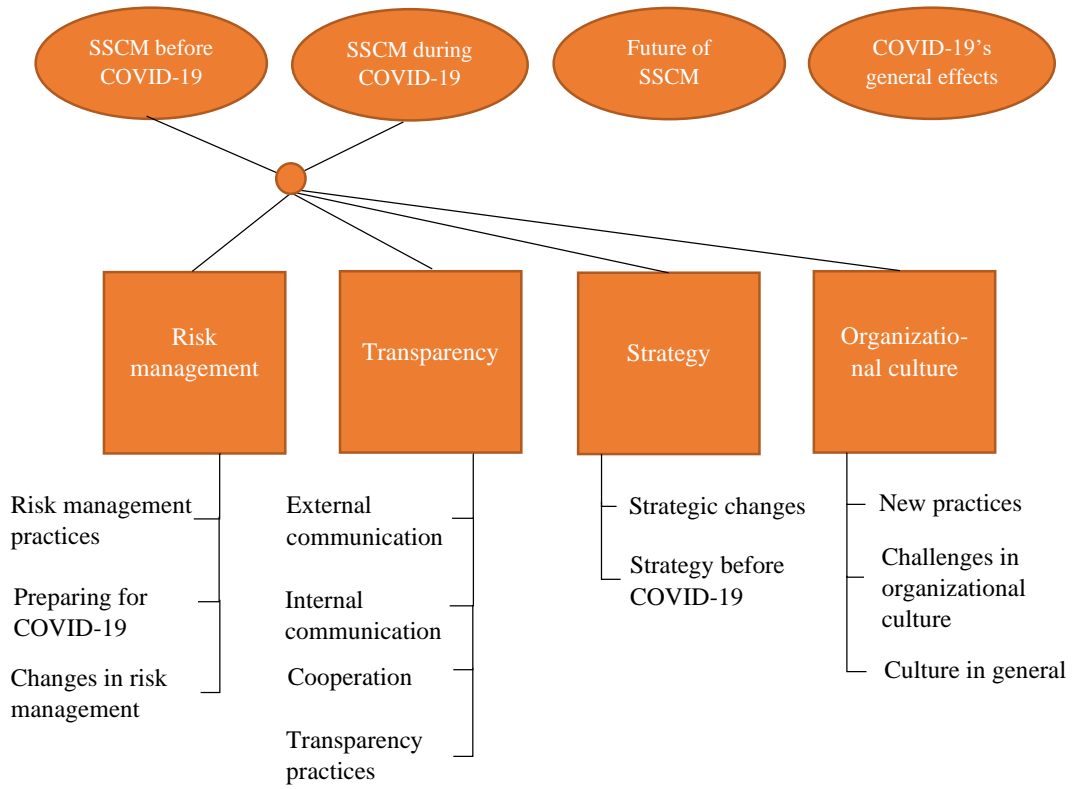


Figure 3 Coding method

4. COVID-19's effects on SSCM

The empirical analysis of the collected data is based on the coding introduced in the previous chapter. The analysis compares case companies' actions during and before COVID-19 in SSCM as well as the general effects it has had in SSCM and the future of SSCM. The analysis introduces and compares information gathered mainly from the interviews but also from companies own reports and websites.

4.1 General effects on SSCM

When talking about how the pandemic has affected companies' supply chains in general, interviewee X mentions logistic difficulties but also how their company has gone through a digital leap, which they see as a general trend. Companies have had to introduce different digital tools, such as digital whiteboards, to replace traditional tools in their daily work. Interviewee Y brings up three major problems COVID-19 has created in addition to the logistical challenges. In the beginning of the pandemic, they had *supply disruptions* due to suppliers having to close their facilities fully or partly. Due to the closing of some factories and delays in deliveries the demand for certain components and materials have risen, which has led to *availability challenges* and *rising prices*. Interviewee Z has noticed similar changes and problems, they explain how their suppliers have had problems with availability of labour, which has forced factories to close their functions. Interviewee Y also brings up that these problems have led to many additional actions outside the normal business functions, which have made the situation more challenging and overwhelming.

It can be seen that the main challenges the pandemic has brought to SCM are logistical problems, supply disruptions, availability challenges and rising prices. The logistical issues and their majority depend on what kind of logistical services the companies use and how far in the world their supply chains reach. Interviewee Y talks about problems in container traffic from Asia to Europe, while interviewee X mentions how the traveling restrictions have affected the air traffic and big part of freight have had to find another route. The problems

were not only in the sea freight or air traffic but, as interviewee Z mentions, the challenges also affect the road transport. Logistics has huge effect on all the other functions of the company and if the factory is not able to get their components or materials in time their production is delayed or even stopped. Even though the risks have been high, any of the case companies do not mention that they would have had to fully close production at any time of the pandemic.

Many suppliers, on the other hand, have had to close their facilities or in other ways reduce their production during COVID-19 which has led to supply disruptions. As mentioned earlier some suppliers have had problems with finding enough labor for their factories which has led to reduction of production or even closing of the factories. Interviewee Y mentions that the disruptions in their supply chains have been only brief, about couple of weeks, and these have decreased from the beginning of the pandemic. The availability challenges that have led to rising prices have affected all three companies. Companies mention that these challenges come from the high demand of materials and popular components. Interviewee X mentions that companies with bigger orders are able to get the most popular components since they might be able to buy the production of a whole factory while smaller companies, such as company X, struggle to find suppliers for the same components.

4.2 SSCM before COVID-19

Case companies' SSCM practices before COVID-19 is analysed based on the four supporting facets of TBL, which have been used as a base in coding of the material. The analysis focuses on finding similarities and differences between the case companies.

4.2.1 Risk management before COVID-19

The risk management practices for the case companies were similar, such as categorization, audits, and code of conducts. Especially companies X and Y but also company Z mention that many of their suppliers are near them in Finland and Europe, which makes it easier to

avoid certain risks especially in social sustainability, for example, child labour, due to strict laws in European Union. Interviewee X also adds that they have zero tolerance for severe problems in social responsibility as well as code of conduct violations and unethical behaviour. Supplier code of conduct, which most companies have, leads companies' suppliers in the right direction in their activities, it also provides base for companies to manage their suppliers. All three interviewees either mention supplier code of conduct or they explain about it in their annual reports or websites (Company Y, 2021; Company Z, 2019; Company X, 2019). They monitor suppliers' actions by doing audits in their facilities. Interviewee Y brings up that they have certain critical suppliers that could potentially bring risks to their SSCM, but these risks are recognised, and the suppliers more carefully monitored.

Categorization helps companies to identify the most important suppliers or materials and components, but also distinguish the ones that need more attention. In their categorization company Y has identified the suppliers that have the most severe effect in the production if there are delays and chosen backup suppliers to minimize the risk of production stopping. Interviewee X explains that they intend to build strong partnership and cooperation with the strategically important suppliers, where both sides benefit from the partnership, to ensure the continuation of the liaison and to get maximum benefit for both parties.

4.2.2 Transparency before COVID-19

Two out of the three case companies have sustainability and SSCM as part of their annual reports as well as their company websites. Company Y does not have their own reports as they are part of bigger international technology company, but they have information about their sustainability efforts in their websites. The parent company does not have SSCM as big part of their annual reports but have very comprehensive website about their sustainability as well as SSCM. Companies X and Z use the GRI standards to follow and report their sustainability, which provide information about their progress in sustainability efforts to their stakeholders, while company Y and its parent company use other certifications to showcase their sustainability. (Company Y, 2021; Parent Company Y, 2021; Company X, 2019; Company Z, 2019.)

Company X has very active sustainability efforts and interviewee X mentions that they do more than they tell outside the company, which speaks of passionate work towards sustainability. They provide their suppliers rules in their code of conducts and follow strictly if those are followed but also give their suppliers options and room for cooperation and discussion about used methods. Companies Y and Z also mention cooperation as part of their methods to keep their suppliers and stakeholders, including their employees as well as investors, informed about company policies and changes.

4.2.3 Strategy before COVID-19

The main strategic guidelines in the case companies come from the top management team, but there are differences on how much bottom-up based strategy making is enhanced in the organization. In company X top management listens to their personnel's requests and ideas mainly through representatives of different employee groups and provides flexibility, while setting the guidelines so that the practices used present similar values and goals. Their aim is to maintain good communication between different groups while keeping the main strategy similar in the whole company. As a smaller enterprise, company Y gives their managers more freedom to design strategies for SCM and the decision-making stays lower in the company making the organization more flexible. Company Z on the other hand, as a relevantly newly re-formed company, still has changing strategy making practices, but at the moment the teams can adjust what the strategies coming from the top mean in their work environment.

The companies have sustainability in the core of their business, and this can be seen in their strategies. They provide solutions to other companies to be better in their sustainability, which drives their own strategic choices towards sustainability. Interviewee Y tells that they rely on laws and United Nations Sustainable Development Goals in their strategic choices, and they expect that from their suppliers as well. All the companies have sustainability deep in their values which guides all their strategic choices. As an example, company X and Y have many suppliers near their factories which makes their supply chains more sustainable.

4.2.4 Organizational culture before COVID-19

Coming from the strategy and company values sustainability is embedded in the organization culture. Company Y is making products in the environmental technology area which leads to sustainability being part of employees' daily work and they represent the company's values in their work. Interviewees Z and X also talk about the sustainability being heavily part of their companies' daily culture.

Company X has non-hierarchical organization and endorses very open environment, where employees can convey their worries and feedback to the management through representatives, to keep sure their organization stays motivated. Interviewee Y thinks that Finnish companies have very flexible work models where employees have a lot of freedom in choosing how they want to work, which creates openness to the workplace and shows trust towards the employees.

4.3 SSCM during COVID-19

Next it is analysed how COVID-19 has changed the case companies SSCM practices. To help the comparison of differences before and during the pandemic, the practices are analysed based on the same viewpoints as in the earlier chapters.

4.3.1 Risk management during COVID-19

When COVID-19 started spreading around the world, it was hard for companies to predict what kind of changes it would bring with it and, as interviewee X pointed out, it was impossible to know how long the pandemic would last and how severe it would be. When it was seen that the pandemic would affect the flow of supply, company X started to increase their safety by advancing their orders and increasing their stock levels in the most critical materials. This is part of the companies' risk management that are utilized in the situations when needed. Interviewee Y brings up how it is important to have the actions planned in advance

to be able to prepare for the upcoming effects since it is too late to start creating backup plans when the supply chain is already disturbed. They remind that not many companies had this kind of pandemic in their risk assessments, and if they did it was unmarked and did not have much weight, which means that companies tried to forecast the course of the pandemic in their best knowledge and take actions that had originally been planned for different situations.

All three case companies have had good risk management and risk assessment before the pandemic since all three companies have had only minor changes in their risk management practices. For example, company Y has had more active approach to following their material and component orders. Companies have had to be more aware of the changes happening around them and follow how those are evolving. Interviewee Z brought up that they have had to be more aware of the economic risks in their supply chains, such as their stakeholders' solvency. One big change in the companies' risk management practices was that they were not able to travel to their suppliers' factories and perform audits, which has led to some companies choosing to do distance audits or not perform audits at all. Interviewee X explains how the distance audits were done through video meetings where the inspector is on the other end and personnel from the factory walked through the facilities and showed everything the inspector needed to perform the audit. Even though there is the opportunity of distance audits it is not always the best choice and interviewee Y reminds that most of the audits have not been held at all.

The pandemic has brought many changes to the way the companies assess their risks and what they see as important things. Interviewee Z mentions that they have started to think even more about the risk of having suppliers far away in, for example Asia, and is the risk worth taking. The trust in supply chains has grown to be more important factor than the price or timeline. Interviewee X mentions that the pandemic has brought new solutions and practices to their risk assessment, but also new requirements to their suppliers in, for example, sustainability and its reporting.

4.3.2 Transparency during COVID-19

There have not been too many changes to companies' transparency actions, they have all continued to report their sustainability and SSCM as usual (Company Y, 2021; Parent Company Y, 2021; Company Z, 2020; Company X, 2020). The interviews revealed that the cooperation and communication between the companies and their suppliers has grown and improved, as they have had to solve problems about COVID-19 together to be able to continue their partnership and keep up the set standards.

Communication with suppliers during the pandemic has happened through their usual meetings where the pandemic has become regular part of the discussions. Interviewee X reminds that they are not able to have meetings about the subject with every supplier but with the strategic suppliers the pandemic is part of the discussion. Interviewee Y brings up that the suppliers are not as interested in the company's activities as they are about the suppliers. On the other hand, as company Y, and the other companies, are only one part of the supply chain, their buyers are interested in if, for example, their own production is late. They add that the communication considering the COVID-19 is not as frequent as in the beginning of the pandemic. All in all, also interviewee Z thinks that the pandemic has had positive effect on communication between different stakeholders.

In internal communication the changes have been similar to the external communication. COVID-19 has been added to the daily communication, but according to interviewee X their meeting practices were changed to serve the whole company so that everybody was heard, and their worries considered. To reach everybody company X also conducted questionnaires about how their employees have survived during the pandemic and have the company's efforts towards everybody's safety and welfare being enough. The results revealed that they have succeeded.

4.3.3 Strategy during COVID-19

COVID-19 did not change the companies SSCM strategies in a big scale, but there were some smaller changes. Interviewee Z mentions that there were changes in strategic priorities, but the main strategic guidelines did not change much. Interviewee Y brings up that it is hard to build long-term strategy or plan for the pandemic since there is not knowledge about what kind of effects the pandemic will bring. Interviewee X mentions that their company did not try to prepare for every possible outcome in advance but rather have more reactive perspective on decision making and plan for shorter timeframe.

The strategic importance of sustainability has continued but interviewee Y mentions that it has not been the main priority during COVID-19, the concentration has rather been on keeping the supply chains flowing and the business going as normally as possible. On the other hand, interviewees X and Z tell that the sustainability strategies have continued as normal and there have not been big changes to priorities or the importance of sustainability. They also bring up that the economical side of sustainability has changed as the companies have ensured that their suppliers can keep their businesses running without having to close their facilities and the importance of getting low prices has decreased.

4.3.4 Organizational culture during COVID-19

The biggest effect on organization culture during the pandemic has been the change of working methods. Lockdowns and other restrictions have forced companies to close offices and switch to distance work. This has created many opportunities but interviewee X mentions that it has created challenges especially in introducing and training new personnel. Distance working creates boundaries between people and the work is not as interactive as in the office. Interviewee Y mention that people have not been able to travel between different offices or to their suppliers, which has also forced companies to find new ways to interact and solve problems. All the interviewees mention that despite of the challenges their communication has increased and there are more meetings held than before the pandemic.

Even though the pandemic has brought distance between people, interviewee X has noticed that people care more for each other since the pandemic has brought challenges to everybody. This has made the boundaries of hierarchy disappear or at least decrease. The company has also made sure that their employees are doing well and company X has conducted surveys to gain information about their employees' welfare but also about how the management of the company is working and they have received good feedback on their actions.

4.4 Future of SSCM

This chapter focuses on the interviewees' opinions and expectations for the future of SSCM practises. It focuses on the permanent changes that the pandemic has brought but also the general development of SSCM.

A bigger change that interviewees, especially interviewees X and Z, see in the future of SSCM is near sourcing coming more popular in companies. Companies are starting to discuss if the risk of having suppliers far away, for example in Asia, is worth taking when its more sustainable to have them closer to the factories, even if it would be more expensive. Interviewee X sees that this kind of sourcing is growing, and companies are already implementing it in their strategies. Interviewee Z continues to wonder if the price stays as determining factor when the uncertainty in the markets diminishes, even though the rise of sustainability might influence it towards the other direction.

Sustainability has been and is still growing in the field of SCM, and it is becoming more important part of all companies' values and strategies. Interviewees X and Z bring up carbon footprint and CO² emissions, which companies need to be able to measure since there are many carbon neutrality targets set by different parties, such as European Union and national governments. Sustainability and carbon neutrality are becoming bigger factors in supplier requirements and interviewee X predicts that subcontractors that have high sustainability standards will gain more contracts in the future. Societal pressure drives companies to pay

more attention to the ethical issues and both social and environmental sustainability problems interviewee Z states.

Interviewee Y sees that companies are now more aware of the global risks, such as the COVID-19 pandemic. These kinds of risks are discussed, and companies notice them in their risk assessment. They create backup and recovery plans for bigger supply chain disruptions that effect many different parts of the supply chains. The pandemic has increased awareness and reserve of global risks and problems that need to be addressed.

5. Discussion of the findings

Findings from the analysis are now discussed to find answers to the research questions. The main findings from case companies are presented in Table 2, to better understand the differences between companies and the supporting facets, which helps the discussion of the findings. To answer the research question, this chapter has been divided into two parts based on the secondary questions. The main question of the study is: “*How has COVID-19 affected sustainable supply chain management?*” and the secondary questions are: “*How has sustainable supply chain management changed compared to the time before COVID-19?*” and “*What does the future of sustainable supply chain management look like?*” Together the secondary research questions help to answer to the main question.

Table 2 Key findings

Time	Supporting facets	Company X	Company Y	Company Z
Before COVID-19	Risk management	-Categorization, audits, code of conduct -Near sourcing -Zero tolerance on code of conduct violations	-Categorization, audits, code of conduct -Near sourcing	-Categorization, audits, code of conduct -Near sourcing
	Transparency	-Sustainability part of reporting -GRI standards -Cooperation	-Sustainability in website -Other certifications -Cooperation	-Sustainability part of reporting -GRI standards -Cooperation
	Strategy	-Strategic decisions from top down: communication about decisions through representatives -Sustainability in the core of strategy	-Main strategic decisions top-down: managers have freedom in decision making -Sustainability in the core of strategy	-Strategic decisions from top down: teams can adjust to fit their work -Sustainability in the core of strategy
	Organizational culture	-Sustainability part of daily work culture -Non-hierarchical culture	-Sustainability part of daily work	-Sustainability part of daily work culture

Time	Supporting facets	Company X	Company Y	Company Z
During COVID-19	Risk management	-Increasing safety -Minor changes in risk management: distance/no audits, new requirements for suppliers	-Minor changes in risk management: active following of orders, distance/no audits	-Minor changes in risk management: more aware of the economic risks, distance/no audits, increase of near sourcing
	Transparency	-Cooperation and communication with suppliers developed, also internal -Questionnaires to employees	-Cooperation and communication with suppliers developed	-Cooperation and communication with suppliers developed
	Strategy	-Reactive perspective -Sustainability strategies continued normally	-Not big changes to strategy -Sustainability not priority	-Changes in strategic priorities -Sustainability strategies continued normally
	Organizational culture	-Distance work -Communication has increased -Taking care of each other	-Distance work -Communication has increased	-Distance work -Communication has increased
Future of SSCM		-Popularity of near sourcing -Sustainability becoming more important	-Being more aware of global risk	-Popularity of near sourcing -Sustainability becoming more important

5.1 Changes in SSCM due to COVID-19

COVID-19 has made companies more aware of global risks that can affect every aspect of organization and their supply chains. Usually, disturbances are local or affect only part of certain supply chains, but COVID-19 has shown that a global pandemic can have wide variety of effects in different companies. The case companies X, Y and Z have had many challenges during the pandemic, but the interviews left an impression that the problems have not been as severe as they could have been. Interviewee X brings up that their sales and market revenue have grown and improved despite the challenges.

The pandemic has made it clear how important good risk management and risk assessment are when planning company's future. Companies that are prepared for many different situations, survive even if there are bigger challenges or sudden changes in the supply chains and business environment. Trust in the supply chain brings assurance to the companies, and as Butt (2021) and Jabbour et al. (2020) pointed out in their research creating and maintaining partnerships is important part of surviving challenges that affect the whole supply chain, but also in preparing for the future challenges. Collaboration between companies bring resilience and flexibility to the supply chains (Butt, 2021; Jabbour et al., 2020), which makes it easier to answer to the changes occurring due to the pandemic.

The pandemic has not affected the companies' main strategies much but there have been changes in the priorities. Companies' sustainability actions continue to grow and develop in the background while the concentration has been on the continuity of supply chains, as Sarkis (2020) as well as Lozano and Barreiro-Gen (2021) discuss in their research economic and social goals are prioritised before sustainability when recovering from the pandemic. The course of the pandemic is hard to predict which has made strategy making difficult, but it has made short-term planning an important tool to secure companies' daily work.

The pandemic has forced companies to create new ways to work since the employees have not been able to be in the office for long times or visit partners. Video meetings have enabled active communication between partners but also internally in companies. Companies have been able to, for example, conduct audits to make sure that even when their suppliers have challenges, they work according to the given rules and provide assurance to their SSCM. The distance meetings create problems, such as boundaries between people, but they also provide opportunities to continue normal work. It has also shown that it is not necessary, for maintaining partnerships and good communication, to visit the suppliers and other partners as often as before the pandemic. The severity of the disease and not being able to see each other has brought up the importance of social sustainability and making sure that the employees are taken care of, not only in suppliers' factories, but also the companies' own

employees. It is important that companies ensure their employees welfare during challenging times because it can be seen in the whole company's prosperity.

5.2 Future of SSCM

Even though there have not been huge changes in SSCM, COVID-19 will leave its mark on the field and practices of SSCM. Based on the supply chain professionals' answers, importance of sustainability is growing when the awareness increases. The change happens in all three of the sustainability dimensions; economic, environmental, and social. Especially the environmental sustainability is growing at the moment and there are many targets that companies and other organisations work towards such as carbon neutrality. It is increasingly expected that suppliers take initial in sustainability matters and report their actions. The pressure for taking action comes from governments but also from the employees and consumers, as interviewee Z states.

One important change that is already occurring is the increase of near sourcing. Companies have become more aware of the risks in having global supply chains and interviewees expect them to start take more initial and considering what the priorities are in their supply chains and their sustainability. The distance meetings and other new methods of working together all around the world will definitely influence the choices companies are making. They provide companies better opportunities to communicate with their suppliers in the whole supply chain all around the world and make sure that the sustainability requirements are filled.

The pandemic brought quickly changing situations, that no one could have prepared for, to all around the world, but the companies and other organizations have learned from it as well as each other and these learnings are utilized in the future actions. Companies are going to be more aware of such risks as COVID-19 and they will be more prepared to global supply chain risks that could affect the whole organization.

6. Conclusions

The aim of this bachelor's thesis was to understand the effects of COVID-19 on sustainable supply chains in Finnish industrial companies through three case companies. Theoretical framework was based on the triple bottom line and Carter and Rogers (2008) framework for SSCM. This created a base for qualitative case study research that brought answers to the research question: "*How has COVID-19 affected sustainable supply chain management?*" Data for the research was collected mainly with interviews with company representatives from the field of SSCM.

The research provided very practical information about the pandemic's effects and changes in the industry, which could help practitioners to understand the phenomenon and utilize the information in their future actions. The findings brought up that COVID-19 has had many different effects to SSCM but the main themes in the industry have stayed the same. Main changes have been that companies are now more aware of the risks similar to the worldwide pandemic, and it has showed whether companies' risk management has been on good footing or is there a need for bigger change. It has also changed some practices for SSCM mainly due to restrictions in movement of people. Sustainability continues to be part of companies' strategies and its importance is predicted to be growing, even if it was not the main priority during the challenges of the pandemic.

There were few limitations to the study, which reflect in the reliability of the study. The data was based on only one person's perspective and opinions about the topic from each case company, with more interviews the scope of the research could have been wider. The interviews were not in balance in their length and depth, which brings a question if some of the interviewees' thoughts got more attention than others, which might put the case companies in uneven position. With more extensive data collection the reliability could be higher.

The findings cannot be generalized since the effects of COVID-19 are dependent of the industry but also company and the context they are working on. Another point is that these

companies have had sustainability as part of their work for many years so the changes are probably not as big as on a company that would have been only starting their sustainability practices in the beginning of the pandemic. COVID-19's effects on the case companies can still change and vary since there is not knowledge about the future of the pandemic.

There are many future research opportunities in this topic. The case companies could be studied to more extent in the same topic, or in a more specific area, such as the logistical issues due to COVID-19. The pandemic's effects on SSCM could be studied from many other points of views and different industries and markets. There are many opportunities for research since the topic has not been covered in much detail.

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Appendices

Appendix 1 Interview questions / Haastattelu kysymykset

- 1. How has COVID-19 affected your company's supply chains?** / Millä tavoin korona on vaikuttanut yrityksen hankintaketjuihin?
- 2. How has COVID-19 affected your relationships with suppliers and partners?** / Miten korona on vaikuttanut suhteisiin toimittajien ja muiden yhteistyökumppaneiden kanssa?
- 3. How have you kept your stakeholders informed about the changes due to COVID-19?** / Miten sidosryhmät on pidetty ajantasalla koronaan liittyvissä asioissa ja muutoksissa?
- 4. What kind of risk management the company has regarding supply chain management and how it affected (or helped) during the pandemic?** / Millaista riskienhallintaa yritys toteuttaa hankintaketjujen johtamisessa ja miten se on muuttunut pandemian myötä?
- 5. Have the sustainability priorities changed in your company due to COVID-19? More specific, how was social/economical/environmental side of sustainable practices affected?** / Ovatko kestävyys prioriteetit muuttuneet COVID-19 myötä? Tarkemmin sanottuna, onko sosiaalinen/taloudellinen/ympäristö kestävyys toimet muuttuneet?
- 6. What kind of strategy did you take on tackling the sustainability management during the pandemic?** / Millainen strategia teillä on ollut kestävyys johtamisessa pandemian aikana?
- 7. How has pandemic affected your organizational culture in the sustainable supply chain management context?** / Kuinka pandemia on vaikuttanut yrityskulttuuriinne kestävä hankintaketjujen johtamisen näkökulmasta?

8. Do you think there has been some changes that will not go back to, so called, normal after the pandemic is over? What are these? / Mitä mieltä olet, onko pandemian vuoksi tapahtunut joitain muutoksia, jotka eivät palaa enää niin sanottuun normaaliin?

9. What is your own opinion on what the sustainable supply chain management field will look like in the future? What will be the main priorities, are there some big changes coming? / Sinun omasta mielestäsi miltä kestävä hankintaketjujen johtaminen tulee näyttämään tulevaisuudessa? Mihin keskitytään, onko jotain isoja muutoksia tulossa?