



Supplier risk management in Finnish industrial companies during COVID-19 pandemic

Lappeenranta–Lahti University of Technology LUT

Bachelor's Programme in Business Administration, Bachelor's thesis

2023

Oskari Hiltunen

Examiner: Junior Researcher Aleksi Harju

ABSTRACT

Lappeenranta-Lahti University of Technology LUT
LUT Business School
Business Administration

Oskari Hiltunen

Supplier risk management in Finnish industrial companies during COVID-19 pandemic

Bachelor's thesis

2023

36 pages, 2 figures, 3 tables and 1 appendix

Examiner: Junior Researcher Aleksi Harju

Keywords: supply management, risk management, supply disruption

The recent effects of COVID-19 pandemic have caused major disruptions in the sphere of international business. Due to these disruptions companies and organizations have been forced to re-think about their risk management processes in a more strategic manner. Supplier risk management (SRM) focuses on upstream supply management by identifying, assessing, responding to, and monitoring possible supplier related risks that may cause the organization to be more vulnerable to disruptions. To effectively manage supply risks, companies integrate SRM processes in their purchasing decisions to mitigate potential risks and to allocate appropriate resources to effective use.

This bachelor's thesis focuses on providing insight on how companies can reduce the risk involved in their supplier selection with their purchasing decisions thus creating a more resilient businesses against supply disruptions. The theoretical framework of this thesis has been created through previous research on supply risk management. The empirical evidence presented in the thesis was collected through qualitative semi-structured interviews gathered from company representatives. The case companies are Finnish industrial companies.

The findings indicate that comprehensive SRM practices are essential in reducing the effects of a disruption on an organization. In order for SRM to be effective organizations must cooperate with suppliers to create common goals that benefit both parties and protect them from disruptions. Findings also indicate that dynamic and proactive management methods are becoming increasingly frequent due to the effects of COVID-19.

TIIVISTELMÄ

Lappeenrannan-Lahden teknillinen yliopisto LUT

LUT-kauppakorkeakoulu

Kauppätieteet

Oskari Hiltunen

Toimittajariskien hallinta Suomalaisissa teollisuusyrityksissä COVID-19 pandemian aikana

Kauppätieteiden kandidaatintyö

2023

36 sivua, 2 kuvaa, 3 taulukkoa ja 1 liite

Tarkastaja: Nuorempi tutkija Aleksi Harju

Avainsanat: hankintojen hallinta, riskinhallinta, toimitus disruptio

Viimeaikaiset COVID-19 pandemian seuraukset ovat aiheuttaneet merkittäviä disruptioita kansainvälisessä kaupassa. Näiden disruptioiden ansiosta yritysten ja organisaatioiden on tullut ajatella riskinhallinta prosessejaan strategisemmasta näkökulmasta. Toimittajariskien hallinta keskittyy toimitusketjun ylävirtaan, jossa pyritään tunnistamaan, arvioimaan, reagoimaan sekä hallitsemaan mahdollisia toimittajiin liittyviä riskejä, jotka saattavat saattaa organisaation haavoittuvaiseen asemaan. Hallitakseen toimitusriskejä tehokkaasti yritykset integroivat toimittajariskien hallintaprosesseja hankintapäätöksiinsä riskien lieventämiseksi ja resurssien kohdentamiseksi tehokkaaseen käyttöön.

Tämä kandidaatintutkielma keskittyy luomaan käsityksen siitä, miten yritykset voivat vähentää riskejä toimittajavalinnassaan hankintapäätösten avulla ja siten luoda kestävämmän pohjan liiketoiminnalleen disruptioita vastaan. Tämän tutkielman teoreettinen viitekehys on luotu aiempien tutkimusten pohjalta, jotka keskittyvät toimitusketjun riskinhallintaan. Empiirinen näyttö, joka esitetään tutkielmassa, on kerätty laadullisilla puolistrukturoiduilla haastatteluilla yritysten edustajilta. Case-yritykset ovat suomalaisia teollisuusyrityksiä.

Tutkimuksen päälöydökset osoittavat, että kattavat toimittajariskien hallintamenetelmät ovat välttämättömiä organisaatioon kohdistuvien häiriövaikutusten vähentämisessä. Jotta toimittajariskien hallinta olisi tehokasta on organisaatioiden on tehtävä yhteistyötä toimittajien kanssa luodakseen yhteisiä tavoitteita, jotka hyödyttävät molempia osapuolia ja suojaavat heitä häiriöiltä. Löydökset osoittavat myös, että dynaamiset ja proaktiiviset riskinhallintamenetelmät ovat yleistyneet COVID-19 pandemian vuoksi.

Table of contents

1. Introduction.....	1
1.1 Background.....	2
1.2 Research objectives.....	3
1.3 Structure of the thesis	5
2. Theoretical framework.....	6
2.1 Supply chain management.....	6
2.2 Purchasing and supply management.....	9
2.3 Supplier risk management	10
2.3.1 Supply risks.....	11
2.3.2 Supplier risk management process.....	12
2.4 Kraljic’s purchasing portfolio matrix	15
3. Methodology.....	18
3.1 Data and data collection.....	18
3.2 Analysis	19
4. Results and findings.....	21
4.1 Initial risk management processes	22
4.2 Risk management methodology.....	24
4.3 Future of supplier risk management	26
5. Discussion and conclusions	28
5.1 Implications	30
5.2 Limitations and reliability.....	31
5.3 Future research.....	32
References.....	33
Appendices.....	36

Appendices

Appendix 1. The interview questions

Figures

Figure 1. Theoretical Framework

Figure 2. Risk Management Process

Tables

Table 1. SCM Definitions

Table 2. Kraljic's Purchasing Portfolio Matrix

Table 3. Company Comparison

ABBREVIATIONS

SRM Supplier risk management

SCM Supply chain management

KPM Kraljic's purchasing portfolio matrix

PSM Purchasing and supply management

1.Introduction

Global shortages of components, materials and supply chain problems have caused the flow of goods to hinder in the trails of a world that is getting back to its former state. It has been 5 years since the global COVID-19 pandemic struck the world. The pandemic has caused over 6.8million deaths worldwide and reported cases have risen to over 740million globally (WHO, 2023). Moreover, the pandemic has caused major disruptions on businesses, with other industries and fields of business suffering more than others. Along with the pandemic the world has been affected with the crisis between Russia and Ukraine. The war that started in February of 2020 has caused major concerns in Europe as the gas and oil resources of Russia have been placed under sanctions and thereby affecting over 700million people and thousands of businesses in Europe (MFAF, 2023). In addition, the shortage of Ukraine's massive grain supply due to the war has also resulted in rising prices of various products and commodities (Financial Times, 2022). Even though the world has begun its recovery towards normality and towards its former state the supply-side effects of the pandemic are still prominent in the sphere of national and international business.

The pandemic has caused disruptions in the supply chains globally (World Bank, 2023). Companies have been under severe pressure to maintain their core operations and in managing their stakeholders' expectations due to fluctuations in supply. Suppliers in countries such as China have experienced significant lock down procedures that have caused the manufacturing to halt (PWC, 2023). Ports have also been closed due to the pandemic, which has caused a shortage in shipping containers which in return has caused longer lead times, delayed deliveries, and elevated freight rates (MacroMicro, 2023). To understand the changes and consequences of the COVID-19 pandemic has had this bachelor's thesis examines how supplier risk management has changed especially in industrial companies as they have suffered the some of the most significant changes in their business environment.

This bachelor's thesis consists of three sections, which are named as theory and literature review, methodology and empirical section. Primarily, Kraljic's portfolio matrix is discussed throughout the theory section along with supply chain and supply risk as core concepts. The methodology section brings forth the research methods used to gather the data for this bachelor's thesis. Moreover, it provides information about the companies in which the thesis focuses on. Lastly, the empirical section dissects the results of the conducted research and provides answers to the research questions at hand. The results are also presented in the conclusion section along with ideas and suggestions for further research.

1.1 Background

Suppliers and supply risks have raised a great deal of attention in recent years with COVID-19 related news and because it has affected the field of business extensively. However, global disruptions in supply chains are not a new phenomenon. The world has experienced multitude of different crisis's that have affected supply chains in the form hurricane Katrina, floods and fires that have destroyed entire factories and caused the flow of goods and components to halt. Supply chain management, and especially supplier risk related studies have however been around for years, for example Kraljic published a study that focused on purchasing portfolio management in businesses 50 years ago (Kraljic, 1983). Supply chain management (SCM) includes multiple different facets that can be condensed to the following definition. Supply chain can be described as a network of three or more entities, which may include organizations or individuals, that are involved in the direct upstream and downstream movement of products, services, finances, and/or information from a source to a customer. (Mentzer et al., 2001, 4). According to Chopra and Meindl (2016, 4) SCM can also be defined as the management of the flow of goods and services, including the movement and storage of raw materials, work-in-process inventory, and finished goods, from the point of origin to the point of consumption. It involves coordinating and integrating the activities of suppliers, manufacturers, distributors, retailers, and other participants in a supply chain to optimize the overall efficiency and

effectiveness of the supply chain. As the world has been affected by the pandemic the risks related to SCM have become a reality. Therefore, risk management has become highly prevalent in today's business environment.

Supplier risk management (SRM) is an essential process that involves identifying, assessing, and mitigating potential risks that may arise from the interactions with suppliers (Hallikas et al., 2004, 48). As the supply chain ecosystem is becoming increasingly complex businesses are dealing with suppliers spanning the globe with various regulations, cultural differences, and economic disparities. Consequently, businesses are exposed to various forms of risks, such as financial risks, operational risks, reputational risks, and strategic risks (Fan & Stevenson, 2018, 216). In today's interconnected world, supplier risks can also lead to cybersecurity threats, intellectual property violations, and geopolitical uncertainties. Hence why effective supplier risk management is critical for businesses to ensure continuity that mitigates potential disruptions, protects their reputation, and complies with regulatory requirements. This requires a holistic approach to risk management, where businesses need to proactively assess supplier risks, establish risk tolerance levels, monitor supplier performance, and continuously update their risk management strategies to address emerging risks that might potentially have negative impacts on their business (Hallikas et al., 2004, 57). Kähkönen and Patrucco (2022, 4) also suggest that companies should improve their capability to absorb (e.g., resilience), respond (e.g., contingency plans) and learn from previous disruptions to minimize future repercussions.

1.2 Research objectives

The aim of this bachelor's thesis is to examine and understand supplier risk management during and after COVID-19. It is highly important to understand the effects that the pandemic has had on companies to increase understanding about supply chain disruptions to avoid same mistakes and to change the way of operating for the better in the future. Furthermore, this thesis examines different methods and tools that companies can utilize to make their risk management processes more resilient to disruptions. The results of this thesis highlight important considerations for supplier risk management in industrial companies about their vulnerabilities in their supply

chain. Therefore, risk management has become increasingly relevant for businesses since the world has experienced a global supply chain disruption that has caused manufacturing firms around the world to suffer from shortages of components and raw materials.

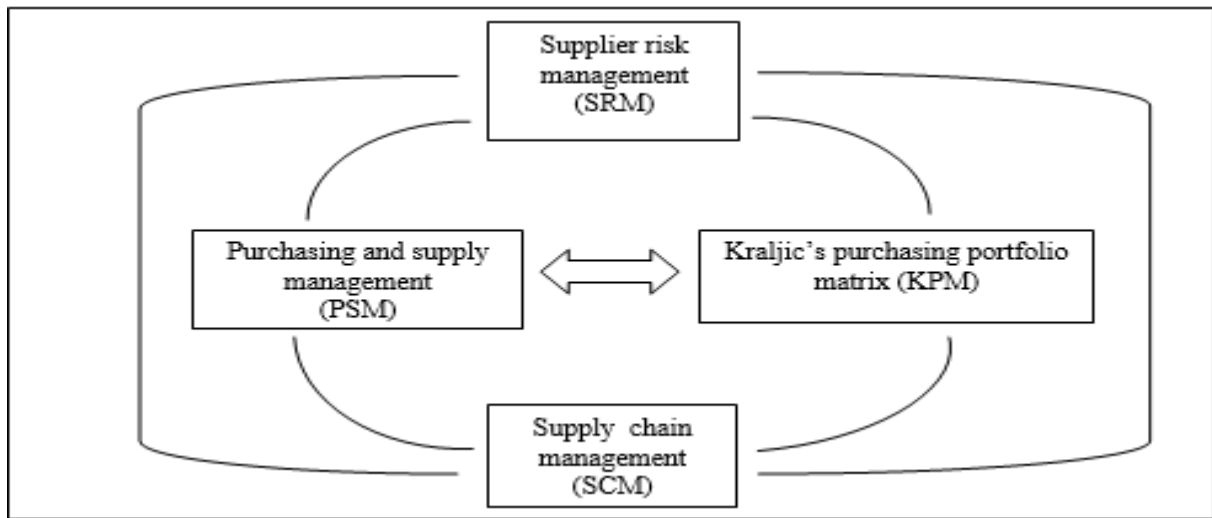


Figure 1. Theoretical framework

Finding methods that could be utilized and sustained in SRM is the most effective method of integrating them for companies. Especially risk related management methods (e.g., contingency and mitigation plans) are integrated more effectively once they have been communicated between parties through joint effort, although there still are systematic risks (e.g., economic downfall, inflation) that cannot be completely eliminated nor controlled (e.g., accidents) (Zsidisin, Panelli & Upton, 2000, 190). The thesis has three research questions that consist of one main research question and two secondary questions. The purpose of these questions is to provide the reader with a comprehensive understanding of the main issues in supplier risk management during the COVID-19 pandemic.

The main research question for this study is:

How has COVID-19 affected supplier risk management?

The secondary questions consist of:

1. How has supplier risk management changed?

2. How is supplier risk management expected to change in the future?

The research consists of a theoretical and empirical section. In order to answer the main research question, a theoretical framework is presented in Figure 1. The thesis will focus on two publicly traded Finnish industrial companies that operate in the field of manufacturing, machinery, tools as well as services to display the effects of COVID-19 for businesses located in Finland during the pandemic. The sample firms are all based in Finland but operate globally due to the nature of their business. Both sample firms have obtained extensive experience from working with foreign suppliers as SCM and SRM are an integral part of their operations.

The thesis reviews and focuses on the years between 2020 and 2023, but additionally examines the possible future implications to SRM. The timeframe has been chosen due to the concentration of COVID-19 pandemic and the early recovery stages of the pandemic in order to review the actions that firms have performed.

1.4 Structure of the thesis

This bachelor's thesis consists of three sections, which are named as theory and literature review, methodology and empirical section. Primarily, Kraljic's portfolio matrix is discussed throughout the theory section along with supply chain and supply risk as core concepts. Methodology section brings forth the research methods used to gather the data for this bachelor's thesis. Moreover, it provides information about the companies in which the thesis focuses on. Lastly, the empirical section dissects the results of the conducted research and provides answers to the research questions at hand. The results are also presented in the conclusion section along with ideas and suggestions for further research.

2.Theoretical framework

This chapter explains the general concepts of SCM and SRM, and Kraljic's purchasing portfolio matrix (KPM) along with supporting concepts and previous literature on risk management. The material will be constructed into one framework, explaining the fundamental theories related to this thesis. When defining the key aspects (e.g., SCM, SRM and KPM) it is paramount to understand that all three concepts are extremely broad areas of research that this thesis cannot cover entirely as this framework focuses on the methods of risk management of these phenomena.

2.1 Supply chain management

Supply chain management (SCM) is a crucial aspect of modern-day business operations. As the world has become increasingly connected due to global trade it is inevitable for companies to focus on their supply chain operations as they play a significant role in business. According to Cooper, Lambert & Pagh (1997, 1) it is a strategic approach to managing the flow of goods, services, and information within and among organizations, with the aim of improving efficiency, reducing costs, and enhancing customer satisfaction. SCM includes a multitude of activities such as sourcing, production planning, inventory management, logistics and distribution of goods. The main objective of SCM is to ensure the availability of produce in the right places in the right time whilst achieving the lowest possible cost. For SCM to be effective and efficient Cooper (Cooper et al, 1997, 6) and Kraljic (1983, 116) state that companies must integrate different functions (e.g., marketing, sales, sourcing) within the organization in addition to collaborating with suppliers, manufacturers, and stakeholders.

As mentioned before SCM includes many different aspects that have to be managed in a cohesive manner in order for the supply chain to operate efficiently. Sourcing and procurement refer to the process of purchasing products from suppliers and to the selection of suppliers. Common sourcing and procurement practices include tendering suppliers with different requirements such as price, quality, reliability, and code of conduct auditing (Hugos, 2018, 43).

Production planning on the other hand deals with internal manufacturing and external manufacturing planning practices of the supplier. Making sure the manufacturing is efficient is an essential part of supply management as it ensures that the flow in production of goods is steady and without unnecessary disruptions. The trend of manufacturing for the last decade has been that companies outsource their manufacturing to suppliers in developing countries in order to reduce costs, which in return brings up new variables that companies have to assess. Inventory management is closely tied with production planning as they both control the flow of goods. Moreover, inventory management plays a significant financial role as companies do not want to have excess produce stocked in warehouses as they can cause costs that hinder profits (Hugos, 2018, 197). Logistics are responsible for the movement of goods and information from point A to point B. It involves planning, controlling, and implementing procedures that allow the flow of goods to be uninterrupted as they are transported for the end consumer (Menzer et al, 2001, 16). Recent events such as the blockage of Suez canal in 2021 has demonstrated that managing logistics is highly important because if the flow of goods is interrupted it may cost companies millions in a very short timeframe. Distribution ties in very closely with logistics as they both are responsible for the handing out of goods for the end consumer as it is essentially logistics in action, which involves inventory management, warehousing and packaging that together dictate how products will end up from the manufacturer to the point of sale. For the purpose of the thesis the main focus will be on upstream (e.g. inbound supply) supply chain where organizations work with suppliers to manage the flow of goods.

Monezeka, Trent, and Handfield (1998)	SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, “whose primary objective is to integrate and manage the sourcing, flow, and control of materials
---------------------------------------	---

	using a total systems perspective across multiple functions and multiple tiers of suppliers”
La Londe and Masters (1994)	Supply chain strategy includes:” ...two or more firms in a supply chain entering into a long-term agreement: ... the development of trust and commitment to the relationship; ... the integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process.”
Stevens (1989)	” The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost.”
Houlihan (1988)	Differences between supply chain management and classical materials and manufacturing control: “1) The supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas such as manufacturing, purchasing, distribution, and sales. 2) Supply chain management calls for, and in the end depends on, strategic decision making. “Supply “is a shared objective of

	practically every function in the chain and is of particular strategic significance because of its impact on overall costs and market share. 3) Supply chain management calls for a different perspective on inventories which are used as a balancing mechanism of last, not first, resort. 4) A new approach to a system is required – integration rather than interfacing.”
Jones and Ripley (1985)	”Supply chain management deals with the total flow of materials from suppliers through end users...”
Cooper et. al. (1997)	Supply chain management is ”...an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user.”

Table 1. SCM definitions – applied from Menzer et. al (2008)

2.2 Purchasing and supply management

Organizations manage the resilience of their procurement operations through purchasing and supply management (PSM). Purchasing management involves the management of external resources such as goods, services and information that are required to operate the essential functions of an organization at the most favorable conditions according to van Weele and van Raaij (2014, 57). PSM enables purchasing parties to identify upstream supply issues related to suppliers by implementing sophisticated purchasing processes and thus making more strategic purchasing decisions and thereby improving supply resilience.

As mentioned before supply management involves two parties in the form of the purchaser and the supplier. For PSM to be effective the purchasing organization must be aware of both internal and external factors and events that may affect the flow of supply. The internal part evolves around the information flow within the purchasing organization. Szwejczewski et al., (2005) state that by transferring and providing information about the supplier's ability, capacity, prices, and financial situation for other important functions within the organization managers in different positions are able to make effective and more informed decisions. External purchasing management deals with upstream supply decisions that are meant to make purchasing methods more effective (Foerstl et al., 2010). The external side of purchasing management considers various factors such as risk management in the form of alternative suppliers and risk contingency plans. These functions are in place for the company to effectively respond and recover from possible disruptions by proactively assessing their business environment and thus improving their supply resilience (Pereira et al., 2020).

2.3 Supplier risk management

Supplier risk management (SRM) is a crucial process for any organization to ensure the continuity of supply chain operations. It involves the identification, assessment, and mitigation of risks associated with a company's suppliers (Hallikas et al., 2004, 52). To understand supplier risk management, it is imperative firstly to understand how risk itself is defined. It is widely accepted amongst economists that risks can be defined as unwanted events or outcomes that can have negative (e.g., financial losses) impacts on the business. Since the supply chain is a complex system risks present themselves in different forms. Hence why supplier risks can manifest in various forms such as financial instability, quality issues, delivery delays, compliance violations, natural disasters, and geopolitical risks. The goal of SRM is to safeguard the organization from the potential negative impacts of supplier-related risks on its operations, reputation, and financial stability. Therefore, effective SRM requires a proactive and strategic approach to mitigate both internal (e.g., ineffective management) and external risks (e.g., supplier related risks), monitor supplier performance, and maintain a collaborative relationship

with suppliers (Hallikas et al., 2004, 57). Jüttner et al (2003) also note that “It has been shown that collaboration with suppliers in terms of risk management (identification, information sharing, continuity planning) is vital in effective supply chain risk management”.

2.3.1 Supply risks

Supply risk is defined by Zsidisin (2003) as “...the probability of an incident associated with inbound supply from individual supplier failures or the supply market occurring, in which its outcomes result in the inability of the purchasing firm to meet customer demand or cause threats to customer life and safety”. Therefore, supplier risk management can be defined along the same lines as the process of identifying, assessing, and mitigating risks associated with the company’s suppliers. Supply risks includes multiple different facets of risk that a company must consider when choosing a supplier. These risks consist of operational, financial, environmental, reputational, legal, and political risks (Manuj and Menzer, 2008, 138-139). Operational risk, also known as internal risk, refers to risks that may arise from the operational view of the supplier or the organization itself. This includes quality control issues, stoppages in production due to machine breakdowns and logistical disruptions that can affect the flow of goods. Financial risks arise when the suppliers experience financial difficulties, such as bankruptcy. This can possess a significant threat to the company as it may have allocated a substantial amount of its business operations to a certain or several other suppliers. Environmental risk like earthquakes, tsunamis or floods are understandably very difficult to predict but they still possess a constant threat for businesses and therefore must be taken in to account as they can also affect the logistics and flow of goods. The importance of managing reputational issues such as poor quality and unethical behavior has become more important than ever due to the rising popularity of social media exposure and human rights issues. Reputational misconduct may cost businesses a substantial amount of customers along with fines or legal fees and therefore they should not be taken lightly. Legal risks refer to changes in regulation along with legal disputes. Regulation changes can have major consequences for companies and may force them to move their production elsewhere or even halt their operations entirely (Manuj et al., 2008). Political risks

such as instability of the area or a country, different crises such as war or conflict poses a major concern for companies. Lately sanctions placed on Russia have affected thousands of companies across the world due the war between Ukraine and Russia, not to mention international and local businesses located in Ukraine. These are the fundamental risks and risk factors that companies have to mitigate and work with when selecting suppliers. As Zsidisin et al. (2000, 189) note, one or the other is no more important as the risks together form a unique profile of importance for the company in their respective field of business.

2.3.2 Supplier risk management process

As business has become more global than ever risks must be monitored by different measures within the organization itself. First step towards effective SRM is to identify potential risks connected to existing or potential suppliers. This can be done through a combination of data analysis, supplier surveys, and external research. Once risks have been identified, they can be assessed based on their likelihood and potential impact (e.g., financial, reputational, legal). As the risk have been identified and analyzed the organization must mitigate the possible risks. This phase consists of actions to develop a risk mitigation plan, which may involve working with suppliers to address specific issues, diversifying the supplier base, or developing contingency plans in case of disruptions (Zsidisin et al., 2000, 190). Ongoing monitoring is also critical to ensure that risks are being effectively managed and new risks are identified in a timely manner. By monitoring potential risks companies are able to gather data to support and improve their methods of managing future disruptions. Since supply and supplier risks can come in many forms, including financial instability, quality issues, delivery delays, compliance violations, natural disasters, and geopolitical risks. Like supply risks, supplier related risks can be classified to quantitative and qualitative risks (Manuj et al., 2008, 137). Quantitative risks refer to losses such as stockouts or sparse availability of components. Qualitative risks can be defined as lack of reliability, or quality in produced goods. Different organizations and companies can have varying views, interpretations and needs regarding SRM practices which in return can cause the aspects of risk management to differ between different industries.

SRM is an essential component of supply management and can help companies to reduce costs, improve efficiency, and thus enhance their overall resilience. A well-designed supplier risk management program can help companies to avoid costly disruptions, maintain quality standards, and protect their reputation in the marketplace (Roehrich, Grosvold & Hoejmoose, 2014, 697-698).

Hallikas (2004, 52) introduces four supporting facets of risk management to define the SRM and risk management process in general. The four supporting facets consists of, identification, assessment, response and monitoring facets which are all essential parts of SRM (Figure 2.). Even though the practices are presented individually, there are connections between all four, and some also overlap within categories.

Risk identification refers to the process that companies perform in order to reduce the uncertainty of economic losses or gains. From the SRM perspective, companies are faced with multiple different variables that may cause other suppliers to be riskier than others and therefore cause losses or in worst case scenario customers. Different actions like auditing and compliance checks are a part of the risk identification process and provide valuable information about the suppliers. Factors like culture, logistics, quality, and environment are some of the most common factors that companies have to assess when trying to prevent unwanted risks from becoming reality when selecting suppliers.

Supplier based risks are external uncertainties that companies must address along with internal risk factors. External risks such as supply, demand, environmental and business risks are not controlled by the company and therefore pose a substantial uncertainty and demand extensive communication between both parties according to Hallikas (2004, 52). Moreover, external risks are often very difficult to predict because they often are connected to multiple different issues such as political decisions along with legal and environmental changes.

Internal risks, also known as operational risks, refer to risks that can be controlled, analyzed, and minimized by the company internally. These risks consist of mitigation, manufacturing, planning and control risks as well as contingency risks (Manuj et al., 2008, 139). These risks can be identified, monitored, and controlled by the company and thus create an urgency to fix any issues that may arise. Even though internal risks can be monitored there is still uncertainty

involved due to human error. Uncertainties like miscalculated forecasting, planning or contingency plans may prove to be costly if they become a reality. This can be seen across the world yearly as companies have faced changes in demand as well as supply and therefore have suffered significant losses, especially during and after COVID-19.

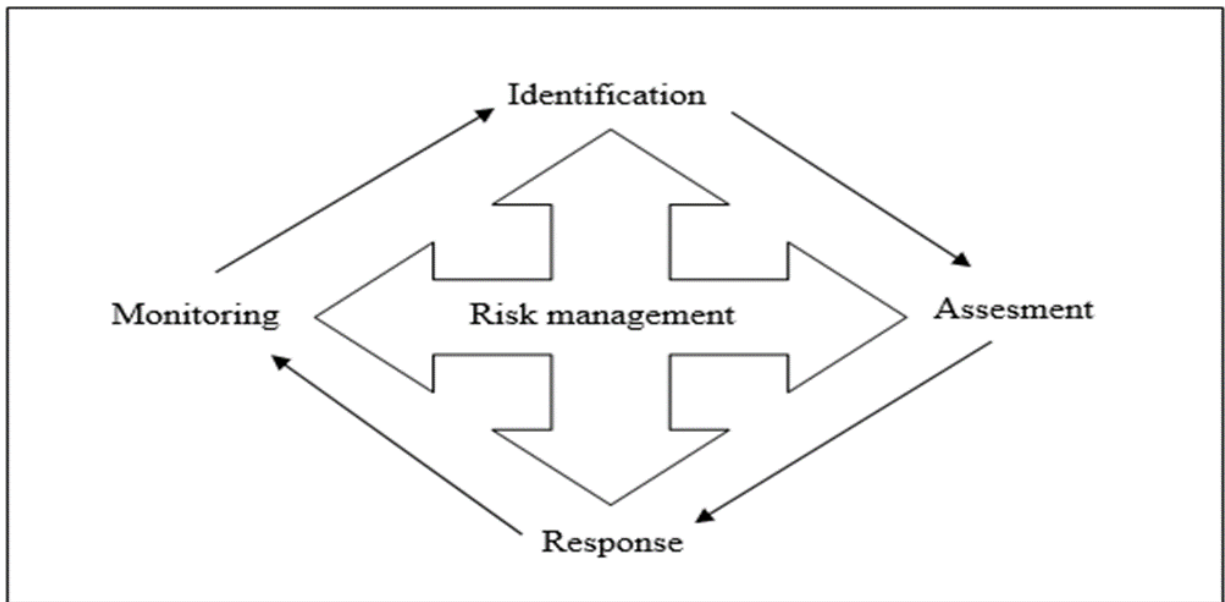


Figure 2. Risk management process

Assessment in SRM refers to the process of evaluating the severity of potential risks. The assessment process is followed up by creating contingency plans in order to protect the company from unwanted events that may become a reality. Assessing environmental, logistical, supply and quality risks enables companies to mitigate potential risk beforehand and reduce the likelihood of losses (Fan et al., 2018, 215). Contingency planning is essential when mitigating risks and managing risks that can cause business to be affected in a negative manner. Plans for risk mitigation may include finding and selecting a alternative supplier, manufacturer or logistics operator that can be utilized in a event of emergency. Kraljic's (1983) purchasing portfolio matrix is an excellent demonstration how the supplier base could be analyzed due to its risk/financial impact scale. Companies should focus their contingency planning on strategic items as they are essential and provide most financial gain and therefore should be protected in a case of emergency. On the other hand, bottleneck items should also be protected by having

access to alternative suppliers even though they do not have the largest financial impact on the business.

How companies respond to a risk that have become a reality is also a crucial part of SRM. By responding in an efficient manner companies can reduce potential financial, supply or market share losses produced by the disruption (Sodhi, Son, and Tang, 2012, 6). Risk mitigation and assessment process is also very connected to the responding phase as it is responsible for the severity of actions that must be taken in case of an unwanted event. Therefore, timely response to a problem is crucial in order to minimize the effects of any disruption or unwanted event that may cause the business to be affected financially or operationally. Responding to a problem is mostly internal but also includes the opposite party that replaces the old one (e.g. supplier). Collaboration in the response stage between the two enables the response to the problem to be efficient, cohesive, and quicker and therefore saves time and resources from both parties (Kleindorfer and Saad, 2005, 56).

2.4 Kraljic's purchasing portfolio matrix

Kraljic's purchasing portfolio matrix (KPM) was first introduced 40 years ago (Kraljic, 1983). The Kraljic matrix divides purchases, products, or services in to 4 categories by their financial impact the risk or complexity they possess. They matrix consist of leverage, strategic, routine and bottleneck items or products. It is used as a guide for managers and purchasers on how make more informed purchasing decisions and as a tool to categorize suppliers, services or products that have different implications and impact on their respective businesses. Moreover, the matrix aids the managers to recognize what items are too risky for their purchasing portfolio and therefore causes managers to perform more informed decisions that lead their business to be less vulnerable to supply fluctuations or supplier risks.

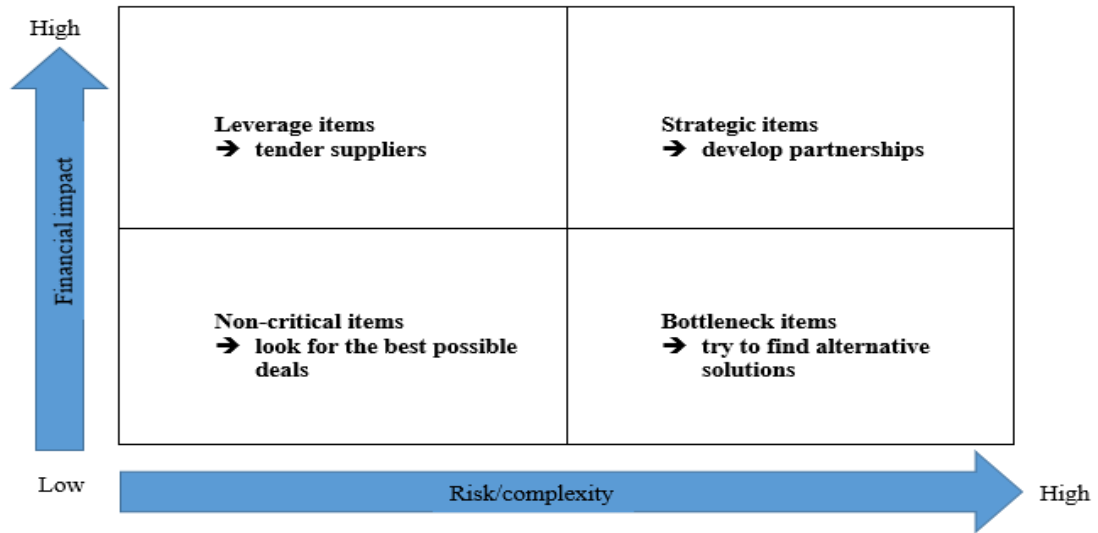


Table 2 Kraljic purchasing portfolio matrix

As mentioned before there are four different categories in KPM (Table 2). **Leverage items:** These are products or services that have a high level of supply risk, but a low level of strategic importance. They are mostly readily available from a large number of suppliers but may be subject to price fluctuations or other supply chain disruptions. Examples might include raw materials or other non-critical materials that are easy to substitute. **Strategic items:** These are products or services that have a high level of strategic importance, but a low level of supply risk. They are important to the company's overall goals and objectives but have a relatively low number of available suppliers and are difficult to substitute due to their unique specifications. Examples of strategic items could include certain components or services that are strategically important to their respective business. **Routine items:** These are products or services that have a low level of both strategic importance and supply risk. They are readily available from abundant number of suppliers and may not require significant attention from procurement or supply chain management. Examples might include standard commodities, office equipment or routine maintenance services. **Bottleneck items:** These are products or services that have a high level of supply risk and a high level of strategic importance. They may be critical to the company's operations and have a limited number of available suppliers or are otherwise difficult to substitute. Examples can include key components for a production process or a critical service

provider. Previously mentioned examples regarding different categories are of course dependent on the industry and the field of business that companies are a part of.

The integration and usage of KPM is quite extensive in businesses that operate in any kind of purchasing or supply related industry. As mentioned previously, it is used as a tool for managers to select and monitor suppliers or products. KPM enables managers and buyers make more informed decisions in identifying the strategic importance of each supplier or product from a profit and risk perspective. Moreover, it is commonly used in analytics, more specifically market analysis, in order to obtain a comprehensive picture how the company's resources are spent between different product/item categories in different market areas and segments. By analyzing spend companies can either diversify, balance, or cut down their supplier/product range in order to make their business more profitable and sustainable in the long run. The usage of KPM enables companies allocate risk management resources by the importance and risk profile of each supplier in addition to thinking about purchasing as a strategic advantage instead of treating it as "business as usual" (Kraljic, 1983, 12) function that is seen as inevitable cost rather than a competitive edge. By treating purchasing as integral part of risk management organizations can increase their supply security and flexibility thus creating a more stable environment to operate in.

3. Methodology

This section of the thesis introduces the researcher's role, participants, data, and the analysis process of this research. The sub-sections provide information about the data collection, and analysis. This research was conducted by using qualitative methods, as the main focus on comprehending the concepts of SCM and SRM rather than using generalizations based on numbers (Elo and Kyngäs, 2008, 157). This study includes both inductive (i.e., evidence is empirically based) due to the recency of the phenomena and deductive (i.e., empiricism combined with theory) approaches (Tracy, 2019, 26) as there is previous literature on the subject. The case companies that took part in the interviews consisted of a firm that operates in the forest industry (Company A) along with another Finnish firm that operates in the field of electronics and communication (Company B). Both companies have significant experience in working in multiple countries worldwide with highly sophisticated supply chain management methods. Due to confidentiality reasons further company details (e.g., number of employees, size) cannot be revealed in order to keep the case companies and interviewees anonyms.

3.1 Data and data collection

The primary data collected for this research is based on semi-structured interviews (Appendix 1.) from sample company representatives working in supply and procurement-based positions in the manufacturing industry. The interviews were conducted by asking interviewees pre-determined questions that could be followed up by additional follow-up questions if supplementary information is needed for clarity or for improved accuracy (Tracy, 2029, 157). Because semi-structured interviews are conducted between the interviewer and representatives of a company it is subsequently a highly effective method to acquire applicable information from the interviewees. The interviews were dissected by removing unnecessary information about the company or the representatives themselves to keep the interview data anonymous.

The interviewees consisted of two different company representatives. Interviewees are referred to in the text based on their positions: Head of Category, Operations and Services (HCOS), and

Procurement Manager (PM). The HCOS is responsible for the outsourcing contracts of external service suppliers and has been involved in the supplier interface for over 10 years. The PM is responsible for the sourcing of components and services for Company B and has worked in the sphere of procurement for nearly 15 years.

The interviews were conducted remotely in April 2023. The interviewees got a chance to familiarize themselves with the questions before the interview in order for the interviewer to receive comprehensive answers. The length of the remote interviews fell between 30-45 minutes, which was dependent on the length of the answers interviewees provided, along with the amount of additional follow-up questions and the general pace of the interview. All interviews were conducted in Finnish to ensure efficient communication and to allow the interviewees to express themselves in an effective manner. The personal information of the interviewees will remain anonymous in order to ensure truthful responses along with open discussion with the interviewer.

The list of 13 interview questions were formed by utilizing the main research questions along with the theoretical framework that was formed from a deductive point of view (see Appendix 1). The main themes such as risk and risk management, identification, and prevention – are all based on research. These themes were included in the interview list to ensure that the main objective, research questions, would be discussed with the interviewees.

3.2 Analysis

The analysis was conducted by using qualitative content analysis to draw insights from the primary data both systematically and objectively. Qualitative content analysis concentrates on creating models and themes, that enables the research phenomena to be explained in a condensed manner all whilst being connected in the broader theoretical framework (Kyngäs & Vanhanen 1997, 3–4). Moreover, the purpose of standard content analysis is to analyze the information that the interviewees provided rather than focusing on the manner or way it was presented or said (Elo and Kyngäs, 2008). Thus, why semi-structured interviews incorporated with both theoretically driven and open-ended questions to fundamentally understand the experiences an

circumstances of the interviewees (Galletta & Cross 2012, 45). The analysis process consisted of transcribing, dissecting and reducing the interview data to specific themes and dividing those themes into different categories or groups by abstracting. Any unnecessary information that was not relevant to the study was also removed at this stage from the interview data.

4. Results and findings

This chapter presents the findings of the interviews conducted in this thesis. The collected interview data was divided into three sections in order to address specific themes related to the supplier risk management process. First, the views of the interviewees on supplier risk management are presented with the goal of mapping out how they view risk management as a whole and how it is integrated into their respective business. Secondly, the focus will be on the evaluation process that takes place when selecting suppliers. Here interviewees present their experiences and views on the current processes and provide insight into how the evaluation process is managed. Lastly, the third theme takes into consideration the future of supplier risk management from the interviewee's perspective.

	Company A	Company B
Field of business	Forest industry	Electronics and communication
Supplier base (mainly)	Europe	Asia
SRM Practises	2 nd & 3 rd party auditing industry & company standards supplier contracting compliance & code of conduct monitoring	supplier contracting internal standards monitoring
Key metrics of supplier selection	quality price reliability of delivery responsibility & sustainability ethical rules environmental regulation security	quality price reliability of delivery
Supplier monitoring	Weekly	Monthly
Defined risk management strategy	Yes	No
Defined purchasing/sourcing strategy	Yes	Yes

Table 3. Company Comparison

4.1 Initial risk management processes

The interview questions 1-6 mainly focused on the risk management methods and processes of the case companies. The interviewees described their risk management methods used to select supplier or to manage risk in their respective fields of business. The interviewees noted how pre-determined risk management frames (i.e., quality, compliance, financial stability) are an essential part in reducing the likelihood of negative outcomes in the future. When describing risk management, Company A strives to minimize potential risks by selecting suppliers based on industry specific ethical regulation and compliance checks.

“Due to the nature of our business the key factors in our risk management process are to ensure that the suppliers comply with industry standards. Suppliers must comply to certain standards to even be considered and even after that there is a tendering process which takes into account different factors like price, stability, quality and sustainability that are used to narrow down the final supplier”- HCOS

Company B stated that their main selection criteria in addition to quality are the reliability of delivery along with the price of the components. When describing their risk management, the PM noted that they attempt to manage their supplier related risks by securing their critical component suppliers by contracting and by tendering their customers on the basis of their financial impact.

“When we are sourcing for suppliers, we definitely focus on quality because of the quantity of components we order...but we also put considerable emphasis on timely deliveries along with the price of course”- PM

From the supplier selection perspective Company A did not make any changes during the pandemic. Due to their already comprehensive selection process, they did not have the need to make any major adjustments to reduce the risk associated with their suppliers. A significant part of this is also that their supplier base is mostly located in Europe, and therefore their supply chain was not affected in an extent that would have caused major issues.

“As our suppliers are mainly located in Europe and since we don't have many suppliers outside, we didn't have to make any significant changes to our already existing selection

process. Normal tendering process continued throughout the pandemic, and we only experienced very few and minor financial inconveniences with suppliers that had been affected by the pandemic”- HCOS

Company B on the other hand suffered major setbacks in their processes. Due to the component shortages of the electronics supplier industry Company B suffered greatly. As their supplier base was mostly located in Asia the lead times lengthened significantly during the pandemic along with the shipping times.

“The pandemic was very rough...due to the pandemic we had to search for new suppliers because some of our existing Asian suppliers had financial issues and were running low on stock...we still tried to focus on our core criteria when choosing new suppliers, but there were times when we had to prioritize price to keep our business running”- PM

When asked about the biggest challenges during the pandemic it was surprising to hear that Company A survived with relatively few setbacks. Their main goal according to HCOS when the pandemic struck was to keep their operations running in relatively the same way as before. Although the goal was accomplished, there still were some complications regarding service providers, delayed deliveries, and shortage of products.

“Our main goal was to keep production running during the worst stages of the pandemic. Although we were able to operate in relatively the same way, there were still some challenges in the form of delayed deliveries and availability of produce. We also suffered difficulties with service providers as COVID-19 protocols restricted their access our production sites and overall movement”- HCOS

As mentioned before Company B suffered during the pandemic. The PM stated that their biggest issue during the pandemic was the availability of components and the delayed deliveries and lead times. They managed to keep their business running, but not without significant financial impact due to the increased prices of components.

“We were able to keep our business running, which was of course a positive thing...but we were affected quite harshly by the increased prices of components. There were also issues with deliveries and lead times that almost tripled during the pandemic. Addition to that we were not

able to react quickly enough to the disruption in supply which resulted in even more delays from open market purchases”- PM

When asked about the current crisis between Russia and Ukraine HCOS stated that they had learned about the effects of COVID-19 and were therefore more agile to make changes to their operations:

“It affected us for sure. We had to halt certain operations due to the conflict and the origin of some of our products inevitably changed. Even though we had to change some suppliers, we felt like we were more prepared to make these changes and react quickly due to the lessons that the pandemic provided”- HCOS

The HCOS also noted that they have increasingly added contracted suppliers to their portfolio. The reason being that pre-determined contract clauses can be characterized as buffers against possible contract violations or risks. Therefore “wild trading”, used to fill gaps in availability, has been increasingly reduced on a yearly basis. Company B on the other hand was forced to the open market due to the issues that their suppliers had, which resulted in a relatively stable flow of supply at the time of the pandemic but also in significantly higher prices and uncertainty.

4.2 Risk management methodology

The interview questions 7-11 considered the methods and factors that case companies utilized and took into consideration when evaluating suppliers and their performance. Interviewees were asked about their views on the evaluation process in order to form an understanding of how their respective organizations view the importance of supplier evaluation. The interviewees also noted key factors that are being monitored during the process.

When asked about the factors that are being evaluated Company A noted that they evaluate factors like reliability of delivery, quality, and sustainability. The HCOS noted that different factors have weighed importance whether services or products are under evaluation. Moreover,

if a certain supplier is selected as a contracted supplier there are separate factors that are being evaluated.

“The evaluation process includes many things. First of all, the basic requirements like industry standards have to be in order. After that we evaluate the supplier based on the type of procurement (i.e., service or product), where quality, price, and reliability of delivery along with responsibility and sustainability are evaluated. If a supplier is eligible to be a contracting supplier there are factors such as ethical rules, environmental regulation and security that have to be taken into account”- HCOS

Company B also noted that the reliability of delivery is a key factor in their supplier selection as their business requires a steady flow of components. Quality was the primary factor that was scrutinized the most according to the PM as some components are highly critical for their products and have to have a certain standard. These suppliers were almost without exception contracted suppliers that Company B had a long relationship with. Some suppliers are evaluated solely on the price as their components don't have a significant impact on the performance of the final product.

“Our evaluation process evolves around quality. We first ensure that the components are up to our requirements...there are of course differences in the requirements between so-called critical items and mass components that have very little effect on the final product. Our critical item suppliers are basically almost without exception always contracted...because we want to be assured of the steady quality that is essential for our products”- PM

Company A monitors its suppliers through an ERP system, where it can follow the performance of its suppliers. The interview with HCOS revealed that they monitor the performance of their suppliers on a nearly weekly basis with a premium on suppliers' timely deliveries and reclamations. Auditing was also considered to be an important part of the evaluation process according to HCOS.

“We have systems in place that we use to monitor the performance of our suppliers. We especially pay attention to timely deliveries from our suppliers in addition to positive and negative feedback and reclamations. In addition, we also utilize third party auditing in addition to suppliers own auditing to ensure compliance with contracts”- HCOS

Utilizing a third-party auditing method (e.g., independent certification bodies) is especially helpful when working with suppliers from other countries. By removing any links or affiliations between the parties, both can be assured that business is conducted in a manner that is acceptable. In Company A' case, they also have plans for a new system that takes new metrics into account when evaluating vendor performance.

When asked about supplier monitoring it was not surprising to hear that Company B also has an ERP system in place. Even though they do follow their suppliers performance as frequently as Company A. The PM stated that most of their business is based on projects and therefore they do not have to follow the performance of their supplier on a weekly basis. Most of their supplier monitoring evolves around delivery management and quality control. There were still some changes to their processes during COVID-19 due to the delayed deliveries, which affected their ongoing projects.

“Yes, we use an ERP system to monitor all our suppliers. Primarily it is used to monitor the deliveries of our suppliers along with creating quality reports if there are some deviations...we follow the performance of our suppliers on a monthly basis, but there are exceptions, like during COVID-19 we had to update our customers on the schedule of our ongoing projects due to the delayed deliveries or availability of components” - PM

4.3 Future of supplier risk management

Questions 11-12 focused on the possible implications and methods that case companies had adopted to their risk management methods after the pandemic. Moreover, they focused on how the interviewees viewed the future of risk management. Company A surprisingly did not make any significant changes to their supplier risk management methods during the pandemic since they already had comprehensive risk management systems and methods in place.

“Regards to our risk management methods and processes we did not make any big changes. Our already existing methods have proven to be very effective in managing risks. By

proactively following possible supplier risks on a weekly basis helps us to identify risks effectively”- HCOS

“I personally don’t see the risk management area of our business go through any significant changes in the future. I feel like the current methods have become so internalized in our actions that significant changes don’t seem probable. There are always small things here and there that are changed but nothing major”- HCOS

As mentioned before Company B was affected by the pandemic quite extensively. They stated that they have plans to restructure their SRM processes by securing their critical suppliers by contracting and by expanding the portfolio of “supporting suppliers” in case of a disruption. Their primary concern being their company’s resilience and performance in the event of a supply disruption.

“We definitely learned that our risk management methods were not up to the challenges that we faced during the pandemic. Regarding supplier selection we have begun adopting new metrics (i.e., financial performance) and methods that we take into consideration when we are selecting new suppliers or negotiating contracts with our existing suppliers. We have begun talks with our suppliers, especially with critical item suppliers, to ensure that a steady supply of components is assured even during a possible disruption. We have also decided to expand our supplier portfolio to be used as a buffer if delivery issues arise”- PM

When discussing the future of risk management Company B stated that they learned many things from the global pandemic. With the key takeaway being the importance of working with the suppliers in the future to ensure longevity and security against disruptions

“I feel that we are prepared for future disruptions. The pandemic showed us the importance of having the right systems in place and the importance of working together with suppliers to ensure the sustainability of our business and resilience against supply disruptions”- PM

5. Discussion and conclusions

This chapter of the thesis focuses on and discusses the findings of Chapter 4 along with the theoretical framework built in Chapter 2. The chapter dissects the findings of Chapter 4 while also comparing them to the literature and theories presented in Chapter 2. The aim of this chapter is to provide an answer to the main research question by first addressing and answering the two sub-research questions. It is highly important to note that the discussion and conclusions focus on two companies, and therefore the conclusions cannot be epitomized and generalized on the scale of worldwide business. This chapter provides evidence, and examples of actions performed by certain firms and therefore assuming that other organizations perform the same is not applicable nor realistic. The first sub-research question is as follows:

SQ1. How has supplier risk management changed?

The data gathered from the interviews indicates that the COVID-19 pandemic has changed supplier risk management. When interviewing the company representatives, it was clear that there are differences in the ways that the pandemic affected different industries. Whereas Company A experienced relatively few complications in the form of delayed deliveries and shortage of certain products Company B suffered greatly in the form of reduced availability and delayed deliveries. In addition, Company A did not change their risk management methods significantly since they proved to be effective even during COVID-19 whereas Company B had to re-think their SRM methods. The biggest change in Company A's case was the ability to respond to disruptions. As the interview pointed out, the crisis between Russia and Ukraine forced Company A to respond quickly and minimize any financial damage due to lost supply. In Company A's opinion the lessons learned during COVID-19 were essential in the way they responded to the crisis. Both companies answers regarding the learning process is also supported by the risk management model presented in Chapter 2 and in Figure 2. With the experience obtained from previous disruptions organizations have better understanding on how to perform in the time of crisis. These lessons enable companies to operate efficiently if a disruption arises

while also cutting losses down to a minimum. The case companies also discussed their management methods moving more towards proactive practices. By actively following and monitoring their suppliers and their markets on a more regular basis companies are able to recognize emerging risks in advance. By adopting these methods companies can protect their supply resilience in the event of new disruptions.

SQ2. How is supplier risk management expected to change in the future?

The findings and answers from the interview with Company A would indicate that there are no major expectations for SRM to change in the future. Nevertheless, it can be said that companies are likely to treat their SRM practices with more proactive methods in the future. As Company A pointed out, they were more prepared to respond and to recover from the crisis in Ukraine because of the effects that COVID-19 pandemic had. The experiences and lessons that Company A and B obtained during COVID-19 pandemic will prove to be valuable assets in the future as companies face new challenges and disruptions that influence their supply and suppliers. Company A also pointed out that their purchasing has become more contract based. When an organization is using contracting with suppliers their supplier selection is likely to be more thorough due to the contract requirements. The HCOS noted that their so called “wild purchasing” from open markets has reduced significantly in the last few years and the number of contracted suppliers is expected to increase in the future. By contracting suppliers, the organization can protect its supply with contract clauses in addition to being assured of pre-determined criteria regarding supplier performance. This leads to increased resilience against disruptions and better business performance in the form of supplier integration and overall stability. Therefore, the increased use of contracts in supplier selection could be characterized as a risk management method, due to its inherent ability to mitigate risk.

Q1: How has COVID-19 affected supplier risk management?

As the business world has started its recovery towards its former state the question is – how did it affect businesses, more specifically their supplier risk management? The interviews provided

many different aspects of how the case companies were affected. Firstly, the pandemic showcased companies the importance of supplier risk management, to be more exact the response aspect of risk management. When the pandemic struck companies had to react quickly to the changes in their business environment. Moreover, they had to respond dynamically to the disruption to minimize financial losses and effects on their core business operations. This has raised awareness within the companies on how important risk management is. Secondly, the pandemic exposed methods used by organizations that were not applicable during the pandemic. Whereas Company A had very robust SRM methods during the pandemic that provided security and stability, Company B suffered greatly from the shortage of key components and delayed deliveries. That being said, the case companies operate in different fields and demographics of business and therefore were exposed to different risks.

5.1 Implications

This thesis has provided considerable information of SRM and supply management from organizational point of view during COVID-19. Even though SRM and supply management focus on different aspects of SCM they can be utilized to support each other. When an organization is striving to reduce the risks that are associated with its respective business it naturally looks at the stakeholder's effect, in this case its suppliers, and the risk management process's role in their operations. When reducing the risks associated with suppliers the sustainability of the business often is improved through enhanced resilience against disruptions. In addition, improved SRM processes enhance the competitive advantage of an organization when faced with a supply related disruption. For example, strategically thought out SRM practices reduce the impact of a disruption on an organization by reducing financial losses or lost supply. The avoided loss of supply enables the company to operate effectively even during turbulence and avoided financial losses can be therefore allocated to effective use within the company.

Organizations may see risk management as a highly complex and time-consuming activity that is challenging to integrate into their supply operations. However, organizations regularly have

multiple tools and factors of risk management in place even without completely integrating risk management. By thoroughly selecting suppliers with different metrics such as quality, industry standards and reliability of delivery are all factors and indicators that organizations have some form of risk management practices in place. Company A provided very tangible evidence of consistent commitment to managing suppliers which has proven to be effective against disruptions. Although their management methods have not changed significantly during COVID-19 pandemic, they have been effective in managing the risk associated with their industry. Company A is a prime example of a company that has not seen risk management as a time-consuming activity which has questionable upside. Rather, they have seen it as a necessity that has provided them with a more solid platform to conduct business in the long run. This is highly logical when comprehending that SRM can have substantial benefits in the form of reduced losses. This claim is also supported by Kähkönen et. al (2022), in their research on supply resilience. When considering SRM, companies need to understand that integrating risk management methods have a concrete competitive advantage and therefore should not be treated as a redundant part of their business operations.

Regarding the relationship between an organization and a supplier, organizations must realize the importance of integration. By including suppliers to the risk management process, they can be a part of the decision-making process and provide valuable insight on their views and limitations regarding SRM. This result is also supported by previous research by Hallikas et. al (2004). By including suppliers in the process companies may reduce the resistance towards change and bring the two closer together by sharing information and thus improving the relationship and business performance.

5.2 Limitations and reliability

The conclusions of this thesis are based on two case companies. The conclusions cannot be used as generalizations on the subject nor the industries as business entities have different structures. As a whole the thesis provides a good picture of the case companies situations. Nonetheless, it must be noted that these events can occur in other organizations, even though there is no tangible

evidence presented in this thesis that would support that probability. The case study involving two different companies from the field of manufacturing provides feasible information about the subject of SRM topic that should be expanded upon with other research in the future.

When assessing reliability, it is imperative to note that the interviewees were only able to talk about Company A and B's practices and experiences from their personal perspectives. Due to this, the evidence and information gathered from the interviews may not contain the most accurate data. Nevertheless, the empirical evidence collected from the case companies (two companies, two interviewees) and information from company websites as a source of information proposes that flawed information would have risen during the dissection of data. When considering the data analysis process, the collected data was analyzed multiple times to minimize the chances of misinterpretation.

5.3 Future research

The future research on SRM could focus on the framework presented in Chapter 1 (Figure 1.) to examine if subcontractor (e.g., suppliers' supplier) issues related to supply resilience share similar connections to larger organizations. The risk management practices are a standard part of SM; however, previous research has not examined the relationship between subcontractors and main suppliers. The risk management processes in that sector should be studied in more depth because this thesis indicates concrete evidence that risk management practices are a major tool for resilience.

A question arising from this thesis is the connection with risk management practices and the financial performance of an organization during a disruption. The interviewees felt that their operations could have been affected more severely if certain risk management practices were not in place during the pandemic. They pointed out that being able to operate effectively during a disruption helped them to reduce the effects that the pandemic may have had on their business. Future research could therefore focus on finding management practices that had the most significant financial impact.

References

- Chopra, S., & Meindl, P. (2016). *Supply chain management: strategy, planning, and operation* (6th ed.). Pearson.
- Cooper, M. C., Lambert, D. M., & Pagh, J. D. (1997). Supply chain management: more than a new name for logistics. *The international journal of logistics management*, 8(1), 1-14.
- Elo, S., & Kyngäs, H. (2008) The qualitative content analysis process. *Journal of advanced nursing*, 62, 1, 107-115
- Fan, Y. & Stevenson, M. (2018) A review of supply chain risk management: definition, theory, and research agenda. *International journal of physical distribution & logistics management*. [Online] 48 (3), 205–230.
- Financial Times, 2022. Russia's invasion to have 'enormous impact' on world food supplies. [Website]. [Accessed 12.3.2023]. Available: <https://www.ft.com/content/ad225932-5600-432f-b8bf-e31b8050c73a>
- Foerstl, L., Reuter, C., Hartman, E., Blome, C., (2010) . Managing supplier sustainability risks in the dynamically changing environment: sustainable supplier management in the chemical industry. *J. Purch. Supply Manag.* 16, 18-130.
- Galletta, A. & Cross W. E. (2012) *Mastering the Semi-Structured Interview and Beyond: From Research Design to Analysis and Publication*. New York: NYU Press.
- Hallikas, J, Karvonen, I, Pulkkinen, U, Virolainen, V-M, Tuominen, M (2004) Risk management processes in supplier networks. *International journal of production economics*. [Online] 90 (1), 47–58.
- Hugos, M.H., (2018), *Essentials of Supply Chain Management*, John Wiley & Sons, Incorporated, Newark.
- Jüttner, U., Peck, H., & Christopher, M. (2003). Supply chain risk management: outlining an agenda for future research. *International Journal of Logistics: research and applications*, 6(4), 197-210.
- Kleindorfer, P. R. & Saad, G. H. (2005) *Managing Disruption Risks in Supply Chains*. *Production and operations management*. [Online] 14 (1), 53–68
- Kraljic, P. (1983) Purchasing must become supply management. *Harvard business review*. 61 (5), 109–117.

Kyngäs, H. & Vanhanen, L. (1997) Ssällön analyysi. *Hoitotiede* Vol. 11, no. 1/-99. [Online] 3–4.

Kähkönen, A.-K. and Patrucco, A.S. (2022). Guest Editorial: A purchasing and supply management view of supply resilience for better crisis response. *Journal of Purchasing and Supply Management*, 28(5), 100803.

MacroMicro, 2023. Drewry world container index. [Website]. [Accessed 15.2.2023] Available: <https://en.macromicro.me/charts/44756/drewry-world-container-index>

Manuj, I. & Mentzer, J. T. (2008) GLOBAL SUPPLY CHAIN RISK MANAGEMENT. *Journal of business logistics*. [Online] 29 (1), 133–155.

Mentzer, J. DeWitt, W. Keebler, J. Min, S. Nix, N. Smith, C. Zacharia, Z. (2001) DEFINING SUPPLY CHAIN MANAGEMENT. *Journal of business logistics*. [Online] 22 (2), 1–25.

Ministry for Foreign Affairs of Finland. [Website]. [Accessed 2.2.2023]. Available: <https://um.fi/sanctions-and-russia-s-invasion-of-ukraine>

Pereira, C. R. et al. (2020) Purchasing and supply management (PSM) contribution to supply-side resilience. *International journal of production economics*. [Online] 228107740–.

PricewaterhouseCoopers: Macroeconomic Impact of the COVID-19 in China and Policy Suggestions. [Website]. [Accessed 10.2.2023] <https://www.pwccn.com/en/covid-19/macroeconomic-impact-covid19-policy-suggestions.pdf>

Roehrich, J.K, Grosvold, G, and Hoejmose, S.U. (2014) Reputational risks and sustainable supply chain management: Decision making under bounded rationality. *International journal of operations & production management*. [Online] 34 (5), 695–719.

Sodhi, M. S. Son, B, Tang, C.S. (2012) Researchers' Perspectives on Supply Chain Risk Management. *Production and operations management*, 21 (1), 1–13.

Szwejczewski, M., Lemke, F. and Goffin, K. (2005), "Manufacturer-supplier relationships: An empirical study of German manufacturing companies", *International Journal of Operations & Production Management*, Vol. 25 No. 9, pp. 875-897.

The World Bank, World Development Report 2022 FINANCE FOR AN EQUITABLE RECOVERY 2022, Chapter 1. [Website]. [Accessed 11.2.2023]. Available: <https://www.worldbank.org/en/publication/wdr2022/brief/chapter-1-introduction-the-economic-impacts-of-the-covid-19-crisis>

Tracy, S. J. (2019) *Qualitative research methods: collecting evidence, crafting analysis, communicating impact*. 2nd ed. Newark: Wiley.

van Weele, A.J. and van Raaij, E.M. (2014), The Future of Purchasing and Supply Management Research: About Relevance and Rigor. *J Supply Chain Manag*, 50: 56-72

WHO, COVID-19 Stats. [Website]. [Accessed 19.2.2023]. Available: <https://covid19.who.int/>

Zsidisin, G.A. and Ellram, L.M. (1999), ``Supply risk assessment analysis", *Practix*, Vol. 2 No. 4, pp. 9-12.

Zsidisin, G.A., Panelli, A. and Upton, R. (2000). Purchasing organization involvement in risk assessments, contingency plans, and risk management: an exploratory study. *Supply Chain Management: An International Journal*, 5(4), 187–198.

Appendices

Appendix 1. Interview questions

1. How is supplier risk management defined in your company?
2. What has been your biggest challenge regarding supplier risk management in recent years/during the pandemic?
3. How has the pandemic affected your supplier selection process?
4. How has the pandemic changed your supplier risk assessment? Why?
5. Has supplier risk management been a critical part of company strategy? Why?
6. What are the main requirements for a supplier to be considered i.e. price/quality/dependability?
7. What are the main risks that your company faces when selecting suppliers? (3 points)
8. How does your company measure supplier performance and risk? Does your company use ERP to follow supplier performance?
9. How has the pandemic affected your supplier base?
10. How does supplier risk management resilience show in your management methods?
11. What are the risks your company encounters after the supplier has been chosen? (Examples)
12. Has the company made any changes after the pandemic regarding supplier selection process/supplier risk assessment?
13. How does your company view the future of supplier risk management?