Risk Management for Sustainability Related Risks in Supply Chain

Case: KONE Oy

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Bachelor's thesis
December 2023
Degree Programme in International Logistics

jamk | Jyväskylän ammattikorkeakoulu
University of Applied Sciences

jamk

Description

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Risk Management for Sustainability related Risks in Supply Chain

Jyväskylä: Jamk University of Applied Sciences, December, 2023, 44 pages

Degree Programme in Logistics Engineering. Bachelor's thesis.

Permission for open access publication: Yes

Language of publication: English

Abstract

Following up on the current growth of business strategy in today's economic environment, sustainable business tends to develop positively, in other words, it is a combination of economic, environmental, and social purposes in a company's planning, goals, and practical activities. The core goal is to deliver sustainable value despite the world facing unexpected events such as geopolitical conflicts, the COVID-19 pandemic, natural disaster, and climate change. The great amount of risk identification in today's supply chain challenges companies and, from that company able to design environmental and social standards into company's strategy, management, and operations at all levels, an organization could successfully achieve its business goals like enhancing reputation, gaining customer loyalty, and mitigating risks in the face of global disruptions. Additionally, companies ensure how sustainability risks can be managed in supply chains in order to improve current solutions as well as forecast future risks for long-term.

The thesis deeply discusses identifying and categorizing risks in supply chains in a specific company case which is KONE has been chosen as a high standard company present of the most sustainable Finnish company in 2023. SSCM presents in detail risky factors that cause negative results in the environment and sociality. In addition, the next objective was to study a comprehensive view of the diverse challenges that a case of KONE organization had to face when conducting sustainable practices throughout its supply chains. The report demonstrates effective strategies, methods, and solutions adopted to enhance its management of sustainability risks and ensure a resilient and ethical supply chain that aligns with global environmental and social standards, is the final aim of this study.

Qualitative methodology was used to conduct detailed examinations of written information derived from an extensive documentary report. A real case study from a local company was chosen, leveraging qualitative methods for in-depth analysis. The approach facilitates the exploration of risk management strategies, challenges, and specific approaches to sustainability management implemented by the research firm.

The main result of the thesis work illustrates the vital role of sustainability risk management in supply chains in order to gain a competitive edge in today's business environment. In addition, the work provides specialized insights on aligning supply chain operations with sustainability goals, guiding businesses to continuously evolve in a sustainable, responsible, ethical way whatever the circumstances.

Keywords/tags (subjects)

Sustainability Supply Chain Management (SSCM), Sustainability Risk Management, Risk Management Framework, Challenges in SSCM

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1 Introduction

1.1 Background to the topic

There are diverse considerable disruptions in the global supply chain caused by factors such as COVID-19 pandemic, the US-China war trade, the ongoing Russia-Ukraine conflict, and so on. The COVID-19 pandemic has sent shockwaves far beyond geographical borders. At the same time, the tensions are escalating in the US-China trade competition and the ongoing Russia-Ukraine war has further tense the fragile conditions of the supply chain. This complicated interplay of events has created a landscape where the global supply chain contends with novel difficulties and challenges. Unexceptionally, Finland is also affected by the consequences of these disruptions.

In today's business landscape, Supply Chain Sustainability Management (SSCM) plays a crucial role for global enterprises. SSCM not only emphasizes sustainable and responsible practices to protect human beings and the environment but also is an essential strategy for long-term success in an era where environmental and social responsibility matter. Issues such as deforestation, pollution, water security, and greenhouse gas emissions are considered environmental problems. While social issues cover forced labor, health and safety, working conditions, and fair employment practices. The consequences of without sustainable considerations can damage the company's global reputation.

Government rules are always changing and although companies may be able to comply, what about the suppliers in their supply chain? Active third-party vendor management evaluates, tracks, and requests changes from their suppliers' compliance to prevent non-compliance problems. This means the organization maintains environmental and social standards not only for its internal operations but also extends these benchmarks to its suppliers, embodying a commitment to comprehensive sustainable principles throughout its entire supply chain. A company must ensure that its global suppliers adhere to the company's codes of conduct which is an essential obligation to minimize the risk to the firm's reputation (Reuter et al., 2010). Therefore, for corporations, developing a SSCM system is always a top goal.

Every organization is affected by both internal and external risk factors in relation to supply chain disruptions. Internal risks could arise from diverse sources, such as noncompliance with labor or environmental laws, insufficient inventory to meet customer demand, unethical practices, irresponsible supply chain management, security threats, and inadequate planning and assessment leading to hazards and lack of control. Furthermore, the company's tendency to withhold or delay unfavorable information can give rise to cultural risks. External risks, on the other hand, can be attributed to climate change, global disruptions, shortages, and global crises such as pandemics, disasters, and wars.

Control the risk or risk management is called “the future stages” when creating the bad-worse-worst scenarios for all situations might come up and, these scenarios are always attached their own solutions. The more specific in risk management would be cut off largely the vulnerable supply chain in vulnerable times.

The growing attention on sustainability risk management because of healthy status of the business, more aware of the sustainability that effects significantly the reputational, financial, healthy of companies. To strengthen the competitive possibility, Foerstl et al. (2010) state that sustainability practices must be considered carefully by enterprises. Corporations shoulder a dual responsibility: actively addressing climate change challenges and utilizing their global influence to mitigate its consequences. Their expansive operations wield a unique capacity for impactful measures beyond individual efforts. Harmful environmental practices affect workers and communities immediately, while issues like pollution and deforestation pose long-term threats to both human well-being and global ecological resilience.

Besides, consumer and investor demand also the key factor of sustainability. They force positively the company be aware of their actions in Supply Chain process for example unethical practices such as child labor, forced labor, gender discrimination. As consumers and investors based on these issues may decide to purchase from companies. Today’s consumers are far better informed of how much the supply chains they impact to global environmental issue and social aspects. Consumer want to support companies that are working to create more sustainable practices and great at-risk management in long-term impacts for the planet and inhabitants.

1.2 Limitation

Even though this study contributes valuable insights into sustainability practices within the supply chains of Finnish companies, which are globally recognized for their environmental and social dimensions, it is vital to acknowledge certain limitations. The study's exclusive focus on the environmental and social factors, while omitting the economic aspects, may result in a narrow viewpoint on the overall management of sustainability risks. Beside that the decision to only include a Finnish company, despite its ability to provide comprehensive insights within a specific context, does limit the general applicability of the findings to a broader international context. Another drawback of using a single company case study is the limitation in a number of conclusions that can be made in this study.

1.3 Research objectives and Research questions

Within the time and ability of the writer, author will only analyze the following contents: (1) Overview of sustainable risk management in the supply chain; (2) Identify the current state of sustainable supply chain risk management in the case company is chosen from the 2023 Global 100 ranking that lists the 100 most sustainable companies; (3) Discuss how the selected company mitigates and manages risks within its supply chains.

The thesis work focuses on three main questions:

- What kind of risks enterprises have in their sustainability of supply chain?
- What types of challenges exist in the management of sustainability risks?
- How can enterprises enhance the management of sustainability risks within their supply chain?

2 Sustainable supply chain

2.1 Sustainable supply chain management (SSCM)

Supply chain (SC) includes a chain of activities and resources linked together during the product formation process, transported from manufacturer or supplier to consumer/customer. The SC is organized with quite complex processes, from production, warehouse, distribution, transportation, and retail. Close coordination between parties in operating the supply chain

determines the business success of the enterprise, thereby bringing about socio-economic efficiency.

A competitive and successful model for sustainable supply chains integrates transparency, ethics, and environmental responsibility. Transparency is crucial in this integration, fostering accountability and ethical practices throughout the supply chain. Businesses committed to this holistic approach not only uphold rigorous ethical standards but also prioritize openness, providing visibility into sourcing, manufacturing processes, and overall environmental impact. Sustainable supply chains must always be associated with environmental protection. Supply chain sustainability not only brings benefits to businesses and stakeholders, but also to society.

According to Sarkis (2001), “Sustainable development and sustainability are most commonly defined as meeting the needs of the present generation without compromising the needs of future generations” (p. 666). The integration of sustainability into supply chain management is fueled by the imperative to comply with regulations, ensuring ethical practices and avoiding legal consequences. Changing customer preferences for environmentally conscious companies and considerations like reputation damage and corporate strategy integration also drive the sustainable practices adoption. (Carter and Rogers, 2008; Hofmann et al., 2014; Seuring and Muller, 2008).

According to Seuring and Muller (2008), following regulation is a fundamental necessity to ensure the sustainability of a SC. Furthermore, laying the groundwork for long-lasting achievement requires essential stakeholders of a company to perceive its activities as trustworthy is crucial. This trustworthiness can be achieved by conforming to the sustainability standards anticipated by these stakeholders (Carter and Rogers, 2008; Hofmann et al., 2014). Fulfilling these sustainability requirements is crucial not only for nurturing confidence but also for guaranteeing the continual backing and faith of crucial stakeholders, which ultimately contributes to the enduring success of the company.

Based on the three dimensions of the “Triple Bottom Line” (Figure 1), a concept developed by Elkington (1998), Teuteberg and Wittstruck (2010) propose the ‘‘House of Sustainable Supply Chain’’. Environmental, social and economic performances are three key factors that keep the balance of the building while the building's base is formed by risk and compliance management. In

SSCM, essential requirements extend to the incorporation of ethical values across the organization, the cultivation of a highly efficient and adaptable environmentally conscious IT infrastructure, and the alignment of corporate strategies with a firm focus on sustainable development. (Zailaini et al., 2012).

Figure 1 Triple Bottom Line (Elkington, 1997)

Carter and Rogers (2008) state that "SSCM as the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance of the individual company and its supply chains" (p.368). This definition constructed by authors on the principles of the triple bottom line, this interpretation of SSCM encompasses an exhaustive framework that depends on four crucial sustainable aspects which are risk management, transparency, strategy, and culture. By embracing these core components, SSCM not only strives to optimize economic, environmental, and social outcomes but also nurtures a holistic approach that underpins the sustainable success of an organization.

According to Seuring and Müller (2008), requirements from stakeholders set environmental, social, and economic objectives that are accomplished through the application of an organization's

sustainability practices within its supply chain. In basic terminology section of *From a literature review to a conceptual framework for sustainable supply chain management,* Seuring and Muller (2008) define "sustainable supply chain management as the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development. i.e., economic. environmental and social, into account which are derived from customers and stakeholder requirements" (p. 1700).

The provided definition of SSCM, as quoted, provides a framework for comprehending fundamental principles and objectives of this pivotal field. It accentuates the multifaceted character of SCM, surpassing the conventional scope of material and the stream of finance to encompass information and inter-organizational collaboration. It is essential to have a comprehensive approach from all three aspects. Sustainability not only has concerns about the environment but also encompasses social and economic dimensions. Additionally, the integration of sustainability targets emphasizes the consideration of balancing environmental responsibility, social values, and economic profitability for resilience as well as long-term success in the global marketplace. The requirements, expectations, and demands of customers and stakeholders need to be carefully considered. With the growing trend of stakeholder-focused business practices, companies recognize that sustainability is not an isolated effort but rather a cooperative endeavor involving different parties to be able to achieve goals. This definition is not only perceptive but also highly pertinent to author research goals and the broader discussion on SSCM.

SSCM aims to carry out a performance assessment and include the factors concerning the environment, society, and economy (Hassini et al., 2012, Seuring and Müller, 2008). This comprehensive assessment ensures that SC operations align with objectives in sustainability management, promoting responsible practices and long-term success.

In *a framework of sustainable supply chain management: moving toward new theory,* Carter and Rogers (2008) point out that the results related to environment, economy, and society are three main sections of the sustainability outcomes in the supply chain. This classification offers a systematic framework for appraising and comprehending the multifaceted consequences of sustainable supply chain practices across various dimensions, ensuring a comprehensive assessment of their efficacy.

The term outcomes fundamentally refer to advantageous changes or advantages that arise when companies actively apply the application of sustainability management in their SC. (Zailaini et al., 2012). These outcomes resemble the tangible accomplishments and effects witnessed when businesses embrace sustainability practices in their SC, thereby fostering environmental, societal, and economic enhancement in the world.

Countries with a visionary outlook, forward-thinking businesses, and proactive investors collectively serve as pioneers in driving the transition toward a greener economy. These pioneers play a crucial role in fostering sustainable development by embracing sustainability practices. Their initiatives not only set examples for others but also contribute significantly to the collective efforts aimed at building a more sustainable and eco-friendly future.

2.2 Sustainability risks in supply chain

Supply chain risks can be broadly categorized into two primary groups: internal risks and external risks, as highlighted by Faisal in 2009. More specific, Abdel-Basset et al. (2019) sum up some managed risks (internal risks) and uncontrolled risks (external risks) (Figure 2).

According to Abdel-Basset et al. (2019), internal risks include:

1. Manufacturing risks: these risks may be caused by disturbances within a manufacturing process. For example, machine breakdowns, property damage, supply chain interruptions, or quality control issues.
2. Business risks: happen when changing key structures of a business, such as organizational, strategic, or leadership changes. For example, leadership changes, shifts in market trends, or interruptions in the business model.
3. Planning and control risks: occur due to lack of estimation and planning, which causes ineffective management. For example, poor planning projects, mistaken resource allocation, or failure to adapt to changing circumstances.
4. Mitigation and contingency risks: occur because of the absence of plans or alternative solutions when wrong things occur. For example, the lack of a backup supplier when the primary supplier has a problem or the absence of a crisis management plan.
5. Cultural risks: these risks are caused by the organizational culture that hinders the open flow of negative information. For example, fear of reporting issues, a culture of blame rather than problem-solving, or lack of transparency.

External risks are listed by Abdel-Basset et al., (2019) consisted of:

1. Demand risks: caused by arising from unpredicted fluctuations in customer demand, which can affect a company's ability to meet market requirements. For example, sudden spikes or

drops in customer demand, changes in consumer preferences, or unanticipated market trends.

2. Supply risks: caused by interruptions in the flow of products, materials, or components through the supply chain. For example, supply chain interruptions due to natural disasters, geopolitical events, pandemics, or logistics and transportation disruption.
3. Environmental risks: caused by external factors such as shifts in governmental regulations, social factors, economic conditions, and climate-related issues. For example, shifts in government policies, economic decline, social unrest impacting operations, or climate change affecting production and distribution.
4. Business risks: related to various factors like the financial stability of suppliers, management issues, or changes in ownership of supplier companies. For example, the unstable finance of a key supplier, or shifts in management that affect operations.
5. Physical plant risks: caused by the physical infrastructure condition of a supplier and its regulations conformity. For example, poor infrastructure, regulatory non-compliance, or facility-related issues that could disrupt the production process.

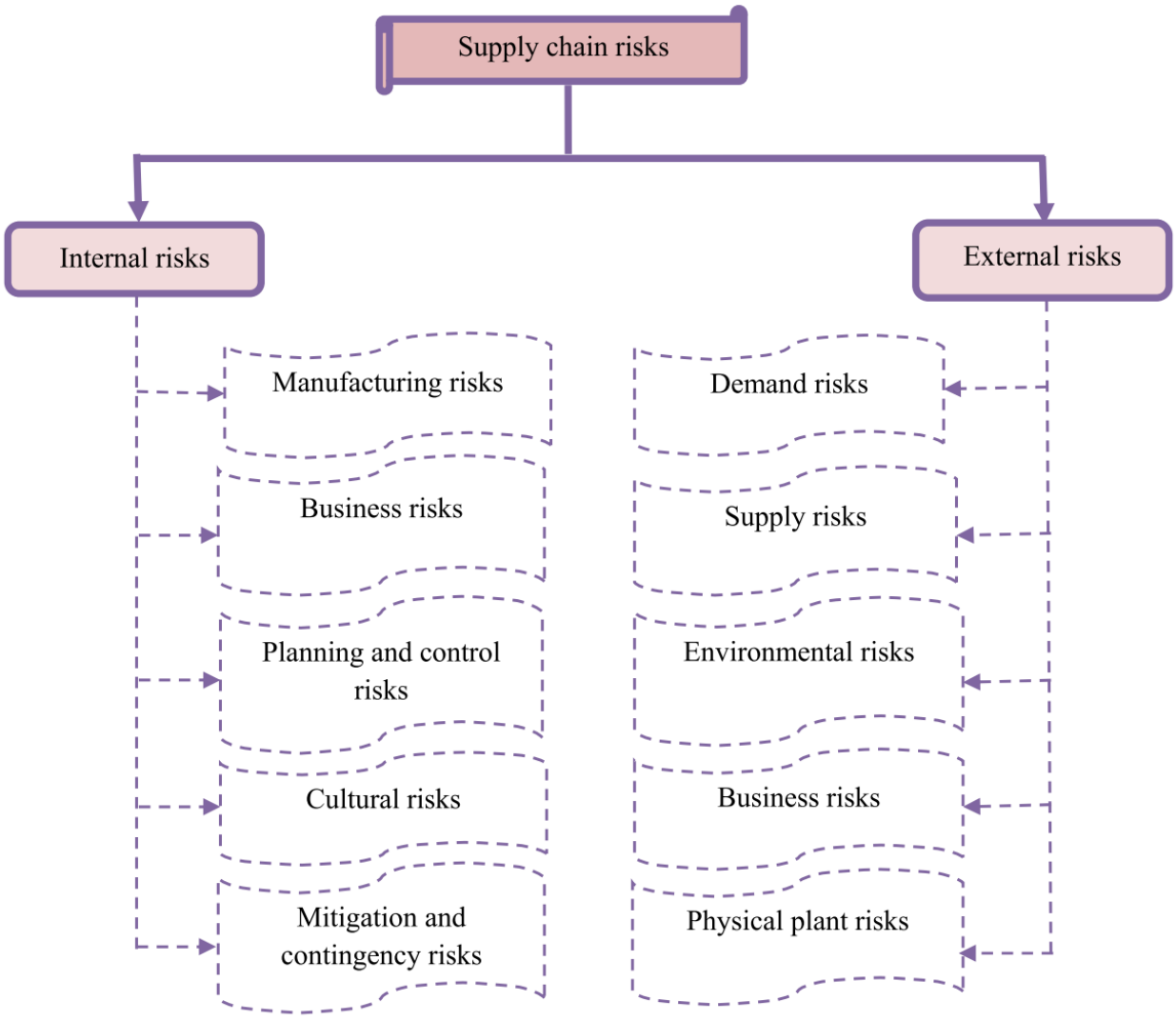

Figure 2 The categories of supply chain risks (Abdel-Basset et al., 2019)

Gurtu & Johny (2021) recognize that uncertainty in the commercial context has the effect of stimulating potential risks. This statement aligns with Christopher and Peck's (2004) categorization

of SC risks. The interaction between internal and external factors includes process, control, demand, supply, and environmental risks (Figure 3). This recognition emphasizes the need for a comprehensive risk management approach that considers both internal and external dynamics. The integration of these perspectives provides a comprehensive framework for addressing and managing risks in the modern business environment.

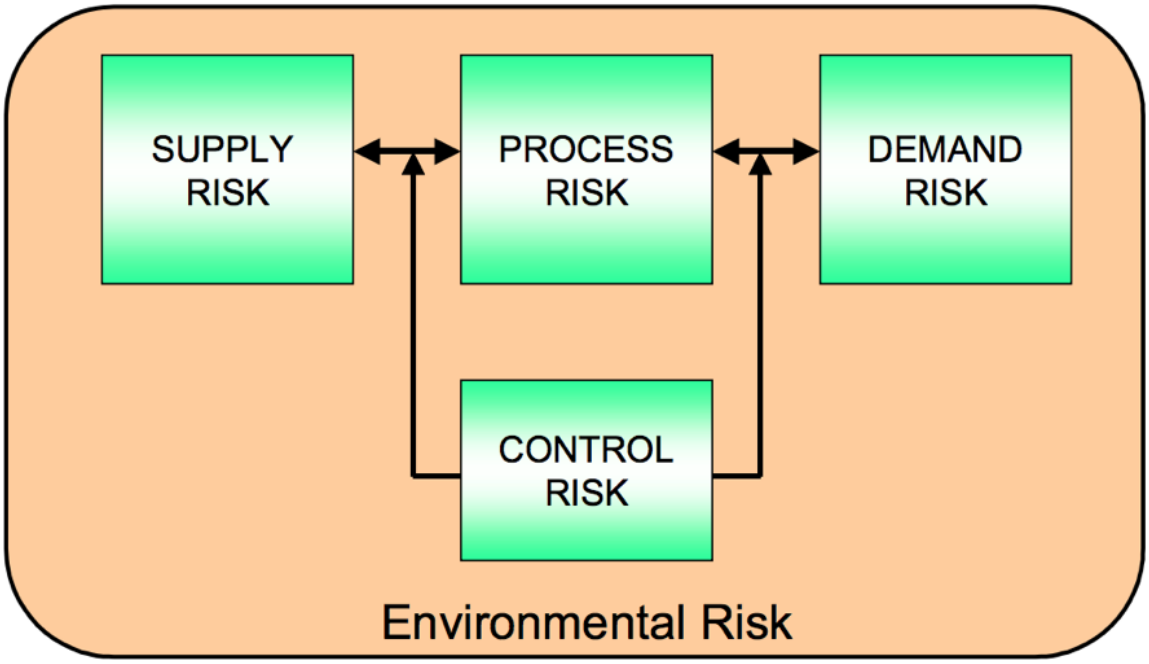

Figure 3 Sources of Risk in The Supply Chain (Christopher and Peck, 2004)

According to Chowdhury & Quaddus (2021), the occurrence of disruptions in the supply chain and its overall vulnerability determine the susceptibility of a supply chain. The statement highlights the interdependence of two key factors in assessing risks in SC. Various sources can cause disruptions such as natural disasters, geopolitical events, or technological failures, while vulnerability encompasses the weaknesses within the supply chain. Determining and understanding these elements is crucial for effective risk management in SC operations together with emphasizing the importance of a comprehensive risk mitigation strategy. Additionally, the disconnect between the stream of information, materials, and finance is also considered as risks in SCM (Sodhi et al., 2012).

There are six types of sustainability risk summarized by Palousis et al. (2008) which consist of physical, regulatory, litigation, competitive, reputation, and supply chain risks. The study underscores the important connection between the diverse obstacles and the advancement of

sustainable products, placing particular emphasis on not only ecological concerns but also legal, economic, and societal aspects to ensure comprehensive sustainability risk management. While Xu et al. (2019) categorize sustainability risks under three main groups which include operational (economic) risks, environmental risks, and social risks. Each group consists of more specific risks as in figure 4.

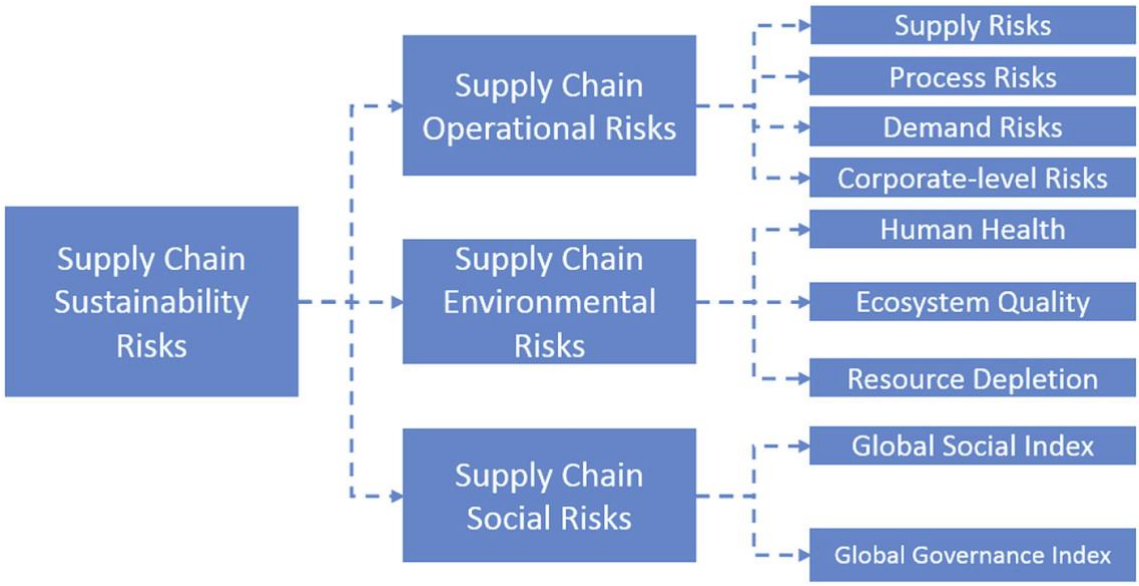

Figure 4 Supply Chain Sustainaility Risks (Xu et al., 2019)

The vital role of determining root causes is undeniable. To be able to analyze and mitigate risks, a responsible person needs to identify the origin of the problem. According to Hofmann et al. (2014), risk sources related to sustainability are "social issues", "ecological issues", and "ethic bussiness conduct issues". In addition, the authors also state that sustainability risk involves situations that may trigger negative reactions from stakeholders and potentially harm an organization. Altogether, [their] statements emphasize the need for businesses to adopt a comprehensive approach to sustainability risk management. The considerations of all three aspects are to maintain positive stakeholder relationships and safeguard organizational well-being. The viewpoint presented by Hofmann et al. aligns with present-time perspectives on the responsibility of business, emphasizing the interconnectedness of sustainability with various aspects of business operations.

The growing apprehension regarding societal and ecological risks in the near future underscores the critical noteworthiness of sustainability risk management (Figure 5) (World Economic Forum, 2022). The heightened awareness of these risks reflects a growing understanding of the potential impacts on businesses, economies, and societies. In response, organizations need to prioritize sustainability risk management as a strategic commanding, not only to mitigate potential adverse effects but also to align with evolving societal expectations and contribute to long-term resilience and responsibility in the face of a changing global landscape.

Figure 5 Future Risks from World Economic Forum Global Risks Perception Survey 2021-2022 (World Economic Forum, 2022)

2.3 Sustainability risk management

The heightened attention towards sustainability risk management is a direct result of the flourishing state of businesses and a growing awareness of the profound influence that sustainability practices can exert on various aspects of companies. Acknowledging the significance of stakeholder involvement, Hofmann et al. (2014) underscore the role of stakeholders and conclude that stakeholder reactions having strong affection on sustainability risk management in supply chain. Stakeholders, being attuned to the societal and environmental impact of business activities, have the power to influence corporate behavior. A positive response from stakeholders can enhance a company's reputation, foster brand loyalty, and attract socially responsible investors. On the other hand, negative reactions or concerns from stakeholders can pose risks to a

company's operations and market standing. As businesses continue to evolve, the collaboration between companies and their stakeholders in navigating sustainability challenges will likely play a pivotal role in shaping a more responsible and resilient business landscape.

The proficient control of uncertainty constitutes a crucial and indispensable facet in the strategic delineation and comprehensive administration of any entity (Finch, 2004). It accentuates the key significance of identifying, evaluating, and mitigating risks to ensure the enduring success and resilience of the organization. In the words of Carter and Rogers (2008), supply chain risk management is defined as “the ability of a firm to understand and manage its economic, environmental, and social risks in the supply chain” (p. 366). The definition of supply chain risk management holds immense significance. It emphasizes the need for companies to understand and address economic, environmental, and social threats in their supply chains. There is a change in the way risks are managed that moving towards broader considerations beyond just economic factors. The incorporation of economic, environmental, and social risk management promotes resilience and sustainability as well as enhancing reputation while fulfilling social responsibilities.

According to Faisal (2009), addressing and managing risks within the supply chain is a complicated task that requires industrious decision-making which involves numerous criteria. By understanding the importance of different priorities, companies are enabled to customize strategies for mitigating the supply chain risks. The strategic approach ensures a more effective risk management framework and enables companies to address critical vulnerabilities proactively and enhance general supply chain resilience.

In Shi’s (2004) view, insufficient risk management has resulted in increasingly grave consequences in recent times. Beyond the immediate financial implications that affect a company's revenue and profit, [his] work also points out that disruptions in the supply or demand can extend their adverse effects to the company’s partners including both suppliers and customers. This interconnectedness within the supply chain amplifies the repercussions, triggering a series of events that can reverberate throughout the entire supply chain ecosystem. As a result, inadequate risk management no longer confines its consequences to the internal workings of an organization. Instead, it extends throughout the intricate network of relationships within the SC, posing more extensive and severe challenges for all stakeholders in the process.

Given the complicated relationship that exists between risk management, economic efficiency, and sustainability, it is crucial to exercise prudence when seeking to reduce risks and strengthen the SC's capability to withstand challenges (Ivanov, Sokolov and Dolgui, 2014). This interdependence underscores the critical role of a holistic approach, one that minimizes potential disruptions as well as achieves the sustainability goals and economic effectiveness in supply chain management.

Depending on differences in sustainability goals and strategy, each company will design a suitable framework for its SCRM. In science research, there are also various perspectives about the process of risk management. Tummala and Schoenherr (2011) introduce five stages in risk management process which include 1) risk identification 2) risk measurement 3) risk assessment 4) risk evaluation 5) risk control and monitoring. Hallikas et al. (2004) propose a framework for supply chain risk management that is based on 1) risk identification 2) risk assessment 3) risk mitigation 4) risk monitoring. According to Waters (2011), there are three main steps in SCRM: 1) risk identification 2) risk analysis 3) risk responses. The risk management process in ISO 31000:2018 international standard includes 1) defining scope, context and criteria 2) risk assessment (which contains risk identification, risk analysis and risk evaluation) 3) risk treatment 4) monitoring and review. There exist numerous suggested frameworks for the effective management of supply chain risks. However, a general SCRM will consists of steps in figure 6 (Haji, Kerbache, & Al-Ansari, 2023)

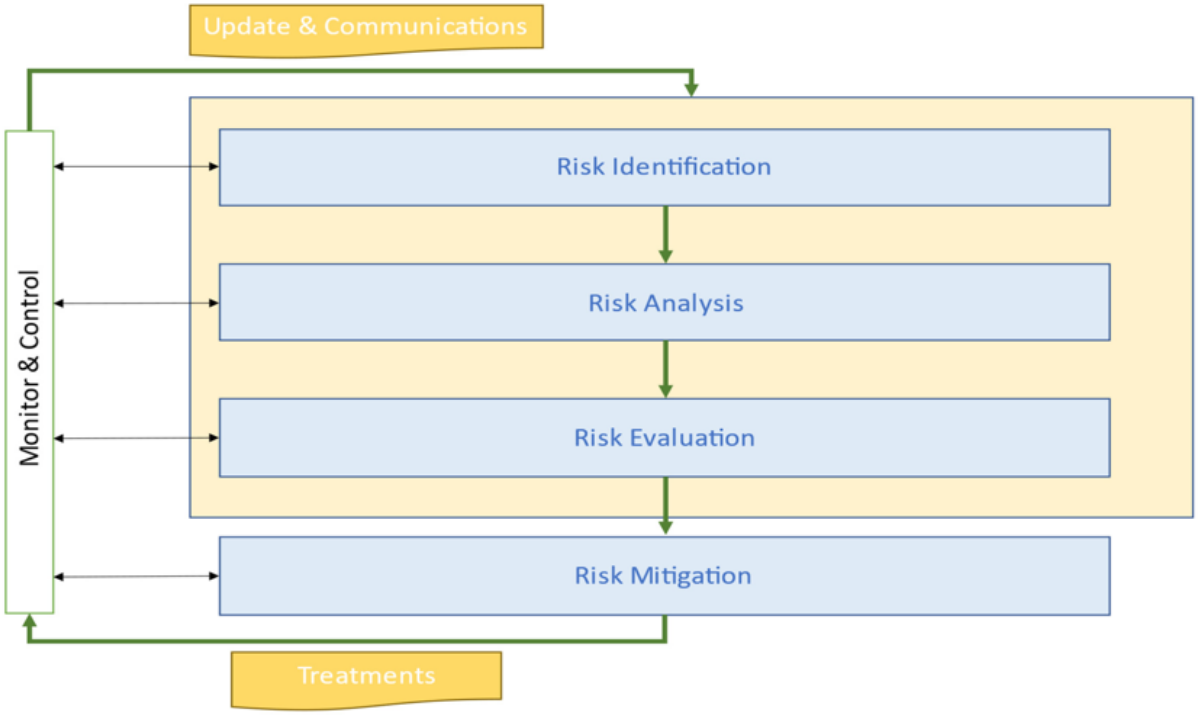

Figure 6 Supply Chain Risk Management Framework (Haji, Kerbache, & Al-Ansari, 2023)

2.3.1 Risk identification

Identity specifically the risk could build the value chain in the long term. Obviously opposite meaning of sustainability, risk identification is determining issues related to unsustainability. These risks can consist of a variety of problems, suchlike noncompliance and poor cyber hygiene as well as abuses of human rights and the environment.

Risk identification in the Supply Chain Risk Management Process involves categorizing and understanding potential problems within a SC systematically (Tummala & Schoenherr, 2011). Rangel et al., 2014 add once risks are categorized, it becomes more straightforward to assign appropriate management procedures to address specific risks.

In the step of risk identification, as outlined by McCormack et al. (2008, p.21), organizations are advised to consider "What can go wrong?" and "What is uncertain?" to compile a comprehensive list of relevant supply chain risks, allowing for proactive development of cost-effective risk management plans before potential issues arise.

Iles (2023) summarizes tools and procedures for risk identification that are seen in figure 7.

Technique	Definition
Geomapping/Supply chain mapping	"Visual maps of supply chains reveal supply chain structures, dependencies, and handoffs that may contain risk. SCOR mapping and Value Stream Mapping are two types of supply chain mapping that can be used." (McCormack et al., 2008: 22)
Looking at historical problems	"Historical problems may have a high chance of recurring. Those problems may have happened to the organization itself or to others." (McCormack et al., 2008: 22)
Researching industry trends	"Other organizations and industry groups may have already researched risks that are applicable." (McCormack et al., 2008: 22)
Group of experts brainstorming	"People with experience in different areas of your organization and supply chain have lots of knowledge of risks. Getting them together increases the knowledge sharing. (The Delphi method is one technique to conduct expert interviews.)" (McCormack et al., 2008: 22)
Assessment surveys	"Well designed surveys can be an effective way to quickly gather information on risks in your supply chain." (McCormack et al., 2008: 22)
Site visits	"Site visits to supply chain partners allow you to collect detailed and less "filtered" information on risks." (McCormack et al., 2008: 22)
Information audits	"Data system audits can reveal issues and trends from the past. It can show areas of the supply chain that have had poor performance in the past and are thus more likely to perform poorly in the future. Some tools used in risk" (McCormack et al., 2008: 22).
Interviews	Interviews with knowledgeable individuals. The advantage is that these are easy and fast to organise as a way of mean to collect "detailed information about specific risks from the people who are most familiar with conditions" (Waters, 2011).
Risk checklists	"A list of risks that are common for your environment. It may come from past experience or industry research." (McCormack et al., 2008: 22)
Cause-and-effect diagrams (i.e., fishbone, Ishikawa)	"A diagram that traces back the causes for events." (McCormack et al., 2008: 22)
Process charts	"Collecting information systematically studies the operations and identifies the risks at each stage." (Waters, 2011: 114)
Group meetings	"A group of around 10 knowledgeable people are collected to discuss risks in the supply chain." (Waters, 2011: 113)

Figure 7 Tools and Procedures for Risk Identification (Iles, 2023)

2.3.2 Risk Analysis and Evaluation

In *A framework for risk assessment, management and evaluation: Economic tool for quantifying risks in supply chain,* Abdel-Basset et al., (2019) state that once risks are identified, conducting risk analysis and risk evaluation are the next steps of risk assessment process. The authors define risk analysis as the methodical procedure of assessing the probability and impacts of prospective risks

that a business may confront. This analytical approach aims to prioritize identified risks for treatment, ensuring that resources are allocated efficiently to mitigate the most significant threats to the organization. In the risk management process, carefully conducting risk analysis is important for making decisions at all levels. Besides, it is essential to estimate the likelihood and consequences of issues, which enhances mitigating risks effectively and reducing negative impacts on the company efficiently. Using advanced methods like the “bowtie” method (Figure 8) enhances precision. This visual tool illustrates the relationships between possible causes, possible consequences, preventive/corrective actions, and aiding risk prioritization. In general, risk analysis and its advanced methodologies are crucial for effective risk mitigation.

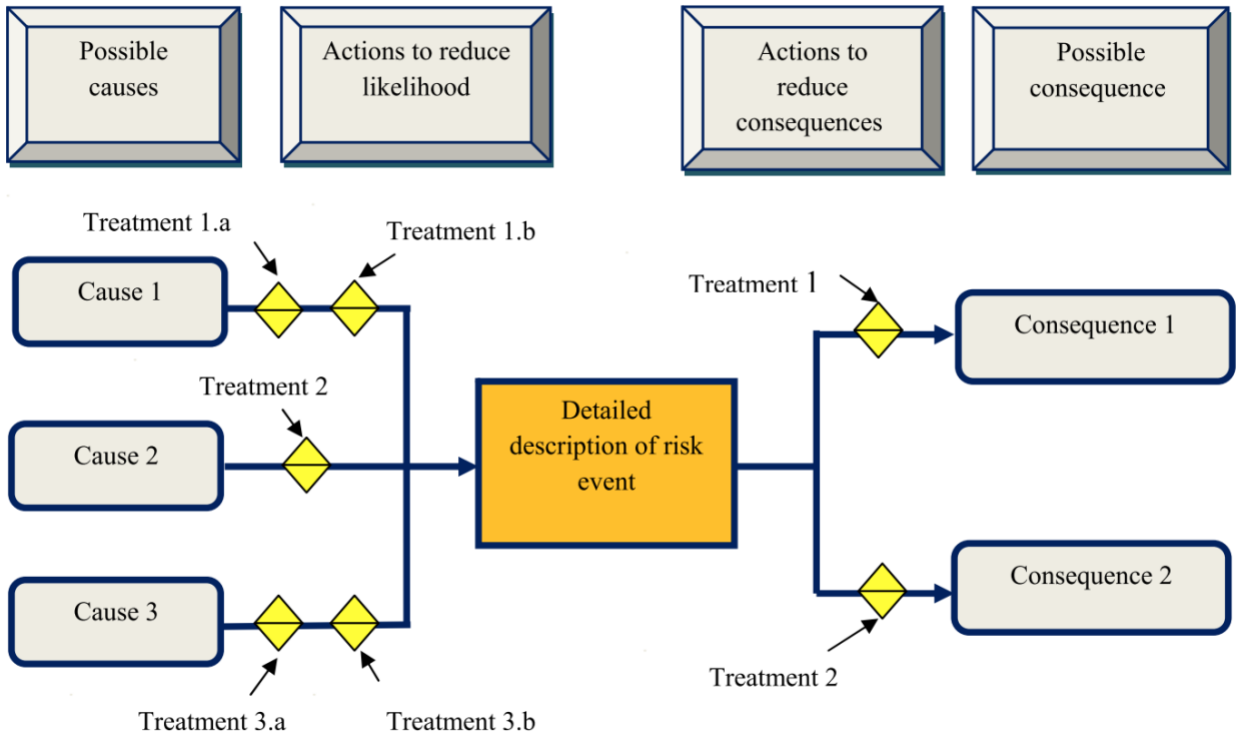

Figure 8 The Bow-tie Method for Risk Evaluation

According to Abdel-Basset et al. (2019), the purpose of risk evaluation is to consider the probabilities and consequences of problems before treatment. In risk management, the evaluation process ensures risks align with acceptable limits. After the treatment, the risks are compared against the enterprise's risk tolerance. Exceeded limitation risks requiring further treatment. To prioritize risks, companies can utilize different methods and tools such as a "heat-map" (Figure 9) that based on probability and consequence. The difference in risk tolerance of each organization is

influenced by goods, services, and time.

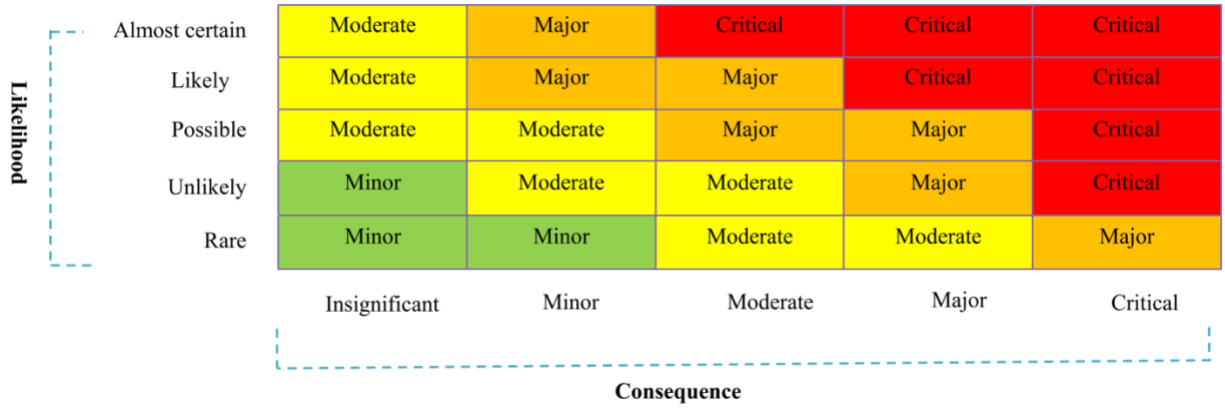

Figure 9 The Heat Map to Prioritize Risks

There are various frameworks for sustainability risk assessment proposed and researched for the initial phases of designing and developing products (Anand et al., 2016; Enyoghasi et al., 2020; Gar-galo et al., 2016; Palousis et al., 2010). More and more researchers agree that integrating sustainable considerations into the life cycle of products at the initial stages is essential. Early integration provides tangible advantages in addition to addressing the increasing need for environmentally responsible practices. It enables the identification and mitigation of risks, thereby decreasing the probability of encountering regulatory compliance issues and preparing the organization for the ever-changing market dynamics. Moreover, it results in financial savings and increased efficacy in the utilization of resources., avoiding expensive redesigns and ensuring responsible resource use. The focus on sustainability also enhances market competitiveness, appealing to the increasing number of environmentally conscious consumers. By aligning with stakeholder expectations, companies can build trust and safeguard their reputation. Furthermore, early consideration of sustainability fosters innovation, driving new technologies development and providing a distinctive edge in the market. In essence, this proactive approach contributes to long-term business resilience, adaptability, and competitiveness in an ever-evolving, sustainability-focused business landscape.

2.3.3 Risk Mitigation

After the process of identifying, analyzing, and evaluating risks, the subsequent step involves carrying out risk mitigation. Risk mitigation encompasses the strategic evolution and

implementation of proactive measures, which include the creation of plans to respond to risks. The purpose of these measures is to confine, regulate, and optimize potential risks within a project or supply chain (Tummala & Schoenherr, 2011). The ultimate objective is to decrease the severity or probability of a loss to a level that is deemed acceptable by the organization (Hubbard, 2020).

In 2004, Chopra and Sodhi propose mitigation approaches and corresponding tailored strategies which are seen in figure 10.

Mitigation Approach	Tailored Strategies
Increase Capacity	Focus on low-cost, decentralised capacity for predictable demand. Build centralised capacity for unpredictable demand. Increase decentralisation as cost of capacity drops.
Acquire Redundant Suppliers	Favour more redundant supply for high-volume products, less redundancy for low-volume products. Centralise redundancy for low-volume products in a few flexible suppliers.
Increase Responsiveness	Favour cost over responsiveness for commodity products. Favour responsiveness over cost for short life-cycle products.
Increase Inventory	Decentralise inventory of predictable, lower-value products. Centralise inventory of less predictable, higher-value products.
Increase Flexibility	Favour cost over flexibility for predictable, high-volume products. Favour flexibility for low-volume unpredictable products. Centralise flexibility in a few locations if it is expensive.
Pool or Aggregate Demand	Increase aggregation as unpredictability grows.
Increase Capability	Prefer capability over cost for high-value, high-risk products. Favour cost over capability for low-value commodity products. Centralise high capability in flexible source if possible.

Figure 10 Mitigation Approaches and Tailored Strategies (Chopra & Sodhi, 2004)

The overview of risk mitigation strategies in project management is well-detailed and provides valuable insights into addressing potential challenges throughout the project lifecycle. The five strategies Brown (2023) outlines Accepting, Avoiding, Controlling, Transferring, and Monitoring which are fundamental pillars of risk mitigation. Each strategy is explained as follows:

- Accepting the Risk: acknowledging and analyzing risks are essential steps to recognize which risks are in an acceptable range. Understanding the consequences of each risk and making them visible to the team fosters awareness and preparedness.
- Avoiding the Risk: proactive planning to avoid certain risks is a key aspect. The workload distribution based on skills and capabilities demonstrates one of the practical approaches to risk avoidance.
- Controlling the Risk: developing action plans for unacceptable and unavoidable risks. This ensures that the impact of these risks is minimized or eliminated through careful planning and execution.
- Transference of Risk: the concept of transferring risk to external parties, such as through insurance, is a considerable approach. It enables companies to minimize the financial consequences associated with specific risks.
- Monitoring the Risk: the emphasis on continuous monitoring throughout the project lifecycle is critical. Risks can evolve, and early detection allows for timely adjustments and proactive management.

2.3.4 Risk Monitoring and control

Continuous monitoring and control of progress are examples of proactive approaches to risk management in the supply chain, which is stated by Tummala and Schoenherr (2011). [Their] assertion that this approach involves the identification of preventive measures, the provision of improvement guidelines, and the implementation of corrective actions aligns with the fundamental principles of effective risk mitigation. Moreover, the authors also suggest that the utilization of data management systems as vital tools for monitoring reflects the increasing significance of technology. Depending on the company's strategy, goals, and capacity, different methods, tools, or systems will be chosen and conducted to enhance the effectiveness of the monitoring and control process.

Supplier performance is one of the most important factors that need to be monitored carefully (Lambert and Schwieterman, 2012). Otherwise, companies cannot ensure whether their key supplier could be able to adapt to market demand and requirements (Prajogo et al., 2012), which can cause disruptions and affect business performance. Post-contract, suppliers undergo ongoing assessments, including surveys, on-site reviews, and audits with feedback and improvement guidelines provided afterward (Dammert, 2021).

2.4 Challenges in sustainability risk management

Integrating sustainability factors into risk management still has many challenges. The results from WBCSD (2017) report emphasize that sustainability risks are identified as impactful. However, these risks are not being addressed adequately within the risk management framework. Due to sustainability risks frequently have emerging risk characteristics, are interdependent, and are difficult to predict.

Additionally, Boiral et al. (2020) state that “risk analysts face serious challenges due to the lack of reliable information, the unpredictability of sustainability risks, the methodological issues related to the measurement process, and the complexity and context-dependency of risk assessment” (p.1). Beside that the reason could be "a lack of knowledge, guidance, and cross-functional collaboration, and because sustainability risks are difficult to quantify and require longer time horizons to be taken into account" (Schulte & Knuts, 2022, p.737-738). There is a gap between sustainability risk impact and successful incorporation into operations of risk management. Moreover, the quantification of sustainability risks is inherently difficult, and the necessity for longer-term perspectives in risk assessments is an additional factor contributing to this gap. It is vital to tackle these challenges to improve the sustainability factors incorporation. In sum, the complexity and long-term nature of sustainability risks need to be approached more comprehensively and collaboratively.

Hartmann and Moeller (2014) argue that the primary company often shoulders the blame, assumes major responsibility, and faces diverse risks stemming from stakeholders' reactions. This is primarily due to consumers' inability to determine the responsibilities of members within the supply chain, leading to the term "chain liability effect." The "chain liability effect" serves as a warning for companies to approach sustainability as a collective responsibility, acknowledging the interconnectedness of actions and consequences within the entire supply chain. In essence, a focal firm is forced by stakeholders to take responsibility for any sustainability lapses throughout the entire SC, emphasizing the significant burden placed on the central entity in terms of perception, responsibility, and risk management. This underscores the need for companies to proactively manage sustainability to mitigate these challenges effectively.

The next challenge is stated by Schulte & Knuts (2022) that the process of creating specific connections between socio-ecological considerations and economic conditions is fraught with difficulties. The mention of challenges implies obstacles or complexities in integrating these two aspects. Further exploration and solutions to bridge the gap between socio-ecological and economic aspects also need to be studied and examined more effectively.

3 Implementation

3.1 Research method

In this study, the selected methodology is qualitative research, which places importance on a thorough examination of written information obtained from a literature review. Based on the collected theory, author subsequently carries out case study research on a specific company (KONE), and the use of qualitative methods is suitable for conducting in-depth analysis. This approach facilitates author to deeply study and analyze the risk management strategy of the case study company, the challenges it faces, and the specific actions taken in the context of sustainability.

3.2 Data collection

To build the theoretical foundation for this research, the author taps into a variety of primary sources such as journals, books, websites, and reports to gather the theoretical foundation of the research. The author conducts the exploration across academic journals and relevant books to identify scholarly articles as well as reliable information from reputable websites. The methodology involves a meticulous review and the extraction of knowledge from these diverse sources. Then, the author integrates a well-rounded information into the research study. This approach ensures that the examination is comprehensive.

In the process of data collection, the author focuses on utilizing existing materials. This approach involves extracting relevant information from KONE's sustainability reports and the official website of the company. The purpose of this method is to acquire comprehensive and reliable data directly from KONE. That is important to ensure that the obtained insights are current, authentic, and aligned with the company's disclosed sustainability practices. Furthermore, this foundation also serves as the fundamental basic for insightful analysis and interpretation.

3.3 Data analysis

In the next chapter, author conducts a systematical analysis of the collected data, sourced from reports of a case study company. The focus extended to evaluating the sustainability risk management framework employed by the company. Key elements, including risk identification, analysis, evaluation, mitigation, and monitoring/control strategies, were scrutinized to derive insights into how they approach and manage sustainability-related risks. This structured analysis aimed to uncover patterns, trends, and variations in the company's risk management practices, contributing to a comprehensive understanding of their sustainability initiatives within the broader context of risk management

4 Results

4.1 Case company KONE

KONE stands as a prominent Finnish company, holding a leading position in the elevator and escalator industry. Renowned for its expertise, the company specializes in delivering high-quality elevators, escalators, and automatic doors designed to enhance the functionality and accessibility of various buildings. With a commitment to innovation, KONE continuously strives to introduce cutting-edge solutions that not only meet but exceed the evolving needs of its diverse clientele. Plus, also offer maintaining services them working well and to update them. This adds value to buildings over time. According to 2023 Global 100 Most Sustainable Corporations ranking, KONE Corporation has been recognized as the 19th most sustainable company worldwide, and the top in Finland (Corporateknights, 2023). KONE aims to improve the quality of urban living and assists clients in maximizing their experiences. The main strategy of their mission is: “Sustainable success with customers” (KONE Sustainability report, 2022)

4.1.1 Risk identification of KONE

KONE's supply chains are susceptible to risks arising from both the company's internal operations and shifts in the broader operating environment. These potential risks necessitate a proactive and careful approach to supply chain management, ensuring adaptability and resilience in the face of dynamic challenges and uncertainties. That is a wide range of risks, which are identifying and

classifying environmental and social threats is crucial to KONE's operations. Sustainability-related risks in supply chains are including things example violations of human rights, environment degradation, financial losses, a decline in stakeholder trust, and difficulties with accountability and credibility. A supply chain management deviation may consequence in the outcome measures.

In the year 2022, KONE experienced a memorable period marked by sustained success in its customer-centric strategy and positive advancements in numerous global business projects. However, the company also faced challenges as its operations were affected by the tragic conflict between Ukraine and Russia (KONE Sustainability report, 2022). Even though, the among most significant risk factors listed below will negatively affect KONE's performance and economic standing while also increasing the company's value. On the other hand, some risks that are presently unknown or deemed insignificant by KONE but may be referred to as potential risks in the future could turn into significant issues.

Non-financial risks are also included in the evaluation and analysis of KONE's most major risks. Regardless of whether they are material to KONE, KONE has determined which non-financial risks are the most essential, in compliance with the requirements of the Finnish Accounting Act. Furthermore, KONE adheres to the guidance provided by the Task Force on Climate-Related Financial Disclosures (TCFD) in disclosing climate change risks. Resultantly, when supply chains are investigated, sustainability concerns receive a special attention.

The list below is presented the most significant and current risks in Kone in 2022 (KONE Risk Management, 2022):

- KONE's profits are decreasing due to rising costs for the materials required to manufacture and operate their elevators.
- The world economy is becoming increasingly fragile.
- KONE's competitiveness is influenced by market changes, customer preferences, and competitor offerings.
- Challenges in locating the necessary components and subcontracted labor for projects.
- Issues with the quality, safety, or integrity of the product, as well as problems with the company's reputation.
- Financial risks

- Disruptions to suppliers' and KONE's internal operations
- Challenges in developing capabilities and competencies
- Increased costs or potential disruptions caused by geopolitical tensions
- IT risks

Although risks are precarious, Kone still sees chances to succeed in taking them. If Kone manages sustainability risks well, they can gain benefits from their sustainability efforts. Collaborating with supply chain partners can enhance transparency in operations and foster ethical behavior throughout the supply chain.

4.1.2 Risk Analysis and Evaluation

KONE's management system employs a thorough evaluation of supplier risks as a proactive measure to protect and fortify the integrity of the supply chain. By delving into factors like financial stability, dependence on KONE's business, and location-based risks, including sustainability considerations and human rights, this comprehensive evaluation enables the identification of potential vulnerabilities. The inclusion of compliance monitoring, incident tracking, and continuous cybersecurity assessments further improves the ability of the company to preemptively address emerging risks. The risk engineering audit, covering diverse aspects such as human rights, facility, production, IT, natural hazards, and business continuity, provides a holistic view of potential threats (Kone Sustainability report, 2022). This proactive risk assessment not only allows for the early detection and mitigation of risks but also positions KONE to foster stronger relationships with suppliers, enhancing overall supply chain robustness and reliability.

In 2022, KONE prioritized a transparent and sustainable supply chain through ongoing assessments of around 200 key suppliers. The purpose of these assessments is to verify adherence to KONE's stringent environmental and social responsibility standards throughout its supply network. The focus on collecting life cycle inventory data from material suppliers for precise greenhouse gas emission reporting aligns with contemporary sustainability goals, showcasing KONE's commitment to accurate and transparent environmental impact assessments. Encouraging suppliers to implement measuring in emission reduction, such as more recycled content, reflects a collaborative effort towards sustainable practices. The assessment also includes criteria to encourage continuous improvement, allowing transparent information sharing with customers

(Kone Sustainability report, 2022). Overall, this strategy strengthens KONE's commitment to sustainability while positioning the company as a transparent and responsible player in the supply chain, fostering trust with customers through clear communication about material content and environmental impacts.

4.1.3 Risk Mitigation

The company has two main goals wants to achieve. First, they want to make sure everything they do is sustainable. Second, they want to expand their business with Kone's customers by offering valuable solutions. Therefore, KONE has been continuing developing sustainability practices. Moreover, KONE stimulates and expect their suppliers collaborate and take responsibility for the clear and positive changes in supply chains in all markets.

The target is customer at the center, which motivates KONE creating the value not only about quality of products, or smart solution services. Additionally, KONE persuades customers by embedding sustainability even more profoundly throughout all its operations within the supply chain through effective risk management practices. KONE’s response on specific sustainable cases, from that they bring the best solution. Setting ambitious target to challenge and keep moving forward to the bright future. For example, setting very ambitious goal to cut the greenhouse gas emissions. Increased attention of sustainability in supply chain, including human rights.

KONE's commitment to ensuring quality with its suppliers is not only demonstrated through coaching and rigorous control measures but is also deeply rooted in its overarching objective to sustain the base of suppliers in accordance with global quality and environmental standards. This commitment is not merely a regulatory adherence; it reflects KONE's dedication to responsible and ethical business practices. By expecting key suppliers to achieve KONE's Supplier Excellence Certification, incorporating ISO 9001, ISO 14001, and ISO 45001 certifications, the company aims to elevate the standards of quality assurance and environmental responsibility across its entire supply chain. This strategic move, complemented by coaching and assessments, enhances operational efficiency, mitigates risks, and instills stakeholder confidence, solidifying KONE's position as a responsible and trustworthy industry leader committed to excellence and sustainability in its global marketplace presence.

Internal control

With the large scale and, keep continuing the scale spreading out of KONE and KONE's partners in future, which is created thousands of job positions and, keep in hand the giant source of labor in all markets. KONE works with thousands of suppliers around the world. Thanks to the collaboration of these KONE's suppliers and their sub-suppliers are important for KONE's business and create jobs for thousands of people around the world. KONE gets stuff from 30,000 suppliers like materials, parts, installation services, and other things they need (Kone Sustainability report, 2022).

The primary objective of KONE's internal control system is to guarantee Group's operational efficiency and profitability, the management, elimination, or mitigation of risks to a reasonable degree, and the reliability of reporting in finance and operation following relevant regulations, policies, and practices (KONE Corporate Governance Statement, 2022). KONE guarantees the excellence of their products through rigorous adherence to standards in production, assembly, and maintenance. Furthermore, KONE wants to communicate clearly and honestly to avoid damaging its reputation and handle any problems that may come up. KONE follows strict rules for how its company is run. KONE guarantees that "Ethics and compliance are a key element of KONE's sustainability strategy" (KONE Code of Conduct, n.d.). Therefore, KONE allows to establish a standard program for KONE's internal controls that is based on the company's high ethical standards, values, and Code of Conduct.

Thank to the standard framework has drawn in and promoted capable and committed employees while also encouraging committed leadership, opening training programs, improving corporate culture, and creating a positive, orderly work environment. On the other words, internal control is built to manage, mitigate or eliminate these risks are connected to operations and maintenance, finance, and compliance. Controls are backed by global and local policies and principles, and developments from information systems and business operations are constantly and consistently incorporated into control design to maintain it.

The KONE management teams share responsibility the of implementing the control standard framework and overseeing adherence to both local and global policies and guidelines. Global Finance and Controls is in charge of managing the entire structure besides four "Ways to Win" that

are introduced by KONE including empowered people, marketing and sales renewal, Lean KONE and digital + physical enterprise. These are essential concepts that give the company strategy life and reflect the diversity of internal development initiatives.

External control

The last year the world witnessed the chaos of many events in the worlds. The chaos directly or sometimes indirectly affects the supply chain operations. Typically, they know the unexpected event of war in Ukraine, problems of high inflation all contributed to supply chain issues, and the energy problem in Europe. The KONE Centennial was created and ran a prolonged matching funds initiative to provide supportively essential packages to help community where are misery in the tragic war between Ukraine and Russia. Unexpected war causes tough times in many aspects. The company has to present tough decisions that was sold the long-history KONE's operations for over a century in Russia to local management. The decision is not only the untold affirmation to support Ukraine, that also the way KONE protected the Ukrainian KONE team who directly had been working in the operations (Kone Sustainability report, 2022).

Besides, KONE is very dedicated to following rules for responsible business behavior set by the government and sustainability-related organizations. They have integrated sustainability into all aspects of company management. For example, Code of Conduct of KONE, Competition Compliance Policy, Human Rights Policy, Environment Policy, and Climate and Environment Program. They always use the precautionary principle and recognize the importance of prevention, particularly in areas where there are environmental and social risks.

The table 1 presents KONE's mitigation actions corresponding to the identified risks above (KONE Risk Management, 2022).

Risk	Risk Mitigation
The world economy is becoming increasingly fragile	• Enhance continuously the competitiveness by having a broad global presence and supply network, extensive capabilities in manufacturing as well as well-balanced business portfolio.
Increased costs or potential disruptions caused by geopolitical tensions	• Follow up regulations, policies and trade rules application • Backup plans • Assess the effectiveness of its supply chain and sourcing channels

	• Reduce tariff impact and geopolitical tensions on its business operations
KONE's competitiveness is influenced by market changes, customer preferences, and competitor offerings.	• Invest and focus on R&D stage • Track trends in market and industry • Observe opportunities to make industry more solid and stronger
KONE's profits are decreasing due to rising costs for the materials required to manufacture and operate their elevators.	• Adjust and balance profit margin of received orders • Flexible pricing • Focus on reducing costs as well as productivity advancements
Challenges in developing capabilities and competencies	• Considerable training programs for critical talents • Assess proficiencies and capabilities of internal and external talent pools frequently to ensure the effective operations
Challenges in locating the necessary components and subcontracted labor for projects.	• Effectiveness in sourcing • Enhance subcontractor pools • Monitor and develop subcontractors' performances • Carefully monitor the market of semiconductor
Issues with the quality, safety, or integrity of the product, as well as problems with the company's reputation.	• Quality control policies and procedures must be strictly followed to reduce risks in production • Strive effective communication • Uphold strict principles of corporate governance
Disruptions to suppliers' and KONE's internal operations	• Strengthen consistent KONE's management capabilities • Monitor and control its suppliers' performances • Alternative sourcing for critical components and services • Insurance for property damage and disruptions • Mitigate risks from possible interruptions by KONE's advanced global supply chain
IT risks	• Cybersecurity policies • Cyber risk management by control framework of trusted external providers • Identify, assess, monitor and control cybersecurity risks • Strengthen capabilities in cybersecurity • Insurance
Financial risks	• Follow KONE Treasury Policy

Table 1 Mitigation actions

4.1.4 Risk Monitoring and control of KONE

Achieving effective risk monitoring and control within KONE's supply chain is tied to the integration of continuous improvement principles, leveraging tools and techniques that prominently include the application of Lean and Six Sigma methods. These robust management practices play a pivotal role in meticulously controlling process variations, ensuring the seamless

reliability of both product and process transitions, and concurrently mitigating potential risks. The reduction of waste, a core tenet of Lean and Six Sigma methodologies, not only contributes to immediate risk mitigation but also underscores a commitment to operational efficiency. This commitment goes beyond immediate advantages and establishes a strong foundation for long-term resilience. Moreover, it also creates an organizational culture that is finely attuned to continuous improvement. To strengthen this approach, KONE has also considered additional investments in the enhancement of capabilities in order to foster a dynamic and adaptable system within the supply chain. Through the allocation of resources towards technological advancements, employee training, and process innovation, KONE not only has the ability to effectively address existing challenges but also to proactively navigate and manage evolving risks in the future (KONE Sustainability report, 2022). These strategic factors will be useful to keep KONE being a dominance in the elevator and escalator industry.

Monitoring and control suppliers' performance

At KONE, the continuous development of supplier performance is an essential strategic element. This strategy demonstrates the company's strong commitment to maintain elevated benchmarks and foster cooperation within its supply chain. The process of monitoring involves the comprehensive assessment of crucial suppliers by monthly key performance indicators (KPIs), periodic assessments of supplier quality and sustainability maturity. Thanks to this proactive approach, KONE could ensure that its suppliers consistently align themselves with KONE's expectations and sustainability objectives.

In practice, the results of the assessments go beyond mere numbers on a report. Instead, they serve as a cornerstone for meaningful and constructive discussions with each supplier. When a supplier's performance falls short of expectations, KONE undertakes corrective actions or development projects (KONE Sustainability report, 2022). Besides, the dynamic nature of this process allows for real-time adjustments and collaborative efforts to enhance supplier performance. This approach not only safeguards the standards of quality and sustainability but also fosters a culture of open communication and shared responsibility between KONE and its vital suppliers.

Another way to control suppliers' performance is audit. Audit practices are important in the supply chain of KONE. The robust supervision of KONE's supply chain is supported by its audit system, where a majority of strategic suppliers go through periodic examinations. These audits show a dedication to excellence and durability by involving a thorough examination of changes in products or production processes, or ensuring adherence to industry standards and regulations. Moreover, the audits also validate the successful implementation of development initiatives and providing a comprehensive evaluation of the supplier's commitment to continuous improvement. Furthermore, the assessments extend to examine carefully quality and environmental management systems. The audit plan is an annual review and prioritization process. This approach emphasizes KONE's commitment to balancing evaluation with streamlined processes, ensuring that the supply chain remains resilient and aligned with the company's comprehensive values (KONE Sustainability report, 2022).

4.1.5 KONE's sustainability performance

"We don't take human rights for granted; we respect human rights and expect the same commitment from all our suppliers, distributors, and other business partners" the KONE President – Henrik said (KONE Sustainability report, 2022).

With the endurance and always keep going forward that encourage the KONE teams have well played during the tough times. Safety for people is the top priority and KONE guarantees that will be never compromise on that. Spotlight on the people promise that KONE published a promise to efficiently increment differing qualities, value, and consideration at KONE. Always seeking out talents, potential candidates with diverse backgrounds in diverse aspects such as: gender, location, industry, competence. Showing a fresh look at human resources at KONE such as women's employee resource and, open to the LGBTIQ+ community. Empowering to employee under flexible control because employee who directly involves in the supply chain, and make influences on it. For example, employee encourages to optimal the routing of material flow through the distribution center network and, employee decides to choose the best options of close location suppliers to distribution centers. Continuous improvement involves ongoing efforts to enhance reporting methods and equipment, achieved through collaborative initiatives with logistics service providers. This collaborative approach aims to optimize the usage of reporting tools and equipment, ensuring efficiency and effectiveness in the logistics processes.

Here are some achievements of KONE's sustainability performance (KONE Sustainability report, 2022):

- KONE launched the world's first carbon-neutral elevator in March,2022. This elevator goes along with our environmentally friendly service called KONE Care DX, which is the first carbon-neutral maintenance service for elevators.
- Top-notch energy efficiency, ISO 25745 A-class energy rating, first in the industry.
- Save up to 70% of energy by making elevators more modern.
- 90% of the potential to be recycled or reused that have been processing in all products of KONE from metal material. KONE guaranteed that all necessary regulatory environment is processed surely.
- Support positively from transportation to accommodation for local people in Ukraine where is suffering the tragic war. Plus, KONE is one of pioneer to be donated through Finnish Red Cross in aid of the war relief efforts in Ukraine.
- 23.5% of women working at the factory in 2021 and 21.4% in 2020. The aim has been set the percentage will be raised to 35% in 2030.
- Annually support the United Nations Global Compacts includes promising principles on human rights, labor standards, environmental conservation, and against corruption.
- Widest range of Environmental Product Declarations and Health Product Declarations.

5 Conclusions

Within this section, the key findings stemming from the examination of the case company, juxtaposed with relevant theoretical insights will be presented to address the core research questions: "What kind of risks enterprises have in their sustainability of supply chain?"; "What types of challenges exist in the management of sustainability risks?"; "How can enterprises enhance the management of sustainability risks within their supply chain?".

5.1 Risks enterprises have in their sustainability of supply chain

Enterprises like KONE grapple with a spectrum of sustainability-related risks in their supply chains, ranging from human rights violations to environmental degradation and financial losses. The

events of 2022, including the Ukraine-Russia war, highlighted external geopolitical factors influencing sustainability. KONE recognizes significant risk factors, from rising material costs impacting profits to the fragile world economy, market-driven competitiveness, and challenges in sourcing components. Despite these risks, KONE adopts a proactive stance, managing sustainability risks to derive benefits from their efforts. Collaborating with both internal and external stakeholders in the supply chain is one of the strategic approaches to enhance transparency and adapt sustainability requirements. The practices in strengthening relationships not only with suppliers but also with other stakeholders must be improved and enhanced at all levels within the organization.

5.2 Enhancing sustainability risks management in supply chain

The important role of sustainability risk management and the growing awareness of the need to incorporate sustainability practices to tackle challenges and uncertainties is increasing in the evolving global business environment.

Concerned with the significance of SSCM, KONE determine a clear vision, targets, appropriate risk management system, and active approaches to achieve sustainability objectives. KONE also has a crystal awareness of the benefits when integrating sustainability practices into its daily operations at all levels. The benefits of incorporating sustainability practices into the selected company operations are evident throughout this study. Beyond fulfilling corporate social responsibility, sustainable business strategies yield tangible advantages, such as enhanced brand reputation and increased customer loyalty. Companies such as KONE demonstrate how a dedication to sustainability can result in worldwide acknowledgment and eminence.

Sustainability strategies, management and practices are indispensable in any company business. When sustainability becomes an integral part of corporate culture, organizations can achieve successful results by influencing decision-making processes at all levels. The sustainable integration also ensures a comprehensive and enduring commitment to responsible practices. The selected company has an advanced risk management system however it still faces diverse challenges because the nature of the supply chain is complex. Internally, organizational culture, resistance to change, and resource constraints can impede the effective implementation of

sustainability practices. Externally, economic uncertainties, regulatory complexities, and global geopolitical dynamics present additional obstacles. For this reason, companies not only need effective risk management but also continuous improvement and development practices in order to achieve business goals, enhance ecological, and social well-being as well as gain competitive advantages in the market.

As a case in point, this thesis has specifically examined KONE's approach to managing its sustainability supply chain. Additionally, author has gained the ability to understand the challenges and intricacies involved in aligning SC operations to achieve sustainability objectives by studying the strategies employed by KONE. In essence, this study adds to the information on sustainability in business by determining challenges and opportunities associated with sustainability risk management.

6 Discussion

The achievement of established goals was easier with a planned and carried out research methodology. Thorough data gathering, review of existing literature, and flexible approaches in response to obstacles guaranteed the reliability and validity of findings. Collecting feedback from professionals additionally improved the research process. The alignment of the methodology with overall objectives contributed to the successful fulfillment of aims.

Future developments in the field of sustainability risk management in supply chain can be guided by two key research proposals. Firstly, an in-depth exploration should focus on comparing the differences in sustainability risk management practices among companies within the same industry, with specific emphasis on benchmarking against KONE Corporation. This comparative study aims to disclose industry-specific details and best practices, providing valuable insights into the diverse strategies employed for mitigating sustainability risks. Secondly, future research should undertake a comprehensive investigation into cross-country differences in sustainability practices within supply chains. This study could encompass an analysis of the regulatory frameworks, cultural influences, and regional variations shaping sustainability risk management strategies. Understanding how companies adapt their practices to align with diverse socio-economic and environmental contexts will enhance specific and globally applicable comprehension of SSCM. These proposed research directions hold the potential to deepen our

understanding of sustainability risk management strategies and foster the evolution of tailored approaches for companies operating in distinct industries and global contexts.

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