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The Role of Supply Chain Risk Management in Gaining Competitive Advantage

Supply chain management

Bachelor's thesis

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Supply chain risk management (SCRM) has experienced an uptick in relevancy and interest among supply chain managers, as large-scale disruptions in supply chains have become more common. With disruptions being of global scale, so too are modern supply chains becoming increasingly global in nature, with chains consisting of numerous suppliers all over the world being normal. Recent worldwide events have caused major difficulties in securing the flow of material, components, and services, which has made companies that best manage their supply chain risks fare better than their competition. Effective management of supply chain risks could be an impactful tool to create and gain competitive advantage in the field of supply chain management.

Supply chain risk management allows companies to prepare for and mitigate the effects disruptions could have, resulting in no noticeable impact for the end-customer in the supply chain. Supply chain risk management is preparative in nature, as disruptions are difficult to foresee. A new way of looking at supply chain risk management is a concept called supply chain antifragility, which seeks opportunities for growth in disruptions.

Competitive advantage is typically gained through superior performance in creating value, thus making the company be able to compete with cost leadership and scaling of their production. Differentiation can also help gain competitive advantage, especially in a field of business such as supply chain management, where a whole chain is difficult to replicate, as they are so complex. Superior supply chain performance indicates that a supply chain has correctly aligned its strategy with the rest of the business, uses information systems that work well with its needs, and it is able to share key information with its partners in timely manner, resulting in improved value creation performance.

Supply chain risk management's role in gaining competitive advantage is substantial, as supply chains are increasingly used as competing elements in business. Even though global incidents affecting supply chains are rare, they have been proven to be getting more frequent. This encourages companies to prepare for them through supply chain risk management. Though preparation for an event that can't be foreseen will take up resources, the cost of not doing so will be drastically higher than the cost incurred by actions done in the name of risk management.

Key words: supply chain risk management, competitive advantage

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1 Introduction

Small- and large-scale disruptions have affected supply chains since the dawn of the concept itself. However, with the recent uptick in global supply chain disruptions, such as the COVID-19 pandemic, the Suez Canal incident in which a large container ship got stuck in it, or most recently the attacks against container ships in the Red Sea, more attention has been brought upon preparedness for these types of situations. It seems that the modern world of business is facing an increasing amount of uncertainty, which stems from a faster pace of change, increasing complexity, a multi-polar global order, globalisation, as well as increasingly interconnected risks (Elahi, 2013). If large-scale disruptions become a new “norm” in supply chain management, it can be said that the companies who best manage their supply chains in times of trouble, via better preparedness compared to others, will gain in terms of competitive advantage, thus improving their position on the market. For a supply chain to function with efficiency, it must be able to withstand these disruptions. To achieve this, supply chain managers typically seek to guarantee the flow of materials, components, and other elements through alternative routes, which is part of supply chain risk management.

This study’s main research question and aim is defining supply chain risk management’s role when trying to gain competitive advantage. Sub-questions that are investigated include the following: What is the pre-existing viewpoint on SCRM’s effects on competitive advantage? How does risk management affect the performance of a supply chain? On top of the previous points, concepts such as supply chain resilience and antifragility, which expand to seeking growth opportunities out of disruptions, are to be investigated in this study.

Supply chain risk management (SCRM) seeks to lessen the effects that disruptions cause (Helmond et al., 2022). When risk management succeeds, it helps to protect a business’ operations, ideally causing no noticeable effect to end-customers. If a business has exceptionally well-functioning supply chain risk management, it could increase its competitive advantage compared to others. Competitive advantage relates to the differentiating factors a business has that it can turn to its benefit. These factors are typically difficult to replicate, as otherwise they would have been copied already (Kadriye et al., 2020). Among other things, a differentiating factor can be cost leadership, better product quality, quality of service, swiftness of delivery, etc.

This study consists of five segments. The introduction is followed by a literature review, which focuses on the topics laid out in the introduction. The sources used are from Volter, EBSCOhost, and Google Scholar. The literature review is divided into three sub-segments. After the literature review, the findings are summarised and addressed in the summary and conclusions segment.

2 Supply chain risk management

2.1 Introduction to supply chain management

Supply chain management (SCM) is the process of managing the flow of materials or services from the beginning of a supply chain in suppliers, to the end of it in end-customers. This can involve managing, executing, or improving business processes related to the flow of either products, materials, or services (Mentzer et al., 2001). The role of supply chain management is to improve the value delivered to a customer through well-coordinated end-to-end processes, which potentially lead to better quality in services or products (Helmond et al., 2022). Supply chain management is characterised by its inter-organisational nature, as it focuses on bridging the gap between suppliers and customers, with the needs of customers always in mind (Drake, 2012). Rather than seeing a supply chain as a single chain of elements all working towards a united goal, the modern outlook on the nature of supply chains is that it consists of numerous individual elements that may have differing goals (Estampe, 2014). It is the work of managing supply chains that connects these elements into being able to accommodate the goal the company responsible for the management desires. The effectiveness of supply chain management can have direct implications for the competitive advantage of a company, as it increases the overall effectiveness of the business and reduces waste among other things (Helmond et al., 2022 & Arif-Uz-Zaman et al., 2014).

Along with making processes as effective as possible and reducing waste, managing supply chains involves preparing for and responding to disruptions that differ in scale, further highlighting the effect that it can have on the competitive ability of a company. Modern supply chains are of increasing scope, involving numerous subcontractors that each can have their own subcontractors, creating a complex chain of companies (Wilding, 1998). This phenomenon decreases the direct control the main supplier has on its supply chain, increasing the risk of being unable to mitigate potential problems that a subcontractor can experience (Helmond et al., 2022). Supply chain management aims to reduce the effects that variables within the supply chain can cause (Drake, 2012). Globalized supply chains carry the risk of lengthening the response time to a disruption taking place in it but come with the advantage of potentially reduced costs in materials or products. This dilemma of balancing between trying to source locally and limiting

costs makes companies face decisions that have wide implications on the manageability of the supply chain. Global supply chains are shaped by forces occurring in the global economy, namely by market forces, technological forces, and global cost forces (Prater et al., 2013). The focus with supply chain management in the future will be in making it more circular and sustainable, with research towards the economic, social, and environmental sustainability gaining traction (Winter et al., 2013).

2.2 Key attributes of supply chain risk management

Supply chain risk management aims to mitigate the effects disruptions have on a supply chain. A complex supply chain with an extensive quantity of suppliers increases the risk of facing disruptions (Ghadge et al., 2012). This indicates that as globalisation has caused companies to seek reduced costs through sourcing suppliers from all parts of the world, the probability of encountering supply chain disruptions has risen with it. According to Norrman & Jansson (2004) the elements that increase supply chain vulnerability are, among other things, the following:

- increased use of outsourcing of manufacturing and R&D to suppliers
- reduction of supplier base
- the intertwining and integration of processes between companies
- reduced buffers, such as safety stock
- increased demand for shorter lead times and on-time deliveries in shorter time windows
- shorter product life cycles
- fast and heavy ramp-up of demand early in product life cycles
- capacity limitation of key components (Norrman & Jansson, 2004)

Risks in the supply chain can be divided to external risks, or those that you cannot influence, as well as internal risks, that you can influence. Having only internal risks would seem more desirable in terms of risk management, but it is not realistic when dealing with a value network that encompasses multiple suppliers, spanning numerous countries. Risk can be defined as the uncertainty concerning the occurrence of a loss

(Regda, 2007). There are five main types of internal and external risks. The five internal risk types are: demand risk, supply risk, environmental risk, business risk, and physical plant risk. The five external risk types are manufacturing risk, business risk, planning and control risks, mitigation, and contingency risks as well as cultural risks (Helmond et al., 2022). However, supply chain risk types vary according to the source, with some dividing them to two categories (internal & external), and some to three (organisational risk, risk within the supply chain, and risk in the external environment), while some take a stance where all risk types are their own category (Ho et al., 2015).

Steps to manage supply risk have been defined, with varying definitions among scholars and researchers. The basic steps are universal however, with differences typically springing from smaller sub-steps. The concurrent, mostly shared outlook on the steps of supply chain risk management is the following (See e.g. Tummala & Schoenherr, 2011 and Ho et al., 2015):

1. Risk identification
2. Risk assessment
3. Risk management
4. Risk monitoring
5. Organisational learning/improvement of current risk prevention measures

Supply chain disruptions are typically measured on their severity, complexity, duration, and scale (Hohenstein, 2022). Disruptions have been pointed out to cause both short-term losses for companies, as well as long-term effects on their ability to recover and get back to the prior levels of business operations. These effects typically have an impact on a company's stock price as well (Helmond et al., 2022). There is no single, objectively correct way to mitigate supply chain disruptions, but certain strategies can work better for certain business types, as well as help prepare for both radical disruptions such as pandemics, or more regularly commencing events in a supply chain, such as a lorry being late, or a strike. The length of a supply chain determines how responsive it is to variability (Drake, 2012). Therefore, shortening it can decrease the time to react to disruptions. However, with the global nature of supply chains, finding the right balance between a responsive supply chain and low costs can prove to be

challenging. A trade-off could be calculated, where the cost of a specific disruption occurring in a supply chain consisting of e.g. fifteen subcontractors would be measured up against the costs of having a shorter supply chain, with lower risk of encountering the disruption, but with higher running costs.

Supply chain risk management's goal is to ensure that disruptions, whatever their kind, don't affect the overall functioning of the supply chain itself. In reality, disruptions will most likely cause temporary stoppages or halts in the flow of components or materials, but these are ideally resolved swiftly. In a perfect world this doesn't happen, but due to the uncertain nature of disruptions and their consequences, some hiccups are likely to occur. A quick response to the problem will most likely be enough to stay in the competition, or even be ahead of it, given that some companies will not put the same effort in risk management.

With risk management becoming an essential part of supply chain management due to the complicatedness of the area of business, and global competition driving companies to strive for competitive advantage by creative means, the role of supply chain risk management has risen to a new level (Brindley, 2004). However, supply chain risk management is not a tool that can be used without guidance from a set strategy or plan, as finding the most optimal ways to conduct risk management practices would be done with little direction. Finding said optimal ways requires measurement instruments, which are vital in developing both supply chain management and supply chain risk management (Ritchie & Brindley, 2007). Optimisation leads to improved overall supply chain performance.

3 Supply chain performance

3.1 Supply chain performance defined

Supply chain performance is a supply chain's extended form's ability to meet customer expectations, deliver products in promised time, and in good condition. This necessitates the right amount of inventory and capacity. Supply chain performance depends on multiple variables due to its boundaryless nature, including collaboration with suppliers, partnerships, flexibility, and agility (Akyuz & Erkan, 2009).

Supply chain performance crosses organizational boundaries, as the whole supply chain consists of various parts and factors, such as raw elements, subassemblies, components, and finished products, that all must be distributed to end-customers via multiple differing channels. Being boundaryless in nature, supply chain performance crosses many intra-organizational lines as well, such as manufacturing, procurement, and distribution (Hausman, 2002).

3.2 What factors influence supply chain performance?

Supply chain performance is closely related to the overall supply chain strategy that a company has (Sukati et al., 2012). There isn't a single supply chain strategy that fits every company that exists, so individual, differentiated supply chain strategies can and must be developed to stay competitive (Hilletofth, 2008). Depending on the situation, a company can employ a lean, agile, or a hybrid supply chain strategy. A lean supply chain places emphasis on cutting lead times, which has the effect of typically reducing the length of the supply chain (Tortorella et al., 2017). An agile supply chain strategy focuses on collecting topical information which can be acted upon, shortening response times to events that occur. An agile supply chain is especially efficient at exploiting a volatile marketplace (Power & Sohal, 2001). A hybrid supply chain strategy is a combination of both. Based on this notion, a company that wishes to be competitive in the realm of risk management should aspire to have an agile supply chain capable of adapting to varying situations quickly. This is essential for situations where the supply chain is highly globalised and interdependent on multiple subcontractors.

Depending on the chosen supply chain strategy, the performance of it can be measured in different ways, which means that some metrics work better with specific situations.

As mentioned before, supply chain performance covers both organizational lines, as well as cross-organizational borders. Performance is divided into three main assessment criteria: efficacy, efficiency, and effectiveness (Estampe, 2014). Efficacy is the power to produce an effect (Merriam-Webster, 2024). In other words, it is the level of achievement for a goal that is set. Efficiency is defined as the relationship between expending resources and reaching a target – the lesser the use of resources, the more efficient the action has been. Efficiency is typically characterised by not producing waste. (Longman, 2024.) Effectiveness is the degree to which something is effective, e.g. how well an SCRM action can mitigate the effects of a disruption (Cambridge Dictionary, 2024).

On top of the three aforementioned metrics, it can be said that the creation of value can be considered as a metric sufficient to measure the performance of a supply chain, as its end-goal in most cases is to create value and reach strategic objectives. Added value can be pursued by many actors in the supply chain, and it can have different meanings and attributes for each of them. Ultimately, added value is defined by the expectations of the managers of the supply chain. This usually covers customers, shareholders, and other actors in the supply chain. (Estampe, 2014.)

In short, value creation for the customer is beneficial to the company providing the product or service due to the acquisition of new customers, or the retention of existing customers. On the other hand, value for the company can be summarized as the reduction of costs and increasement in turnover, through which the company is then able to improve their profits and receive more in return for the funds that they have been provided by lenders and creditors. This creates value for shareholders as well, though it is not necessarily the best measure of performance (Estampe, 2014).

3.3 What is a well-performing supply chain?

To be able to define a well performing supply chain, there needs to exist ways to measuring it. These performance indicators need to support a global view of supply chains, as a company-specific, narrow view doesn't take all the necessary elements to account when it comes to supply chain performance. Having a narrow view could obfuscate the reading, leading to an unwanted result, whereas with the correct metric, the result would be satisfactory (Hausman, 2002). Measuring the performance of a supply chain with words like “good”, “satisfactory”, or “bad” are vague in nature,

providing arbitrary background (Beamon, 1999). Performance measurement in supply chains is essential for multiple reasons, such as the identification of success, measuring the level of customer's needs being met, better understanding of processes, as well as tracking and enabling progress (Akyuz & Erkan, 2010). Performance indicators are used to turn collected information into action that helps to steer an organization to the right direction (Estampe, 2014). Different viewpoints exist related to what can be considered well-performing supply chain management, however, uniting features exist as well, such as contributing to the creation of value, reducing costs, and reaching strategic objectives. Indicators can measure either results or control, with the former giving information about the progress made towards set goals, ignoring the ways in which strides towards the completion of goals have been taken. Simultaneously, it does not indicate what needs to be changed if anything. The latter way of measuring, the measurement of control, informs the actor of how to manage its activities, thus telling them about their level of control. (Estampe, 2014.)

A high level of value creation is closely linked with superior firm performance, thus making it a commendable tool for gaining competitive advantage (Jayaram et al., 2004). As a supply chain's ability to create value is one of the core elements of measuring its performance, it is good to be able to highlight attributes of supply chains that can create value better than others. This helps specify the steps needed to establish growth through value creation in supply chains. For example, Estampe (2014) has specified four attributes that supply chains must have for them to succeed in creating value, which are the following:

1. Rapidity of the supply chain
2. Global profitability of the supply chain
3. Profitability of the company
4. Growth

First of the four attributes, the rapidity of the supply chain, refers to cutting down processes in the supply chain that don't contribute to the creation of value, but slow it down, making the flow of material slower, thus requiring the company to have a larger stock, which ties down capital. Second is the global profitability of the supply chain. It is based on the collaborative aptitude of the supply chain, where shared interests drive

companies to work together to improve the state of business for all of them. The third value-creation attribute, the profitability of the company, seeks to guarantee funds to the development of the company, as well as having the resources to innovate. Lastly, the attribute of growth measures the acquisition of new customers, or alternatively, the retention of pre-existing customers. (Estampe, 2014.) Together the four attributes listed support the supply chain in its structural mechanisms and relationship building, which are key mechanisms for initiating the creation of value (Jayaram et al., 2004).

Information systems (IS) have been shown to have a positive association with the performance of both the supply chain and the company (Qrunfleh & Tarafdar, 2014). Information systems consist of four components, which are task, people, structure, and technology (O'Hara et al., 1999). Information technology (IT), which is under the "technology"-component of information systems, is closely related to the effective performance of a supply chain. The development and utilization level of IT improves company performance, return-on-investment (ROI), and market share (Vickery et al., 2003). A well-functioning IT-infrastructure is key to providing all the necessary parties up-to-date information in the face of disruptions, confirming the important role IT has on both supply chain performance as well as supply chain risk management. When creating a supply chain strategy for maximum performance and the gaining of competitive advantage through it, a company must take information systems into consideration, and choose systems that are in line with their needs. A failed implementation of supply information systems can result in losses, failure to prevent disruptions from causing negative effects, and failure to manage the overall supply chain in the most effective way (Qrunfleh & Tarafdar, 2014).

As stated previously, a well-performing supply chain that creates value consists of at least four different attributes that drive it towards two key motivators for the creation of value: structural mechanisms and relationship building. In this case, structural mechanisms refer to the need of selecting the most fitting supply chain partners, being located near them, and making sure that the partners' supply chains align with your own in terms of strategy and their operational details (Prescott, 1999). Relationship building refers to the efforts by a company to build trust, commitment, and longevity of partnerships, which aid with the creation of strong supplier connections, that possibly evolve with the companies that they exist between, turning out to be fruitful in the long-term for both of the parties at stake (Jayaram et al., 2004).

3.4 Supply chain performance & competitive advantage

Competitive advantage can sometimes be seen as interchangeable with superior performance, but it is not the same (Hao, 2000). Porter has defined that two types of basic competitive advantage exist, which are cost leadership and differentiation (Porter, 1985). These are based on the notion that through superior profitability, which in this case is achieved through higher volumes of sales due to being the cost leader and having more sales due to better features in the product sold, a company is then able to outperform the competition. Other than the two previously mentioned attributes of superior performance, competitive advantage can stem from e.g. speed (Stalk, 1988; Eisenhart & Brown, 1998) as well as flexibility (Sanchez, 1995). Thus, it could be said that there is more to the concept of competitive advantage than just superior performance through cost leadership and differentiation. Porter also suggests that companies that become successful internationally have typically endured strong domestic competition before turning into large internationally succeeding businesses (Porter, 1985 & Warr, 1994). It is good to note that the intention of this paragraph is not to dismiss the definition of competitive advantage introduced by Porter but point out that further research suggests that there is more to it than just cost leadership and differentiation.

What is competitive advantage then? Hao argues that competitive advantage is more than just performing better than others, and it should be a more general term, that is relative to the use-case (Hao, 2000). With this, for someone to have an advantage over others, competition must exist. This leads to companies having to assess the market situation and analyse the competition. A widely used way of conducting this type of market analysis to aid strategic planning is known to be called the SWOT-analysis, which is short for strengths, weaknesses, opportunities, and threats (Ali Benzaghta et al., 2021). In short, a SWOT-analysis is done to assess the four areas mentioned, and to look for ways to grow or change towards a direction that a company has set out (Thomas, 2019). An important aspect of using the SWOT-analysis method of assessing the state of the company's competition is to acknowledge the internal factors that can be manipulated to gain competitive advantage in relation to others. Companies that can use their internal strengths for exploiting their environment for opportunities, while avoiding internal weaknesses, are more likely to succeed in gaining competitive advantage. (Barney, 1995.) Thus, competitive advantage relies mostly on the company that is conducting actions to improve itself, however, it also needs to be said that they

are ultimately doing so to beat others in performance or some other metric. In this study, competitive advantage is defined as the unique capabilities and attributes that a company possesses that it can turn to its benefit.

Competitive advantage can stem from various sources, and according to Barney (1995), it can be evaluated through four questions: the question of value, rarity, imitability, and organisation (Barney, 1995). The question of value addresses a company's ability to create value through exploitation of opportunities or by neutralising its threats. If the company manages to do either of the two, it is considered a strength. Rarity can lead to having competitive advantage, as a resource or such is so scarce that others have difficulty obtaining it. Imitability refers to the question of competitors ending up in a cost disadvantage if they seek to pursue copying something that the focal company has. If they do end up being at a cost disadvantage due to their imitation efforts, whatever the focal company has that is being imitated by others, is a strength. Lastly, the question of organisation comes down to organising the company to be best able to exploit the strengths that it possesses. Without successful organisation, it is not guaranteed that even with the strengths that a company has, will they be turned into sustained competitive advantage, as can be seen in Table 1.

Table 1. The VRIO framework by Barney & Hesterly (2008)

Valuable?	Rare?	Costly to imitate?	Exploited by the organisation?	Competitive implications
No				Competitive disadvantage
Yes	No			Competitive parity
Yes	Yes	No		Temporary competitive advantage
Yes	Yes	Yes	No	Unexploited competitive advantage
Yes	Yes	Yes	Yes	Sustained competitive advantage

4 The role of supply chain risk management in gaining competitive advantage

4.1 The relationship between SCRM & competitive advantage

The relationship between supply chain risk management and competitive advantage is multi-faceted, as it must deal with all the aspects of supply chain risk management, which typically means looking outward and trying to influence a large, complex network of suppliers, and turning that into an attribute that can be exploited to take the company forward and achieve its targets. In fact, companies have achieved tremendous gains through looking outward and trying to find and utilise external resources to aid in their search to complete strategic goals and beat the competition (Ross, 2010). This could be interpreted as opposite to what a SWOT-analysis would suggest, where mostly the internal factors are addressed to find opportunities, but it is not so. Managing supply chains and the risks that are related to it all come from intra-company decisions and actions, and those actions have consequences on factors external to the company. Thus, the outward-looking nature of supply chain management and its implications on competitive advantage that Ross mentioned, is not in conflict with the claim that competitive advantage sought through the means of a SWOT-analysis is mostly based on internal actions.

Innovation in the supply chain can be an effective tool for the creation of better risk resilience. One example of this is communication systems that are integrated into the supply chain well enough to provide the means to have better monitoring capabilities of critical functions. These types of integrated communication systems where multiple actors work in harmony and can seamlessly transfer information from one another help to achieve rapid responses in emerging disruptive situations. (Kwak et al., 2018.) This can be leveraged to achieve a difficult-to-replicate way of creating a robust and resilient supply chain, which ultimately is an advantage when competing in a dynamic field of business such as supply chain management.

Technological innovations are a key element of supply chain innovation; however, they contemporarily can be an element of uncertainty. This notion stems from the possible creation of excessive complexity, resulting in increased effort put into the overall management of the supply chain due to the difficulty of it (Kwak et al., 2018). A

balanced approach should be recommended, where the potential gains and losses are estimated and taken into consideration – supply chain innovation can be a double-edged sword.

To achieve competitive advantage through managing risk, an aggressive stance towards it should be taken. This means that it must be turned into a strategic element of business operations, as slow and reactive ways of managing risk will not yield the results wanted. If a company does not consider its supply chain management, or even more so its supply chain risk management, its core competency, the idea of it being a differentiating factor is unrealistic. Risk management capabilities can be leveraged to achieve competitive advantage (Elahi, 2013).

4.2 The benefits of SCRM when pursuing competitive advantage

As stated by Elahi, supply chain risk management must be turned into a strategic element if it is ought to provide some form of gain in terms of better performance when a supply chain is facing a disruption. Without adept preparations to face change, and the underestimation of uncertainty, existing strategies may not be able to defend against uncertainties, nor utilise them for gain (Courtney et al., 1997). In this context, uncertainty is defined as the incomplete information regarding the future, which makes decision-making among other things, difficult (Carbonara et al., 2010). Thus, a company's strategy, that intends to differentiate itself from the competition through better risk management, should intend to acquire sufficient means to be able to upkeep an adept strategy for supply chain risk management (Elahi, 2013).

Risk management is generally seen as an important facet of business strategy, as pointed out by a study conducted in 2005 among 271 business executives of whom 90% stated that they are either building or want to have enterprise risk management implemented to their strategy. (Marshall et al., 2005) Enterprise risk management is a proposal in which companies look at risk comprehensively rather than address them individually (Bromiley et al., 2015). It is meant to provide a framework for risk management, which allows the management of risk to be done with a systematic approach (Hiles, 2012). Even though risk management is seen as important, its real-life implementation rate does not correspond to the desire of it being so. The Committee of sponsoring organizations (COSO) conducted a survey which concluded that the implementation of ERM is generally at an unsatisfactory level, and that risk tracking is mostly done on

individual aspects of business, contrary to the idea of ERM, where risk management should cover the whole company (Beasley et al., 2010).

If a framework like ERM is generally not implemented widely, then a single node of it, the risk management of supply chains, isn't either. This leaves room for companies to outperform their competition with superior risk management, and even providing an opportunity to compete with a so-called "blue ocean" -strategy. In this scenario, the market that a company competes in consists of red oceans and blue oceans. Red oceans are markets where the boundaries of industries are clearly defined, and competing in the market is based on trying to attain a larger share of the demand that exists. This results in tough competition and reduced opportunity for growth and profits. Blue oceans are the opposite of red oceans, where there is a high likelihood for value creation, little competition, and the market is not clearly defined with set boundaries (Kim et al., 2005). With the trend of rising uncertainty, better-than-average supply chain risk management could turn out to be a new blue ocean, upon which to base a strategy for growth and better performance (Elahi, 2013).

The basis upon which using supply chain risk management to gain competitive advantage relies on the enhanced resilience of the supply chain, innovation, uniqueness, and holding a strategic advantage. As some companies view risk management as cost-incurring necessary evils

4.3 Future directions of SCRM & competitive advantage

As supply chain management is reliant on multiple companies' joint effort to provide the flow of material and services to targeted customers (Tang, 2006), a possible future outlook for SCM and SCRM is to enhance the collaborative nature of it. At least two relevant joint supply chain risk management practices have been identified, which are risk information sharing and risk sharing mechanism (Gang et al., 2015). As the modern world is highly digitized, information sharing can be done easily. The goal with the increased sharing of information is to achieve better supply chain visibility, which will lead to actors in the supply chain gaining access to accurate and timely information, specifically about current inventory and demand levels (Somapa et al., 2018 & Christopher and Lee, 2004). Without supply chain visibility, the whole chain faces challenges related to slow and misinformed decision-making, as well as risking the profitability of the supply chain (Prajogo and Olhager, 2012). A high level of supply

chain visibility is linked to business process improvement (Somapa et al., 2018), which in turn could make it a feasible tool to use for the improvement of a business' status on the market that it competes in, thus making it useful for gaining competitive advantage.

Applying a system-like method of addressing risks related to supply chains could be a potential way of improving supply chain risk management in the future (Ghadge et al., 2012). This could include the standardization of procedures, which would decrease variation and increase the stability of supply chain operations (Carson et al., 2006). The standardization of processes makes the introduction of new partnerships or other elements into the supply chain more flexible, as well as allowing for easier monitoring of current relationships with suppliers, when a standard exists to which a comparison can easily be made (Tangpong et al., 2010).

4.3.1 Supply chain resilience

While supply chain risk management has a focus on the management of risk while they are not yet realized and looking for alternatives in case a disruption is to take place, the concept of supply chain resilience tackles the scenario of an ongoing disruption. This could prove to be a forward-looking way of addressing supply chain risk management, where regular risk management measures are not enough. Supply chain resilience is defined as a supply chain's capability to operate on a similar level to its pre-disruption state, or if heavily affected by it, its ability to recover to its former state as quickly as possible. At its core, a resilient supply chain focuses on the transformability, adaptability, and rebounding ability of itself, as without it, it would be stuck on its old ways of operation, and unable to face changes (Kummer, 2022). For supply chain disturbances to be tackled rapidly, there need to be preparative measures taken. Thus, supply chain resilience is not only about reacting quickly to disruptions, but preparing for them well ahead, so that a rapid response is feasible (Blome et al., 2020). Therefore, it shares methods of action with supply chain risk management.

Due to the interconnected nature of modern supply chains, the effects of disruptions can be magnified and cover the whole supply chain, instead of only being local (Blome et al., 2020). Supply chain resilience strategies can impact certain parts of the supply chain negatively, if they are implemented by a limited number of supply chain nodes. Thus, supply chain resilience strategy should cover a wider range of factors in the supply chain, as otherwise, they can end up creating a weaker, less resilient supply chain

(Blome et al., 2020). A new concept related to creating a stronger, resilient, and profitable supply chain in the face of disruptions is emerging, i.e. supply chain antifragility.

4.3.2 Supply chain antifragility

It could be said that an industry-wide view on supply chain disruptions is that they are to be avoided at all costs, that there is nothing positive to draw from them. A viewpoint has emerged that challenges these ideas, coined supply chain antifragility. It has been adopted to a supply chain environment from a more universal concept of antifragility, where uncertainty is not to be afraid of. (Taleb, 2012 & Nikookar et al., 2021.)

Supply chain antifragility's core idea is that instead of dreading the possibility of facing disruptions in the supply chain, they should be welcomed as an opportunity to learn, and to generate growth from challenges, growth that could not be created otherwise. This growth can be either financial or non-financial. Robustness in processes, such as supply chains, is characterised by their ability to defend, recover from, and create new as well as exploit from shocks the system faces (Coyle, 1996).

As a phenomenon, supply chain antifragility has gained significant traction after the COVID-19 pandemic (Nikookar et al., 2021). An example of supply chain antifragility would be a company's supply chain's ability to transform to a better performing one in the face of change, where its competitors are not as capable (Nikookar et al., 2024). This could then be used to gain competitive advantage. There is some overlap in terms of using the terms antifragility and resilience as synonyms, as in some definitions, supply chain resilience is said to be a supply chain's ability to recover to its former state or *better* (Kummer, 2022). However, it is necessary to point out that the consensus about the definition of supply chain resilience is the supply chain's ability to recover *only* to its former state, not beyond. As with supply chain resilience, antifragility is built on preparedness to face changes, but the preparedness extends beyond only reaching a normal operative state, which supply chain resilience can be said to settle for.

4.3.3 Similarities and differences of SC resilience and SC antifragility to SCRM

As said, supply chain antifragility is the opposite of traditional supply chain risk management when it comes to anticipating disruptions. However, it still requires a

disruption to happen to prove useful. It is not to be confused with supply chain resilience, as it is characterised by a supply chain's ability to remain operational under changing circumstances, and to recover from the effects that disruptions have had on it. (Kummer, 2022). The main difference between supply chain risk management and creating supply chain resilience is that the prior focuses on managing the supply chain in a way that risks are less likely to occur, while the latter focuses on resisting the effects of already-occurring disruptions in the supply chain. The differences between supply chain concepts can be seen in Figure 1.

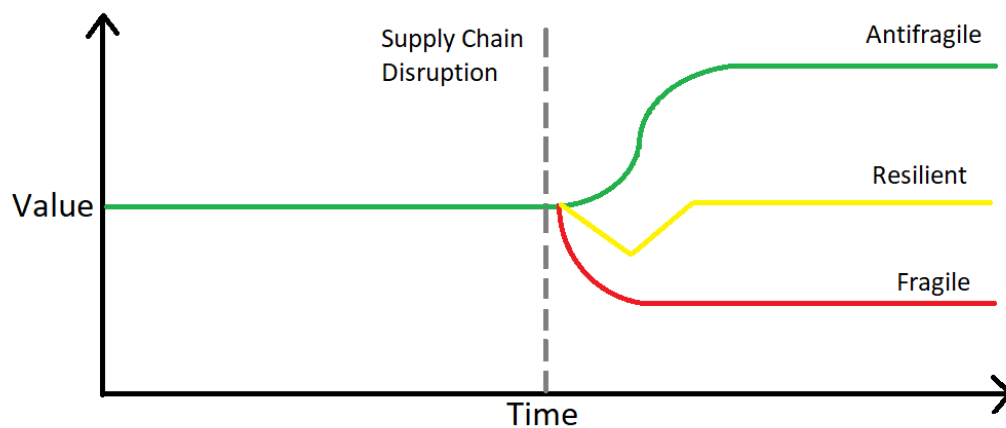


Figure 1. Differences in SCRM strategies (Gartner, 2023)

Even though disruptions can act as catalysts for growth, and while the concept of supply chain antifragility embraces said disruptions, it is not to be a replacement for the resilience of a supply chain, or the management of risk. Nikookar et al. (2024) have pointed out five capabilities a supply chain needs for it to be considered antifragile: supply chain mindfulness capability, supply chain transformative learning capability, supply chain plasticity capability, supply chain bricolage capability, and supply chain collaboration capability. In summary, supply chain mindfulness translates to the ability of a supply chain to be aware of ongoing or potential disruptions and understanding their potential effects on the supply chain itself. The transformative learning capability is the supply chain's ability to further its level of knowledge through the experiences of its own or through others. This is then harnessed to improve the supply chain's functioning. Supply chain plasticity capability is defined as the supply chain's ability to let go of prior goals set for it when new circumstances, such as disruptions, make them obsolete. A supply chain's bricolage capability is its ability to stay operational with sub-optimal resources at hand. This means that in an event of a disturbance or disruption,

when access to some resources may be limited, the supply chain is able to make do with the sparse assets that does have access to. Lastly, a supply chain's collaboration capability is defined as its ability to co-operate with its partners and work towards shared goals and mutual interests that are beneficial in nature. (Nikookar et al., 2024.)

None of the capabilities mentioned above are part of supply chain risk management, which is mainly focused on preventive efforts to manage risk. This isn't to say that supply chain risk management doesn't have the capability for reactive measures, but when there is little going on in terms of disruptions, all that can be done is preventative measures. As such, supply chain risk management and supply chain antifragility share *some* things in terms of actions done: both are processes, where businesses can learn from the failures of past, either through their own failures or failures of others, and draw better results when facing variability. On top of that, both require disruptions to happen to prove useful – the difference is that supply chain antifragility has a different outlook on chances to gain from disruptions (Größler, 2020).

Supply risk assessment can be done when sourcing new suppliers to assess the probability and impact of risk in advance (Cavinato, 2004). The assessment seeks to find out whether differences exist between operational practices of the two companies in terms of risk preparedness, quality-related questions, as well as whether the likelihood of supply chain disruptions can be reduced by co-operation in an early stage of conducting business (Cavinato, 2004). Supply chain antifragility factors in risks of conducting business in only one of its five main capabilities, its mindfulness capability (Nikookar et al., 2024). The remaining four capabilities direct attention to the points in this chapter that differentiate in nature from those of supply chain risk management. In summary, it can be said that supply chain antifragility is a more forward-looking process of managing supply chains where disruptions are an integral part bound to happen, whereas supply chain risk management seeks both to eliminate disruptions from happening via supply risk assessment, but also, when they do take place, from affecting the overall functioning of the supply chain, thus eliminating the impact disruptions could have on end-customers. It is also important to point out that supply chain risk management, the creation of supply chain resilience, and supply chain antifragility are not meant to replace each other, but rather act as complementary ways of approaching supply chain management.

5 Summary and conclusions

This study aimed to find out the role of supply chain risk management when trying to gain competitive advantage. First, the concept of supply chain risk management was defined, and its characteristics were covered. Supply chain risk management is a systematic process of identifying, assessing, and mitigating risks within the supply chain to minimize disruptions and optimize performance (Helmond et al., 2022). As supply chains have become increasingly complex and globalised in nature, it was identified that effective supply chain risk management is quintessential for companies to remain operational while facing disruptions, simultaneously minimising the effects said disruptions have on end-customers. Supply chain risks can be categorised to internal and external risks, of which only internal risks can be directly affected by supply chain risk managers.

Second, the characteristics of supply chain performance were covered, and their impact on a company's ability to gain competitive advantage. It was found out that above all, value creation is at the core of supply chain performance. Different supply chains have different strategic goals, but value creation and the meeting of those strategic goals can be said to be a given for any supply chain. A well-performing supply chain creates value for all parties involved in the chain, i.e., the company, subcontractors, and the end-customer. For a company, measuring the performance of its supply chain must be done with the right metrics to be able to gain insightful information from it, as otherwise finding the correct attributes to improve on will be difficult, thus rendering the effects that it could have on competitive advantage bleak. Competitive advantage was defined, and it was concluded that while there isn't a universally accepted definition of the term, as all the attributes that make it up aren't agreed upon, superior (financial) performance is a uniting factor for gaining competitive advantage, which is why the topic of supply chain performance, and its role was covered in detail in this study.

Lastly, the combined effects of supply chain risk management and the pursuit of optimal supply chain performance were examined in the context of gaining competitive advantage. When supply chain risk management succeeds, it is an effective tool for gaining competitive advantage, but it needs disruptions to happen to prove useful. Depending on the risk management strategy, a company can be more prepared for either small-scale or large-scale disruptions (or ideally, for both), as depending on the

magnitude of disruptions, the potential gains are varied in size. This means that a small-scale disruption, that happens regularly, can have compounding effects due to its high prevalence, making it worth to prepare for, even though an individual small-scale disruption is not likely to cause a lot of financial loss. On the other hand, a large-scale disruption that happens less regularly can have a vicious impact on a single company, but due to the low frequency of events of that nature, preparing for them can take up resources for nothing, if the large-scale disruption simply doesn't take place.

Supply chain innovation can result in improved risk management capabilities, even if it introduces an element of uncertainty into it. This results in gained competitive advantage. (Kwak et al., 2018) Supply chain innovation can be achieved through technological advancements, which allow for quicker transfer of data and improved communication. This leads to improved supply chain resilience and robustness, which both have been pointed out to improve competitive advantage (Elahi, 2013 & Kwak et al., 2018). For supply chain risk management to stay relevant in terms of it having an effect on the competitiveness of a company, it must be under constant supervision to find areas of improvement.

Creating a system of risk mitigation in supply chains is difficult to accomplish due to its outward-looking nature, meaning that as companies work with an increasing quantity of subcontractors and other stakeholders, controlling a supply chain is becoming more complex. This leads to some companies not pursuing a well-integrated risk management system, leaving them vulnerable to disruptions. An opportunity arises for companies to invest in their risk management, which would in turn make them more successful in risk mitigation during supply chain disruptions, making them gain competitive advantage. A well-integrated, quick reacting supply chain risk management strategy will likely be valuable, rare, and inimitable, leaving it down to the focal company to organise its strengths in such a manner that it can be turned into *sustained* competitive advantage. Thus, it can be concluded that supply chain risk management can have a significant role when pursuing competitive advantage, if it is made to be an integral, strategic element of overall supply chain management.

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