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RESILIENT SUPPLY CHAIN IN THE SWISS WATCH INDUSTRY

The Exerted Influence of Economic and Cultural Aspects

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Supply chains are a crucial aspect of an organisation and play an essential role in the viability of a firm. However, due to the nature of supply chains and the different parties involved, disruptions in one part of the chain may have severe implications for an organisation and could even completely lead to a halt in production. Therefore, it is important for companies to have a supply chain that has the ability to prepare, respond, recover, or even completely withstand disruptions, i.e. to have a resilient supply chain.

The objective of this thesis is to analyse the exerted influence economic and cultural (organisational culture) factors have on the resilience of the supply chain. Furthermore, the thesis provides a deeper understanding of the topic of supply chain resilience by presenting a variety of strategies to enhance or achieve resilience.

Current literature defines supply chain resilience in numerous ways. Thus, the thesis first establishes the basis by defining the concept in a comprehensible way and then continues to provide an understanding of related topics, such as disruption risks, key strategies to enhance resilience, cultural and economic influences, as well as different metrics to measure the resilience. The research method used in this regard is qualitative.

In order to check the validity of the theory and to see whether the existing literature can be applied to the Swiss watch industry, a qualitative research method is used, in which three interviews with Swiss watchmakers were conducted. The findings are mostly in line with the conclusions of other researchers. However, some insights show that the Swiss watch industry is unique and does not always fully conform with the presented theories.

Supply chain resilience in the Swiss watch industry can be fostered by collaboration efforts, which in turn also positively impact the flexibility, redundancy, and agility elements of resilience. Cultural aspects that are beneficial in building and maintaining resilient supply chains relate to human and social aspects. That is, effective communication, close collaboration, flexibility, curiosity, open-mindedness, and so on. The thesis further shows that economic factors, such as currency fluctuations, do not play a notable role in the Swiss watch industry.

Keywords organisational culture, supply chain resilience, flexibility, redundancy, collaboration, agility
Pages 41 pages and appendices 2 pages

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1 Introduction

In recent years, especially after and during the COVID-19 pandemic, many companies faced difficulties in delivering their goods and services to customers. Besides the state prescribed closures of certain “unvital” parts of the economy, the resulting economic turmoil in many countries led to obstacles within supply chains and companies were not able to maintain the same operational activities as before. This goes to show that it is of utmost importance to have a well-functioning supply chain that can withstand or quickly recover from such events (Musella, 2023).

In order to build supply chains with that ability and to identify which factors help or hinder the functioning thereof, it is important to examine different economic factors. Furthermore, it is essential to understand how companies have to react to such changes. Hereby, the focus is on the cultural aspects. Companies need to know which cultural characteristics promote a resilient supply chain and which characteristics have negative impacts on it.

In today’s age of globalisation and outsourcing, supply chains play a crucial role in the success of a business. They not only determine the quality and selling price of a product but are also highly important for a company’s viability and overall operations. When speaking about a supply chain, different factors come into play that influence their well-functioning. These factors could be for example of technological, economic, political, and environmental nature (Hiles, 2016, p. 16). However, another important aspect is the role of cultural factors.

The Swiss watch industry sells its products globally and is well-known for its high-quality goods and prestige. The “Swiss-made” label is appreciated all around the world. In fact, different studies have shown that the selling price of products labelled as “Swiss” (or “Swiss-made”, etc.) is increased by up to 50% (Admin, 2022). To ensure the quality and availability of Swiss watches, it is important for the manufacturers to maintain and improve their supply chain. The interaction between manufacturers and suppliers must be guaranteed even if there are economic challenges.

The aim of this thesis is to examine the interaction between economic and cultural factors (regarding the organisational culture), especially in light of building and maintaining resilient supply chains. The thesis is structured in a comprehensible way and will first include theoretical parts about the topic of (resilient) supply chains. Before analysing the interplay of

economic and cultural factors, the most important aspects of each are highlighted and explained in detail.

For the first part a qualitative research approach is used to gather the necessary information to come to a well-informed conclusion. Additionally, in order to apply the findings from the first sections, the second part consist of interviews with Swiss watch brands. The goal is to come to a final conclusion and answer the research questions outlined in the following sub-chapter.

1.1 Research Question

As highlighted before, there are different factors that need to be considered when talking about a company's supply chain. However, this paper focuses on two distinct aspects, namely on economic and cultural factors, and examines how these are connected to one another. The main purpose is to examine the interaction of these two factors and answer the following question:

How can companies within the Swiss watch industry use or react to economic and cultural factors to build resilient supply chains?

In order to come to a comprehensive conclusion and answer the research question, the following sub-questions must be answered:

1. Does the importance of cultural factors change depending on the state of the economy?
2. How do cultural aspects influence the supply chain?
3. What cultural factors contribute to a resilient supply chain?

1.2 Limitations

As mentioned in the previous section, there are other factors that play into the well-functioning of a supply chain, such as technological development, etc. However, the scope of this thesis lies on only two distinct aspects (economic and cultural) and thus does not account for others, which also influence the resilience of a supply chain.

Another limitation is related to the fact that some Swiss watch manufacturers source their raw materials (e.g., precious metals, etc.) from abroad. Therefore, regulatory changes in the import and export of goods could have an impact on the relevance of the results described in this paper, as it could become much more difficult to build supply chains that cross national borders. In contrast, however, the liberalisation of related regulations could encourage companies to expand their global supply chain, which would also impact the relevance of the findings.

The research in this thesis includes experiences, insights, and opinions from three different companies, which are not part of large corporation groups. Therefore, the findings may only apply to SMEs and the relevance of the findings might be less useful for larger firms.

2 Theoretical Framework

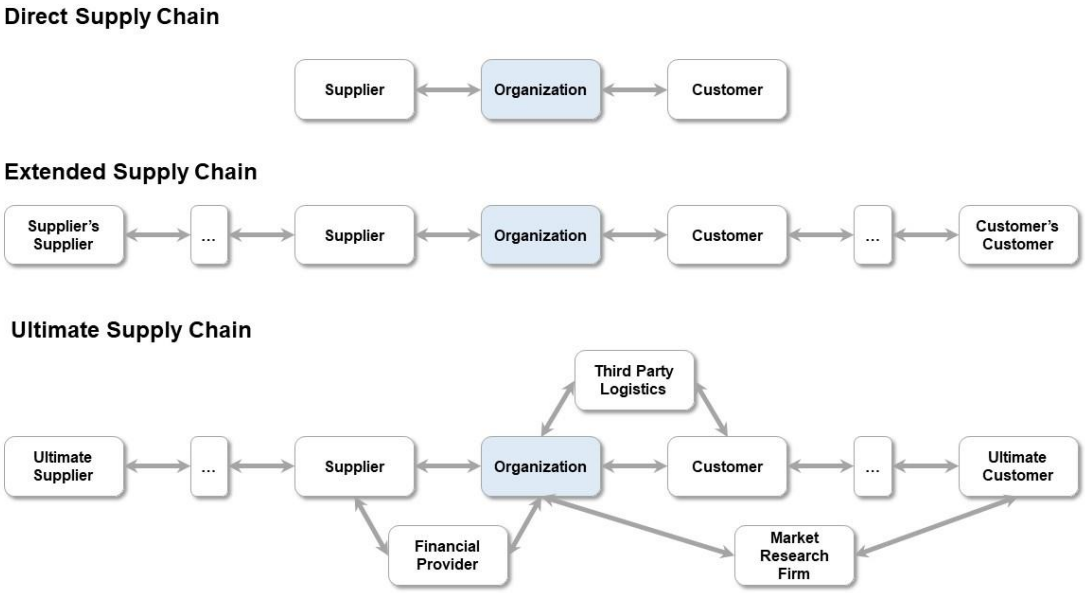
2.1 Supply Chain

A supply chain is inherent to many businesses and describes the flow of materials from its origin to its final destination (end consumer). It includes firms from sourcing and processing the raw materials, to firms assembling and manufacturing products, to firms distributing them, and finally the end consumers. Therefore, the supply chain is the up- and downstream flow of goods, services, money, and/or information from a source to a client and involves three or more units (Mentzer et al., 2001, p. 4).

In addition, supply chains are such an important part of the organisation, that not only the brands compete with one another but, moreover, the brands' supply chains compete with each other (Lambert & Cooper, 2000, p. 65). This highlights the importance of well-managed and well-functioning chains for each individual firm. Companies with strong supply chains have an edge over those with weak and unstable ones (Tukamuhabwa et al., 2015, p. 5592). For example, due to a strong supply chain, manufacturing bottlenecks and significant fluctuations in prices may be avoided, which in turn increases trust in the organisation and consequently its reputation.

The complexity of supply chains can vary. Mentzer et al. (2001) identified three stages of supply chain complexity, as shown in figure 1 below. Despite these three different stages, the authors highlight that there are many different supply chain configurations depending on the nature of the business (Mentzer et al., 2001, p. 5).

Figure 1: Stages of Supply Chain Complexity (Mentzer et al., 2001, p. 5)

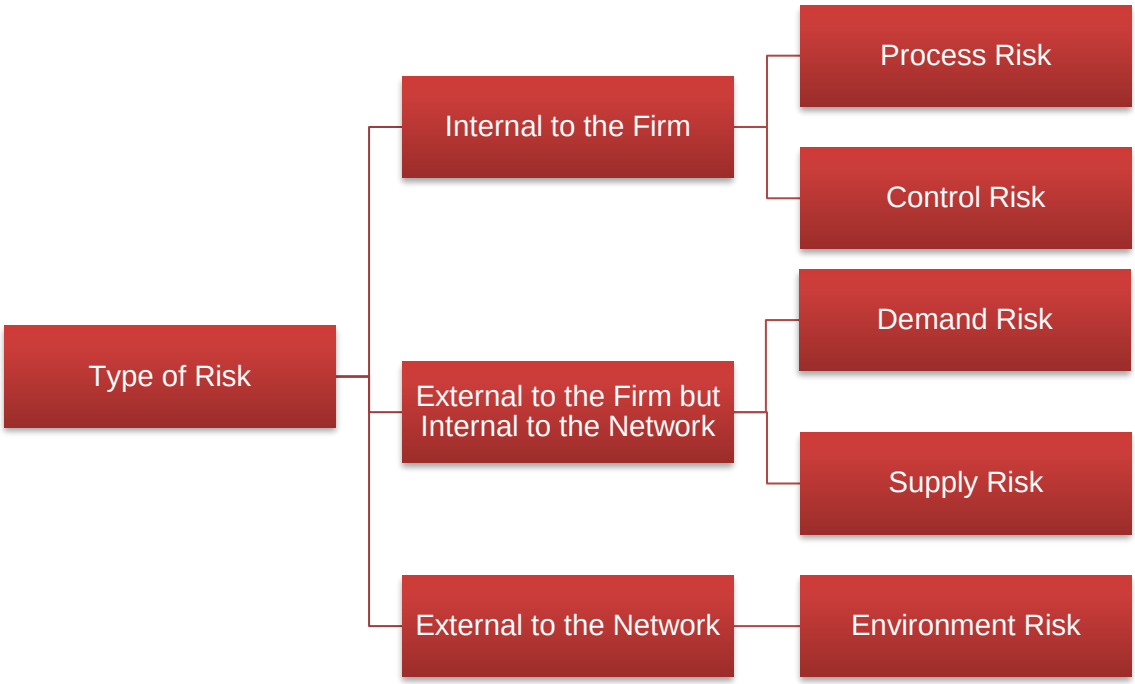


In the first stage (direct supply chain) the supply chain consists of three units: the supplier, the organisation, and the customer. The up- and/or downstream flow of goods, services, money, and/or information happens between these units. The second stage (extended supply chain) involves additional units on both ends. The immediate suppliers of the organisation's supplier that are active in the up-and/or downstream flow, are listed. The same goes for the immediate customers. Lastly, the third stage (ultimate supply chain) involves not only the immediate suppliers and customers, but all other companies involved in the up- and downstream flow. The figure depicts an example of such a complex supply chain. A third-party logistics company may be included as it delivers the products from the organisation to the customer. A financial company might offer financial advice and financing, whilst a market research company might be hired by the organisation to gather information about the ultimate customer so the organisation can better meet the needs and wants (Mentzer et al., 2001, p. 4).

Adding to the definition of Mentzer et al. (2001) the supply chain is the linkage between different businesses. If one of those linkages experience some sort of issues, the likelihood that the impacts are felt throughout the whole supply chain are high (Johnson & Nagarur, 2012, p. 3) In the literature as well as this thesis, these issues and the impacts are referred to as "disruptions". According to Scholten & Schilder (2015), supply chain disruptions are linked to potential and actual disturbances in the up-/downward stream flow of goods, services, money, and/or information (Scholten & Schilder, 2015, p. 472).

An article published by Shekarian & Parast (2020) classifies the so-called “supply chain risks” into different categories, namely process, control, demand, supply, and environment risk. The next figure shows the various type of supply chain risks.

Figure 2: Supply Chain Risks (Shekarian & Parast, 2020. p. 430)



Process risk deals with potential issues in quality, quantity, and timing in business operations. Furthermore, it is linked to equipment, communication, transportation, and infrastructure disruptions as well as IT failures, operator unavailability, and product quality issues (Shekarian & Parast, 2020. p. 430).

Control risk (or network risk) entails potential issues that arise in the management as well as execution of business processes and relationships. To be more specific, it deals with problems related to an organisation’s processes that arise due to the assumptions, systems, procedures, and rules applied by the firm. Sources of this type of risk can be policies, batch sizes, but also poor planning and forecasting, poor visibility along the supply chain, and asymmetric power relationships (Shekarian & Parast, 2020, p. 431).

Demand risk involves bad forecasting, i.e., differences in actual and forecasted demand as well as a disturbed flow within the supply chain network. Market changes, volatile demand, and customer payment delays are – among other things – sources of risk (Shekarian & Parast, 2020, pp. 429 – 430).

The supply risk mainly relates to incoming supplies. This is the risk that suppliers do not meet agreed deadlines or that the quality and/or quantity is not correct. Further, a disturbed flow within the supply chain is also a noteworthy risk here that can happen due to internal and external factors. Sources of risks include but are not limited to supplier problems (e.g., in terms of quality), poor logistics, bankruptcy of supplier, and lead times (Shekarian & Parast, 2020. p. 430).

Lastly, environment risks must be considered as well. These risks impact specific activities (i.e., a specific value stream) and/or any link within the supply chain. As the name implies, environment risks stem from external sources (external to the supply chain) such as economic downturns, war, pandemics, natural disasters, etc. (Shekarian & Parast, 2020, p. 431).

Figure 3: Examples of risks sources (adapted from Shekarian & Parast, 2020)

Process Risk	**Control Risk**
• Machine failure • Labor strike • Product quality problem • Breakdown of external or internal IT infrastructure • Equipment unreliability • Operator unavailability • Bottleneck or inflexible processes • Reliability of supporting communication systems	• Lack of collaborative planning • Safety stock policy • Poor visibility along the supply chain • Transportation management policy • Batch size or order quantity policy • Asset management policy • Asymmetric power relations
Demand Risk	**Supply Risk**
• Volatile demand • Market changes • Innovative competitors • Forecasting errors • Unusual customer payment delays • Unanticipated demand • Competition changes • Insufficient information from customer order	• Outsourcing and globalisation • Supplier commitment • Variability of replenishment lead time • Supplier bankruptcy • Poor logistics performance of suppliers • Sudden hike in costs • Supplier insolvency • Supplier quality problem • Sudden supplier demise • Capacity fluctuations or shortage in supply market

Environment Risk	
• Natural disasters • Terrorism and war • Political instability • Social and political grievance • Technology changes • Diseases or epidemics • Economic downturn	

2.2 Resilient Supply Chain

In order to cope with potential disruptions, supply chains need to be built and managed in a way that allows for a (quick) continuation of normal business operations. That is where the term and idea of supply chain resilience comes into play. However, the definitions in current literature are vast and contain different concepts. One of which is the concept of “supply chain robustness”. Despite being related to one another, Brandon-Jones et al. (2014) have shown that there is a difference between robustness and resilience. Contrary to this finding, Park et al. (2021) define supply chain resilience in a way that the idea of “robustness” is part of a resilient supply chain. In addition, Durach et al., (2015), consider “robustness” as a dimension of resilience, implying that a resilient supply chain is naturally robust.

Resilience is used to describe the power of a supply chain to continue to exist despite changes in the environment. Therefore, it focuses on the power to bounce back to the original state before the chain was disrupted. Brandon-Jones et al. (2014) define this term as “the ability of a supply chain to return to normal operating performance, within an acceptable period of time, after being disturbed” (Brandon-Jones et al., 2014, p. 55). In addition to this, a more extensive definition says: “The ability to be prepared for unexpected risk events, responding and recovering quickly to potential disruptions to return to its original situation or grow by moving to a new, more desirable state in order to increase customer service, market share and financial performance” (Hohenstein et al., 2015, p. 108). The latter definition highlights the fact that resilience also means to move forward rather than to just pursue status-quo, thus adaptation is understood to be included in resilient supply chains as well. In addition, it also mentions preparedness as an element of resilience. Yet another definition

says that resilience means “the ability to withstand, adapt, and recover from a disruption” (Park et al., 2021, p. 1), the research from Li et al. (2017) also uses a similar definition. Hence adding the power to maintain business operations during disruptions to a resilient supply chain. However, as stated before, some studies would argue that “withstanding” is more related to the concept of robustness.

Robustness is defined as “the ability of a supply chain to maintain its function despite internal and external disruptions” (Brandon-Jones et al., 2014, p. 56). Another similar definition says that a “robust supply chain is one that can continue operating near normalcy in the face of a disruption” (Johnson & Nagarur, 2012, p. 3). In other words, robust supply chains are built in such a way that allow for continuation without any great impact on output (e.g., productivity) in the event of disturbances in the chain.

This thesis acknowledges that there is a difference between those two concepts. For the remainder of this research, however, robustness will be included when referring to resilient supply chains because both concepts contribute to the well-functioning and reliability thereof. Hence, this thesis uses the following definition of supply chain resilience: “The adaptive capability of a supply chain to prepare for and/or respond to disruptions, to make a timely and cost-effective recovery, and therefore progress to a post-disruption state of operations – ideally, a better state than prior to the disruption” (Tukamuhabwa et al., 2015, p. 5599). This definition not only states that preparing (in the broader sense “withstanding”), recovering, and adapting are aspects of resilience, but also highlight the fact that it is time bound and must happen quickly.

The literature is not completely consistent when it comes to building resilient supply chains. However, some researchers propose that flexibility is one key factor that positively contributes to the ability of a supply chain to bounce back after disruptions (Mensah & Merkuryev, 2014, p. 315; Shekarian & Parast, 2020). Further research on the concept of resilience in supply chains shows that certain factors, namely adaptability, versatility, reactivity, recovery (reversibility), and continuation are crucial in enhancing supply chain resilience (Akhavan et al., 2021). The comprehensive literature review by Tukamuhabwa et al. (2015) also mentions agility (including supply chain velocity – how fast the network can bounce back or recover), flexibility, redundancy, and collaboration as key elements/strategies in building resilient supply chains. After introducing a variety of resilience strategies, the paper picks up on the assumption of the before-mentioned key elements/strategies. In total, 24 different resilience strategies have been collected in the literature review by

Tukamuhabwa et al. (2015), as shown below. These strategies will be further explained and used by the author of this thesis.

Figure 4: Supply Chain Resilience Strategies (adapted from Tukamuhabwa et al., 2015, pp. 5601-5603)

Proactive Strategies	• Supplier selection • Logistics capabilities • Security • Social capital • "Coopetition" • Contractual agreements • Public-Private partnerships • Risk management culture • Innovation • Visibility • Inventory management • Knowledge management • Diversification • Supplier development • Collaboration • Supply chain structure • Sustainability compliance • Information technology
Reactive Strategies	• Logistics capabilities • Social capital • Contingency planning • Redundancy • Demand management • Agility • Flexibility • Velocity • Visibility • Collaboration • Information technology

These tactics do not always stand alone and are not necessarily either proactive or reactive. Moreover, some of them add to one another, while others are tied together. One example is the usage of information technology, which is required for practically all the strategies listed. Furthermore, some strategies (or concepts) are closely related to others. As mentioned above, an example would be the concept of velocity, which is strongly linked to agility. As a result, Tukamuhabwa et al. (2015) emphasise that it would be useful for future research to come up with a clearer and more extensive categorisation of resilient supply chain strategies (Tukamuhabwa et al., 2015, pp. 5603 - 5604).

2.2.1 Proactive strategies

Proactive strategies are concerned with the readiness and preparedness of supply chains to potential disruptions. Hence, the aim is that, in case of disruptions, the business activities can continue as usual or that the negative impacts can be minimised to a large extent (Tukamuhabwa et al., 2015, p. 5603). Adding to above, this section briefly outlines each point listed.

Supplier selection: When choosing suppliers to work with, the organisation should select them properly. This means that the organisation should implement and regard different criteria to ensure that potential suppliers are not prone to disturbances. Criteria can include but are not limited to suppliers' reliability, financial situation, political stability, etc. (Tukamuhabwa et al., 2015, p. 5601).

Logistics capabilities: This strategy aims to minimise problems and disruptions by properly managing the flows (both supply and information) along the supply chain. For instance, through information sharing and up-to-date information technologies (Tukamuhabwa et al., 2015, p. 5601).

Security: As the name implies, the goal is to build and increase the security along the supply chain to protect it against disruptions such as disruptions caused by theft, terrorism, counterfeits, etc. (Tukamuhabwa et al., 2015, p. 5601).

Social capital: To limit the risk of disruptions, while simultaneously increase the awareness, the literature suggests that effective communication is crucial. Therefore, organisations should encourage communication, trust, cooperation, etc. (Tukamuhabwa et al., 2015, p. 5601).

"Coopetition": Competition does not necessarily have to be negative. If organisations can collaborate with their competitors, they might be able to benefit from synergies such as shared resources, costs, etc., which can enhance security as well as resilience (Tukamuhabwa et al., 2015, p. 5601).

Contractual agreements: With the help of different kinds of agreements (both short- and long-term), the organisation can prepare for disruptions caused by, e.g., shortages (Tukamuhabwa et al., 2015, p. 5601).

Public-Private partnerships: Public-Private partnerships are contractual arrangements between public and private sector companies. These partnerships increase service delivery by pooling talents (skills), assets, risks, and benefits, while also promoting supply chain resilience and collaboration between the government and private sectors (Tukamuhabwa et al., 2015, p. 5601).

Risk management culture: Describes the idea that all members of the organisation need to be aware of supply chain risks and manage them appropriately (Tukamuhabwa et al., 2015, p. 5601).

Innovation: By encouraging innovativeness, new processes can be developed that decrease the likelihood of supply chain disruptions. Additionally, new technologies, products, etc. can also be the source of minimising the risk of disturbances along the supply chain (Tukamuhabwa et al., 2015, p. 5601).

Visibility: This strategy outlines the idea that disruptions can be minimised by identifying the potential risks. Visibility is the ability to see all links in a supply chain, which ultimately leads to an increased risk identification (Tukamuhabwa et al., 2015, p. 5601).

Inventory management: In order to reduce potential inventory issues, a system-wide approach (i.e., to the entire supply chain) that is coherent with the business strategy must be applied when managing inventory (Tukamuhabwa et al., 2015, p. 5601).

Knowledge management: Organisations can be better prepared for supply chain related issues and better minimise or mitigate them, if the supply chain is well understood. Overall, the knowledge of the network structure is an important factor. Additionally, the organisation’s ability to learn and educate others related to their supply chain is just as important (Tukamuhabwa et al., 2015, p. 5601).

Diversification: By diversifying, an organisation can avoid being overly dependent on one product and thus on one supplier. Therefore, bottlenecks of materials used for one product do not have such a great impact on overall profitability as the loss in revenue might be offset by other products. (Tukamuhabwa et al., 2015, p. 5601)

Supplier development: In order to improve supplier reliability, efficiency, and commitment, the organisation can incentivise them by non-monetary means such as knowledge or by monetary ones (Tukamuhabwa et al., 2015, p. 5601).

Collaboration: Sharing information, knowledge and other resources with other supply chains can reduce the likelihood of disruptions. Similarly, to coopetition (described above) collaboration can lead to mutual benefits (Tukamuhabwa et al., 2015, p. 5601).

Supply chain structure: This strategy argues that supply chain resilience can be achieved by, e.g., balancing redundancy, efficiency, etc. (Tukamuhabwa et al., 2015, p. 5602).

Sustainability compliance: The literature highlights that some of the supply chain related risks can be avoided if the organisation complies with regulations and requirements (these can be of economic-, environment-, and social-nature) (Tukamuhabwa et al., 2015, p. 5602).

Information technology: Appropriate IT supports and enhances other strategies mentioned. It also aids in the detection of potential risks/disruptions (Tukamuhabwa et al., 2015, p. 5602).

2.2.2 Reactive strategies

In contrast to the proactive strategies, the reactive ones' goal is to respond, recover, and grow from, rather than to prepare for different kinds of supply chain disruptions (Tukamuhabwa et al., 2015, pp. 5602 - 5603).

Logistics capabilities: By improving the way information flows as well as supply flows are managed, the organisation can ensure a smooth running of the supply chain and thus increase its resilience. For instance, the organisation can increase knowledge management to bounce back from disturbances (Tukamuhabwa et al., 2015, p. 5602).

Social capital: Similar to the proactive strategy of the same name, the literature suggests that effective communication, trust, and information sharing positively contribute to the resilience of a supply chain. This is because these elements allow the organisation to access the relevant resources in a timely way, resulting in a speedier reaction/recovery time (Tukamuhabwa et al., 2015, p. 5602).

Contingency planning: This strategy highlights the importance of not only anticipating events that could lead to disruptions but also the importance of specifying certain actions to deal with the disruptions. An example would be by observing different indicators (Tukamuhabwa et al., 2015, p. 5602).

Redundancy: During times of disruptions, spare inventory or capacity can be used to bridge the gap and maintain operations. Redundancy can mean having more stock, a pool of different suppliers, additional facilities, etc. (Tukamuhabwa et al., 2015, p. 5602).

Demand management: Another strategy that deals with the demand rather than the supply or internal operations is the demand management. The literature highlights that by influencing customer behaviour and choices, the impact of disruptions can be mitigated. Dynamic pricing or assortment planning are, among other things, two ways of demand management (Tukamuhabwa et al., 2015, p. 5602).

Agility: In order to respond in a timely manner to unforeseen changes in demand and/or supply, the supply chain should be agile. In other words, this strategy stresses that “agility” is a crucial aspect when it comes to supply chain resilience (Tukamuhabwa et al., 2015, p. 5602).

Flexibility: This strategy highlights the need of having a flexible supply chain, which allows the firm to respond to changes rapidly and effortlessly (Tukamuhabwa et al., 2015, p. 5602).

Velocity: Linked to the beforementioned strategy, velocity deals with how fast adjustments can be made and thus, how fast the supply chain can bounce back from disruptions (Tukamuhabwa et al., 2015, p. 5603).

Visibility: The reactive visibility strategy emphasises that the ability to see all links within the supply chain leads to more effective responses to disruptions, which strengthens the resilience (Tukamuhabwa et al., 2015, p. 5603).

Collaboration: Sharing information, knowledge and other resources with other supply chains can help mitigate the impacts of disruptions. Furthermore, collaboration can lead to mutual benefits for the own as well as the “partnering” supply chain (Tukamuhabwa et al., 2015, p. 5603).

Information technology: Appropriate IT supports and enhances other strategies mentioned. It also helps to manage different responses to disruptions (Tukamuhabwa et al., 2015, p. 5603).

2.2.3 Key strategies

Tukamuhabwa et al. (2015) as well as previous research have shown that the most essential resilience strategies deal with flexibility, redundancy, collaboration, and agility. Therefore, it can be assumed that by focusing on these factors, an organisation can achieve a good level of supply chain resilience.

The existing literature defines flexibility in different ways. According to the research of Erol et al. (2010), flexibility can be described as “the ability of a system to adapt to the changing requirements of its environment and its stakeholders with minimum time and effort” (Erol et al., 2010, p. 116). Tukamuhabwa et al. (2015) mention in their literature review that flexibility builds resilience by decreasing the time to adapt during disruptions. Moreover, during times of disturbances flexibility helps the supply chain to respond and recover quickly. Besides decreasing the time it takes to respond, adapt, and recover from disruptions, flexibility also allows an easier management of resources. With that being said, supply chain flexibility can be enhanced through redundancy (e.g., by having alternative options, such as a variety of suppliers) or in other words, redundancy is a path to flexibility. Despite this, it is important to know that flexibility can also be achieved by employing multi-skilled people or by having flexible contractual agreements, for example (Tukamuhabwa et al., 2015, p. 5604). Scholten & Schilder (2015) also suggest that collaboration influences the supply chain flexibility (i.e., timely communication and information-sharing enable greater flexibility, while poor/delayed communication and information-sharing lead to a reduction in flexibility because the necessary actions to minimise or mitigate the consequences of a disruption were initiated too late) and ultimately the resilience.

An important yet more expensive factor is redundancy. A company can achieve resilience by establishing redundancy. This means that excess capacity or alternative options can help to recover or overcome disturbances of the supply chain, such as sudden spikes or drops in demand, supply shortages, etc. However, Tukamuhabwa et al. (2015) emphasise that building resilience through redundancy can be impaired by external factors, for example by the location of alternative suppliers. That is, if the disruption is caused by an event that is bound to a certain location (e.g., eruption of a volcano, flooding, etc.) and the alternative suppliers are all located near each other, the planned redundancy does not help to minimise or mitigate the disruption because all of the suppliers are affected (Tukamuhabwa et al., 2015, p. 5604).

Besides flexibility and redundancy, collaboration is often referred to as a key strategy to build supply chain resilience. Collaboration relates to “the ability to work effectively with other entities for mutual benefit in areas such as forecasting, postponement, and risk sharing” (Tukamuhabwa et al., 2015, p. 5604). This means, that collaboration (sharing information, knowledge, and other resources) can help building and strengthening resilience by allowing the collaborating organisations to help each other during disruptions. Additionally, the collaboration makes it easier to share resources needed for a recovery and response (Tukamuhabwa et al., 2015, p. 5605). Moreover, the research from Scholten & Schilder (2015) suggests that collaboration, especially activities like information-sharing, knowledge creation, communication, and joint relationship efforts, increase visibility and velocity - both concepts are discussed in more detail in the subsequent paragraph – as well as flexibility, which in turn improves the overall resilience (Scholten & Schilder, 2015, p. 478).

Lastly a supply chain’s agility is key in building supply chain resilience. Tukamuhabwa et al. (2015) use the following definition of supply chain agility: “The ability to respond quickly to unpredictable changes in demand or supply” (Tukamuhabwa et al., 2015, p. 5605). Furthermore, supply chain agility consists of “visibility” as well as “velocity”. The former one can be defined as “the ability to see through the entire supply chain” (Tukamuhabwa et al., 2015, p. 5605), thus allowing the organisation to see all activities taken from the sourcing of the raw material to the delivery of the finished product. A good visibility leads to different kinds of benefits for the organisation and their supply chain. Having the ability to see through the whole chain does not only aid in the (earlier) detection of upcoming disruptions, but also help to reduce or avoid overreactions, needless interventions, and pointless decisions. That is, a clear visibility enables the organisation to discover potential problems along the supply chain (e.g., vulnerable suppliers, product fluctuations, etc.), which gives the organisation time to come up with appropriate actions to mitigate upcoming disruptions (Tukamuhabwa et al., 2015, p. 5605). By investing in collaborative activities (i.e., information-sharing, communication, and mutually created knowledge) the organisation can improve the supply chain visibility. For instance, information-sharing and communication allow for a higher level of transparency, which in turn leads to a better and earlier detection of upcoming disruptions. The collaborating supply chains can also create knowledge about the processes and measures applied. This leads to a higher confidence in the system, which leads to less overreactions, needless interventions, and pointless decisions (Scholten & Schilder, 2015, p. 480).

Velocity on the other hand is defined as “the speed with which a supply chain can react to changes/events” (Jüttner & Maklan, 2011, p. 251). Supply chain velocity measures the

swiftness of actions taken, i.e., adaptations to the supply chain. Thus, it relates to the recovery time, put differently, the time it takes the supply chain to bounce back from disruptions (Tukamuhabwa et al., 2015, p. 5605).

As can be seen, the four key strategies introduced so far are interlinked with one another. This means that investing in one strategy may result in another strategy benefiting from that investment (e.g., investing into collaboration positively affects the visibility and velocity, which are crucial parts of supply chain agility). However, despite those synergies, the opposite can also be true, and investing in one strategy could impair another one (e.g., the supply chain flexibility could be reduced by collaboration – joint production facilities, for instance, might force an organisation to adhere to a production schedule, which means that if there is a sudden surge in demand, changes to it cannot be made as easily and flexible) (Tukamuhabwa et al., 2015, pp. 5605 – 5606). Nevertheless, research shows, that despite these trade-offs, a high degree of information-sharing, communication, and so on, across the whole supply chain usually suggest a stronger resilience thereof (Scholten & Schilder, 2015, p. 481).

2.2.4 Economic Factors

Inflation is defined as a long-time increase in prices of goods and services. Additionally, the rising prices imply a lower or declining purchasing power of consumers (Atkinson, 1998).

The increase in prices has implications for the entire economy and in the context of supply chain (resilience), certain authors (Achkely G. ,1978; Simon & Echter, 2023) imply that risks or more specifically, the risks outlined in figure 3 are increased. That is, economic events such as inflation influences the likelihood of process risks to occur because the availability of resources and the reliability of equipment is affected. For example, if companies want to save costs, and therefore delay machine maintenance, the risk of machine failures is increased. Additionally, an inflation may also cause lower job security and wages, leading to an increase in labour strikes. In terms of control risk, poor economic conditions may force the organisation (due to cost cutting measures) to lower its safety stock level or change transportation policies, both of which would increase the risk of supply chain disruptions. Besides the risks internal to the firm, economic events also enhance the probability of risks external to the firm, such as demand and supply risks. Perhaps one of the most apparent conclusions is that poor economic conditions lead to a changed consumer behaviour, which ultimately leads to increases in demand-related risks. The consideration behind this assumption is that economic fluctuations lead to a decrease in consumer spending and

hence to unpredictable demand. Furthermore, market changes can also occur due to changes in consumer spending and consumer preferences. Additionally, the likelihood of supply-related risks is increased as well. If the economy is performing poorly, suppliers will be affected too (e.g., bankruptcy), which will lead to supply chain disruptions. Also, sudden spikes in the cost of raw materials of other supplies could lead to shortages and hence lead to disruptions.

According to the analysis made so far, poor economic performance may enhance the probability of disruption risks to occur and therefore negatively influences the resilience of a supply chain in the broader sense.

2.2.5 Cultural Factors

So far, this thesis outlined what the term supply chain resilience is and how supply chain resilience can be cultivated through various strategies. The literature review from Tukamuhabwa et al. (2015) further shows that the main aspects of supply chain resilience relate to flexibility, redundancy, collaboration, and agility.

In addition to these findings, research also shows the crucial role of cultural aspects in establishing resilience. Whiteside & Dani (2020) note that the organisational culture, which is commonly referred to as the way things are done within an organisation (Sun, 2008, p. 137), has an essential influence in whether resilience can be enabled or not (Whiteside & Dani, 2020, p. 6).

Before examining the influence of organisational culture on supply chain resilience, it is important to acknowledge the different cultural categories outlined by the Competing Values Framework (CVF). This framework identifies four distinct types, namely adhocracy, clan, market, and hierarchical cultures (Whiteside & Dani, 2020, p.3).

Characteristics of an organisation with an adhocratic culture are, among others, the preparedness for change and upcoming challenges. Additionally, dynamic, and creative workplaces are typical for such organisations. The long-term objective is to quickly grow market share (Gulati, 2019, p. 18).

Clan cultures put a lot of emphasis on the social aspect within an organisation, hence teamwork and participation are essential. The atmosphere and morale are also crucial for the success of the firm. Characteristics such as loyalty and tradition are typical elements of the

clan culture. Overall, the hierarchy is not very strict as leaders are viewed as equals or mentors (Gulati, 2019, p. 18).

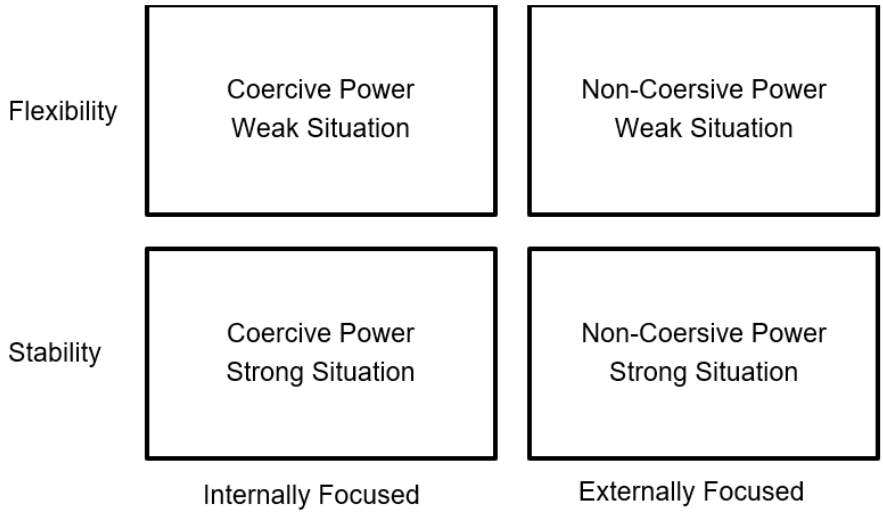
In contrast to the previous types, the market culture focuses more on productivity as well as competitiveness. The culture puts emphasis on results, performance, and market position – which is also the leader's main concern. The long-term objective is market leadership (Gulati, 2019, pp. 17-18).

Lastly, the hierarchical culture is characterised by its structure, internal control, rules, and processes. Additionally, authority is clearly divided among the people within the organisation and the objective hereby is to enhance stability and efficiency (Gulati, 2019, p. 17).

Current literature is not consistent whether these types of organisational cultures encourage or discourage the supply chain resilience. Some authors suggest that adhocracy, clan, and market cultures foster resilience by collaboration, whereas hierarchical cultures have a negative impact on supply chain performance. However, others argue that organisations that employ a hierarchical culture have a high degree of stability, which allows them to better plan for upcoming disruptions. Yet other studies note that the high degree of stability encourages partnerships and thus supports organisations in building good relationships, which in turn has positive effects on supply chain resilience (Whiteside & Dani, 2020, p. 6). For this thesis, the author uses the same assumption as Whiteside & Dani (2020) use in their research, namely that all four types enable supply chain resilience.

In order to evaluate how different cultures affect the resilience, Whiteside & Dani (2020) use a framework that incorporates the CVF, situational strength, power type, and resilience, see figure 5 below.

Figure 5: Framework to achieve supply chain resilience (Whiteside & Dani, 2020)



According to the current literature, internally focused firms, that is, firms with either hierarchical or clan cultures, are less willing to work with external partners. Consequently, internally focused firms are much more controlling over their partners and oblige them to obey and play by their rules, i.e., they use coercive power. On the other hand, externally focused firms (linked to adhocracy and market cultures) are more willing to work collaboratively with external partners. Information sharing, mutual trust, and integration are key aspects of the partnership, thus the use of non-coercive power can be attributed to such organisations (Whiteside & Dani, 2020, p. 6).

Besides differences in how a company exerts its power in supply chain relationships, another crucial factor that differs based on the organisational culture is situational strength. In short, situational strength describes the concept of how certain circumstances guide people's behaviour. According to the paper from Whiteside & Dani (2020) there is a difference between strong and weak situations. The former have clear indicators for people on how to act or react to something, while the cues for a "correct" behaviour in weak situations are more ambiguous or even missing. As a result, weak situations require more flexible decision-making and adaptability, whereas actions in strong situations are dictated by norms, rules, regulations, etc. (Whiteside & Dani, 2020).

Organisations that have either an adhocracy or clan culture are more flexible, hence create weaker situations. Following that, decision-making processes might be less structured and more open to changes, which in turn offers partners a greater level of freedom. However, the lack of structure and the lower decision-making power will lead to less predictability and

control of the supply chain. On the other hand, hierarchy and market cultures put more emphasis on stability, thus situations for supply chain partners are understood to be stronger. The strong situation implies that the decision-making process is strict, structured, and that the organisation exercises more control over the partners within the chain. This higher degree of stability also leads to less flexibility and freedom for supply chain partners. Contrary to weak situations, the predictability and control along the supply chain is increased (Whiteside & Dani, 2020, pp.4 - 6).

Figure 5 shows the four different types of organisational cultures and the discussed attributes. Organisations with adhocracy cultures are located in the top right corner. As per discussion earlier, these types of organisations are flexible and externally focused. Due to the external focus and the associated willingness to work with external partners, non-coercive power is used while conducting business. Further, the flexible characteristic of adhocracy cultures leads to a weak situational strength. The research from Whiteside & Dani (2020) suggests that supply chain resilience can be fostered by collaborating closely with supply chain partners. Organisations that employ a clan culture can be found in the top left corner and much like adhocratic organisations, these types of firms prioritise flexibility over stability. Consequently, clan cultures also lead to weak situational strength. The difference, however, lies in the willingness to collaborate. Clan cultures tend to have a reduced willingness and are hence internally focused. This means that the organisation will likely use coercive power while dealing with supply chain partners. To enable resilience, organisations with a clan culture should allow supply chain partners a certain amount of freedom when it comes to decision-making but take strict action in case of non-compliance. Stability-oriented cultures (i.e., market and hierarchical) are located in the lower half of figure 5. In the bottom right corner are organisations with a market culture. They are externally focused with an emphasis on stability over flexibility. The focus on stability results in a high degree of situational strength, which implies that business activities tend to be rigid and structured. Since market cultures are externally focused the power used is non-coercive. Research suggests that supply chain resilience can be achieved by a close collaboration with supply chain partners. The high degree of situational strength implies that the organisation is setting the rules of the supply chain relationship. Lastly, the category in the bottom left corner of the framework deals with organisations that have an internally focused and stable culture, i.e., hierarchical. These types of firms have a great situational strength and apply coercive power. The resilience can be achieved by setting the rules for the whole supply chain and all partners must obey the established regulations (Whiteside & Dani, 2020, p. 8).

The framework created by Whiteside & Dani (2020) shows that it is essential for managers to acknowledge the organisational culture when working with other firms along the supply chain, especially when they want to achieve supply chain resilience. Moreover, it also shows how managers must behave while working with different cultures in order to achieve a smooth running of the supply chain (Whiteside & Dani, 2020, p. 11).

Drawing on the research from Whiteside & Dani (2020) and Tukamuhabwa et al. (2015), it can be concluded that organisational cultures characterised by their flexibility, such as adhocracy and clan, have an increased resilience by **adaptability (flexibility)**. Conversely, stability-oriented cultures (i.e., hierarchy and market) create strong situations that cultivate resilience by enhancing supply chain **agility**, especially in terms of visibility. For example, Whiteside & Dani (2020) provide a case study of a company that achieved resilience by creating a strong situation with the use of reporting procedures for suppliers.

Externally focused firms, such as organisations that have adhocracy or market cultures, find it easier to work collaboratively with external partners and thus increase supply chain resilience through means of **collaboration**. Lastly, the author of this thesis proposes that internally focused cultures (i.e., hierarchical and clan) may find it easier to build resilience through **redundancy**. The reason for this proposition is that organisations with internally focused cultures put more emphasis on own, internal business activities, enabling them to better increase capacity or manage inventory. The following table below shows the linkage between the findings from Whiteside & Dani (2020) and Tukamuhabwa et al. (2015).

Figure 6: Organisational Culture and Supply Chain Resilience

Culture type (CVF)	**Focus**	**Key aspects of supply chain resilience**			
		Flexibility	**Redundancy**	**Agility**	**Collaboration**
Adhocracy	External Flexible	✓			✓
Clan	Internal Flexible	✓	✓		
Market	External Stable			✓	✓
Hierarchical	Internal Stable		✓	✓	

However, it is important to note that resilience is not solely achievable through the methods outlined in figure 6 (flexibility, redundancy, agility, collaboration). Moreover, the table illustrates the relationship and the most probable approach to increase resilience. This means that organisations with an adhocratic culture, for example, can also enhance their supply chain by prioritising redundancy or agility aspects and are not limited to flexibility or collaboration factors.

2.2.6 Assessment of Resilience & Performance

Considering everything that has been mentioned so far, supply chain resilience has a positive effect on an organisation's operations and as a result on their financial performance. When assessing the resilience, current literature highlights that there are different factors that must be considered depending on the phase of the disruption (Hohenstein et al., 2015, p. 108).

Hohenstein et al. (2015) further mention customer service, market share, and financial performance as three performance indicators of supply chain resilience and identify the recovery time from disruptions as a crucial aspect when assessing the post-disruption phase (Hohenstein et al., 2015, p. 108, 110). The authors note that a greater level of (supply chain) agility results in a shorter recovery time. This suggestion is consistent with the finding of Tukamuhabwa et al. (2015) namely that the recovery time (i.e., velocity) is part of a supply chain's agility. Thus, a higher velocity translates to a greater degree of agility and vice versa.

Furthermore, Hohenstein et al. (2015) propose that a higher velocity or, in other words, a quick recovery from disturbances not only leads to a better performance but also to an increased competitiveness as the organisation may move to a stronger position and recover faster than the competition does. It can be said that a resilient supply chain (especially with a high degree of velocity) enhances customer service, leads to gains in market share, and increased financial performance (Hohenstein et al., 2015, p. 110).

According to studies, the resilience of a supply chain after a disruption (i.e., post-disruption phase) can be assessed using a range of different metrics, namely "Time-To-Recovery" (TTR), "Recovery Level" (RL), and "Lost Performance during Recovery" (LPR) (Behzadi et al., 2020, p. 147). However, it must also be mentioned that these metrics mainly focus on the recovery, i.e., the bouncing back to normal operations. Hohenstein et al. (2015) and Yu et al. (2020) further mention other metrics/measures that consider readiness as well as the

response in addition to recover. The author of the thesis will come back to this study after introducing the widely used metrics (TTR, RL, and LPR).

As specified by Behzadi et al. (2020) the Time-To-Recovery deals with the duration until a supply chain has fully recovered from a disruption. Thus, time-based measures, such as out-of-service times are commonly used. Consider the following example: If a company's main supplier is having problems with its transportation vehicles so that no deliveries can be made, the out-of-service measure can be applied to the metric. In other words, the out-of-service measure consists of the number of hours, days, or weeks in which no deliveries can be made and therefore production comes to a standstill. To improve the Time-to-Recovery, the out-of-service measure must be reduced. The organisation can achieve this, for example, by having a flexible supply chain (flexible supply chains can be created among other things, through redundancy) that allows for an easy switch to an alternative supplier, which reduces or even helps to avoid the downtime altogether, and production volumes are only slightly reduced or maintained. Similarly, lead-time ratio (between expected and actual lead-time) and on-time delivery are other measures that assess the Time-To-Recovery and hence the resilience of a supply chain. In addition, it could be said that this metric focuses on the time of the recovery process and hence is best suited for an assessment of this period (Behzadi et al., 2020, p. 147).

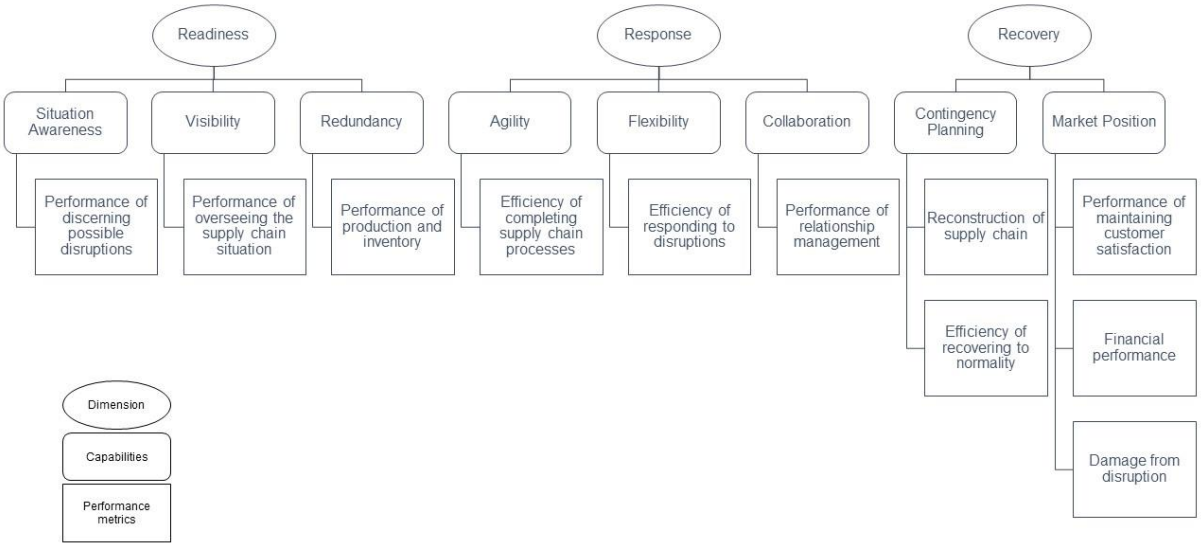
The next metric considers the long-term performance and is named Recovery Level metric. It uses a baseline, which is the performance before the disruption (or the best-case scenario) and then compares it to the performance level after the recovery. Therefore, literature commonly defines it as the fraction of the baseline performance that is regained after a disturbance in the chain. Measures applied with this metric are demand postponement rate, stock-out rate, customer service level, etc. (Behzadi et al., 2020, p. 148).

Similarly to the beforementioned metric, the Lost Performance during Recovery also uses a baseline. It looks at the difference between the baseline performance and the performance after a disruption. However, in order to not under- or overestimate the impacts, the Lost Performance during Recovery metric isolates the effects of the disruption by only focusing on the time of the recovery. It is usually a cost/profit- or quality metric and focuses on the short-term performance during the recovery (Behzadi et al., 2020, p. 148).

Hohenstein et al. (2015) highlight that readiness should be measured using robustness measures, response should be measured by considering the reaction time (to a disruption), while recovery should be measured by the recovery time (from a disruption to normality).

Based on that, Yu et al. (2020) have established the so-called “SCRE Capability-Performance Metrics Framework” (SCPM), which gives an overview of the important capabilities and the respective metrics used to measure supply chain resilience, see figure 7. Some of the capabilities included in the SCPM relate to the resilience strategies mentioned earlier in this thesis but are named differently.

Figure 7: SCRE Capability-Performance Metrics Framework (SCPM) (Yu et al., 2020, p. 4550)



This framework provides a holistic approach for the assessment of a supply chain’s resilience. As touched upon before, it considers readiness, response, and recovery and measures these dimensions through different indicators (or capabilities). Thus, an organisation can measure its readiness to potential disruptions by looking at the situation awareness, the visibility, as well as the redundancy. If the indicators suggest a high degree of readiness, the organisation is well prepared for potential upcoming disturbances within the supply chain and as a result has a stronger supply chain resilience (Yu et al., 2020, p. 4551).

Situation Awareness: The situation awareness can be measured by the performance of discerning possible disruptions. This performance assesses the capacity to foresee disturbances (or the ability to have good quality forecasts) and focuses on the time period before the event occurs (Yu et al., 2020, p. 4549).

Visibility: The second capacity, visibility, can be evaluated by analysing the effectiveness and quality of monitoring actions. Superior supply chain monitoring enables the firm to become aware of probable disturbances, which allows for a longer planning time (ahead of the disruption) (Yu et al., 2020, p. 4549).

Redundancy: The last measurement under the readiness dimension relates to the inventory as well as capacity levels. Higher inventory secures operations when demand spikes, whereas low levels of inventory increase the vulnerability of the supply chain (Yu et al., 2020, p. 4548).

Following the measurements for the readiness, the response, or the ability to react to disruptions must also be assessed. The better the response, the stronger is the resilience of the chain. While assessing this dimension, indicators that relate to the agility, flexibility, as well as the collaboration should be considered. These indicators are the efficiency of completing supply chain processes, efficiency of responding to disturbances, and performance of relationship management (Yu et al., 2020, p. 4551).

Agility: The first indicator relates to the duration and the quality of a process during a supply chain disruption. In other words, it relates to how effective processes within the supply chain are. Yu et al. (2020) emphasise that the lead-time is a useful metric in this regard. Moreover, studies have also shown that by reducing the lead-time, organisations increase the chances of withstanding a disruption (Yu et al., 2020, p. 4548).

Flexibility: As the name of the next performance metric (indicator) implies, it assesses the swiftness of the identification of a disruption as well as the swiftness of taking appropriate actions when the disruption occurs. This also includes the ability to quickly use and provide the right resources to adapt/respond to such events (Yu et al., 2020, p. 4549).

Collaboration: The relationship management, respectively the performance thereof includes metrics that measure the level of interaction and connection as well as the quality of the collaboration in the supply chain during disruptions (Yu et al., 2020, p. 4548).

Lastly, the recovery dimension can be assessed through contingency plans and market position. This does not only allow the organisation to see whether it can quickly recover from disruptions, but also indicate how well the supply chain can maintain its production output (Yu et al., 2020, p. 4551). The framework suggests the following performance metrics:

Contingency Planning: The first metric suggested is the reconstruction of the supply chain. Hereby the metric does not only focus on the redesign of the chain but also on the reconfiguration of the resources after the disruption occurred. That is, it also considers the adjustment of the resources to the changed environment.
The other metric in contingency planning deals with the recovery to normal operations. Yu et al. (2020) mention that this metric relates to the swiftness of a supply chain to bounce back to normal operations. Put differently, it relates to the concept of velocity, a notion outlined by Jüttner & Maklan (2011) as the rate at which reactions to changes occur. However, the focus hereby is not on how quickly responses are made but rather on how quickly a supply chain can recover after a disruption (Yu et al., 2020, pp. 4548 - 4549).

Market Position: The first performance metric listed in the framework is linked to customer satisfaction, more precisely to the maintenance of the satisfaction level, and can be measured by looking at how well customer satisfaction is managed during times of disturbances.
The second metric, financial performance, evaluates if the supply chain is able to increase profits and decrease costs during times of disruptions. It therefore focuses on the costs, profits, benefits, fines, etc. incurred during the disruption.
The last metric to evaluate the market position looks at the damage caused by the disturbance and thus considers measurements to assess the loss. Besides the ability to assess the recovery, this metric can also be used to evaluate the end result from an organisation's resilience efforts (e.g., how was the organisation's efficiency, reliability, etc. affected) (Yu et al., 2020, pp. 4548 - 4549).

Similar to the conclusion of section 2.2.3 the different concepts from the framework are intertwined with one another. For instance, the literature review from Tukamuhabwa et al., (2015) highlights the fact that visibility is part of agility. Thus, considering both the framework as well as the finding from Tukamuhabwa et al. (2015), it can be implied that the measurement of the degree of visibility does not only directly aid in the assessment of the readiness, but also indirectly (through the agility capability) in the assessment of the response. However, Yu et al. (2020) also note the differences between certain concepts and highlight that e.g., the efficiency to return to normality and the efficiency in responding to disruptions both relate to the swiftness of recognising and responding to events. Despite this, in the context of the established SCPM the former relates more to the recovery dimension, whilst the latter is associated with the response dimension (Yu et al., 2020, pp. 4548 - 4549).

Overall, the research from Wong et al. (2020) indicates that the resilience of a supply chain can have positive implications for the market and financial performance (i.e., ROA, ROE, net profit) of a firm (Wong et al., 2020, p. 9).

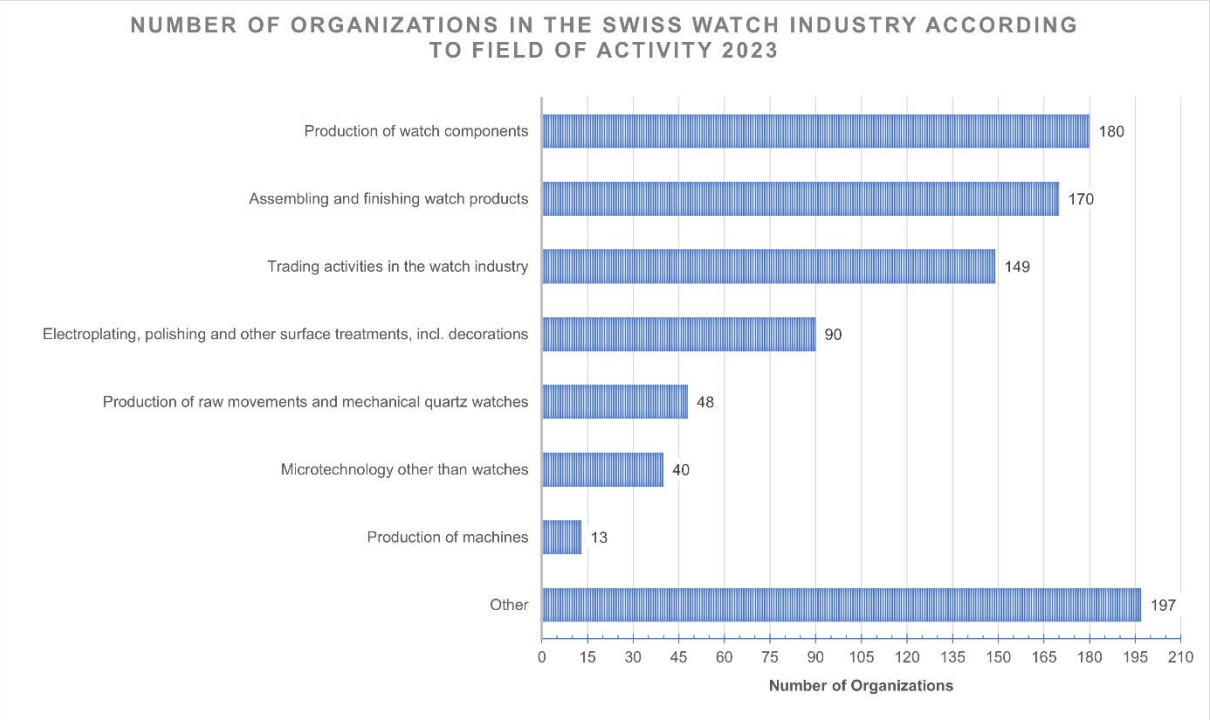
2.3 Swiss Watch Industry

The Swiss watch industry employs 60,000 employees and contributes 4% to the national GDP. Each year Switzerland exports millions of watches. Despite that, it is, if measured in terms of quantity, not the leading exporter. If measured by value, however, Switzerland is the world leader when it comes to exporting watches. This shows that it primarily exports luxury watches – for which it is also known worldwide (Admin, 2023). In 2022, the total amount of exports reached a staggering CHF 24.8 billion (Szegedi & Egerth, n.d., p. 5).

According to the Federation of the Swiss Watch Industry – the respective trade association - the market for watches includes all five continents. Top markets are the United States, China, and Hong Kong (FH, n.d.).

The largest organisations in the Swiss watch industry reach from less luxurious to luxury brands. Companies like LVMH Swiss Manufactures SA, Rolex SA, Swatch Group AG, Omega SA, are among the leaders (Dun & Bradstreet Schweiz & Handelszeitung, 2022). Overall, there are 680 organisations in 2023 that are active within the industry (Recensement 2023, p. 5). These companies are operating in different fields, as figure 8 (below) shows. The overall number of organisations surpasses the previously reported 680, as corporations that operate in a variety of fields are counted multiple times.

Figure 8: Number of Organisations in the Swiss Watch Industry According to Field of Activity 2023 (Recensement, 2023, p.10)



Further, the industry consists of hundreds of watch brands, some of which are successful global brands that are appreciated all around the globe, whilst others are small watchmakers only known to some people. The size difference naturally comes with differences in their supply chain. Large companies that have enough financial means often vertically integrate to ensure better quality and availability of materials. This trend, however, negatively impacts smaller watchmakers that do not have enough financial means at their disposal. So, to say, the large firms invest and purchase stakes in supplier companies, which shrinks the entire pool of suppliers and thus it becomes harder for smaller firms to source their materials (Szegedi & Egerth, n.d., p. 11). Another interesting insight given by Szegedi & Egerth (n.d.) is the following: Inflation increases the production costs and therefore also influences the selling prices of watches. Since some of the top watchmakers in Switzerland operate in the luxury sector, this is not a massive problem for them. As studies have shown, people that purchase from these luxury brands usually have enough financial means to buy watches despite the price fluctuations. Therefore, a price increase does not strongly affect the demand. For less luxurious watchmakers, the implications are greater, and less people are willing to buy their products (Szegedi & Egerth, n.d., p. 8).

3 Methodology

The author of this thesis employs a qualitative research approach to investigate and research the topic of resilient supply chains in the Swiss watch industry. By combining an exhaustive review and analysis of existing literature as well as by implementing interviews, this thesis offers a comprehensive understanding of the topic and background, while also allowing for a deeper analysis of some concepts and real-world experiences within the Swiss watch industry.

The decision to conduct a qualitative research approach is mainly due to the fact that the current literature about supply chain and supply chain resilience is vast. Furthermore, the thesis can be structured in a comprehensive way, while also allowing to specify the theoretical concepts in the context of the Swiss watch industry. The first part of the qualitative research provides a foundation by implementing existing literature about supply chain concepts, disruption risks, and economic as well as cultural factors. The second part (i.e., interviews), on the other hand, adds to these findings and provides real-world experiences of professionals within the industry, thus allowing conclusions about the applicability of the theoretical concepts. By applying a qualitative method, this thesis aims to provide a comprehensible study on the topic of resilience of supply chains in the Swiss watch industry.

As outlined before, the thesis consists of two parts. The first qualitative part of this thesis aims to establish a theoretical framework by analysing current and relevant literature, consisting of literature reviews, research papers, studies, and so on. The data were gathered from academic databases using search terms such as “supply chain resilience”, “Supply chain visibility”, “Swiss watch industry”, etc. Finally, the analysis consisted of identifying common conclusions and relevant topics for the subsequent chapters of this thesis.

The second part consisted of semi-structured interviews that were conducted with organisations in the Swiss watch industry. The main goal hereby was to gather insights into their experiences and perspectives on supply chain resilience and to see whether parts of the theoretical framework can be applied or not.

The interviews included 16 open-ended questions that dealt with the topic of supply chain resilience, organisational culture, and the assessment or evaluation of supply chain resilience. The interview questions were carefully designed to ensure a high degree of relevance to the research topic as well as the research objectives. This was achieved by developing questions that aligned with the main findings identified and outlined in the

theoretical part. As a result, the interviews played a significant role and proved themselves useful for the analysis of supply chains in the Swiss watch industry.

The interviewees were selected based on their role within the company and their expertise in the supply chain. In general, when deciding on the interview partners, the focus was primarily on the company. That is, the companies should not only operate in Switzerland but should be of Swiss origin. Another important aspect was to interview a person within the company that has enough knowledge about the organisation, especially about the supply chain. Thus, the three interviewed people either work directly with the supply chain or are the owners of the watchmaking company.

The interviews were conducted by phone and MS Teams in April 2024. In order to ensure anonymity, no personal information (including company names) is mentioned. The ideas, opinions, insights, experiences, and information provided by the interviewed people are collectively cited as “personal communication, April 2024” to further ensure anonymity. Prior to the interviews all parties agreed to provide the information for the academic use of this thesis.

4 Results

As part of this thesis, three interviews were conducted to see to which extent the presented theory can be applied to the Swiss watch industry. To further provide useful and applicable insight into the topic of supply chain, including general knowledge about the industry up to specific measurements on how to assess the resilience thereof, the interviews were constructed and divided into four different parts. Consequently, this section follows the same structure.

4.1 Swiss Watch Industry – Supply Chain

As this thesis already outlined (see Section 2.3), the industry consists of many different firms. The interviews align with these findings and further highlight that there is a significant difference in the way supply chains are constructed. That is, large organisations and corporate groups have a comparatively high degree of in-house production, i.e., they either produce watch components themselves or pursue an integration strategy (e.g., vertically integrated). This means that the supply chain consists of fewer external partners. However, the majority of organisations, roughly 80%, in the Swiss watch industry do not have such a

high degree of in-house production as it would not be economically viable for them. From this financial standpoint, a high level of in-house production only pays off, if the organisation has a high production volume (as it is the case for large corporation groups). Therefore, approximately 80% of firms in this industry procure the parts needed in the watchmaking process from specialised suppliers and then assemble them into new, modern, and beautiful watches. To be more specific, this means that dials, cases, hands, straps, etc. are purchased by suppliers specified in the production of dials, cases, hands, and straps, respectively. As a result of the high number of nodes within the supply chain, a shortage of certain types of metals, for example, only has an impact on components such as watch cases, but not on movement parts (clockwork), as they do not use the same kind of metals in the production. Thus, a shortage may only affect certain parts of the supply chain (Personal communication, April 2024).

The supply chains of the interviewed companies correspond to the above findings. Although some parts might be in-house, the larger part of the supply chain consists of external partners. The parts that are manufactured in-house are generally used for special products and are not produced in large quantities. Additionally, a strong network of external partners is crucial, and some components/materials may even be procured from different countries. So, depending on the company, the supply chain could include both a “foreign chain” and a “domestic chain”. However, when dealing with partners from foreign countries, the regulation concerning “Swiss-made” plays a crucial role. It stipulates that the movement must be manufactured and assembled in Switzerland (Personal communication, April 2024).

Since “Swiss-made” is an important aspect of the watchmaking industry, it is necessary to discuss its implications. Generally, it can be said that luxurious watches are not as highly affected by the regulation as more affordable ones. The reason is luxury brands add most of their value in Switzerland. Henceforth they are in line with the regulation. For more affordable watches, the regulation restricts the creative leeway, and a tightening thereof could make it increasingly harder for these types of firms to conform with the prescribed requirements. Ultimately, they could lose the right to add the “Swiss-made” label (Personal communication, April 2024).

Another interesting finding is the critical role delivery times (or lead time) have in the watchmaking industry, especially their influence on organisations and on the resilience of supply chains. Delivery times particularly affect the planning, hence organisations must plan one or more years in advance. Ultimately this leads to negative impacts on responsiveness and the ability to adjust quickly to changes. In general, the combination of the delivery times,

the complexity, and the extensive number of work steps within the supply chain make the entire industry slow to react to trends and changes on the market (Personal communication, April 2024).

4.2 Supply Chain Disruption

Economic factors, such as currency fluctuations and inflation have an impact on the success of organisations, the strong Swiss Franc and the moderate inflation have positive effects on the profit. Regarding the supply chain, one interviewee highlights that their supply chain was never negatively affected. Moreover, they were “positively inspired”. Another emphasised that currency fluctuations could lead to problems on the customer side of the supply chain, as currency appreciation or depreciation impact the purchasing power of potential customers. The same thought can be applied on the supplier side. However, looking at this side of the supply chain, it is important to note that the largest part of the value creation occurs in Switzerland and as a result currency fluctuations do not affect the supplier side to a large extent. Furthermore, inflation (or an increase in the prices of raw materials and watch components) does not have a large impact as well. The reason is the same, the value lies primarily in the work involved rather than in the material itself. So, economic factors tend to influence the customer side of the supply chain to a greater extent than the supplier side (Personal communication, April 2024). This finding is consistent with the work from Szegedi & Egerth (n.d.), which note that a lower purchasing power could lead to a lower demand.

The interviews further showed that there are other more impactful causes for disruptions than economic factors. Especially emphasised were disturbances due to the COVID-19 pandemic. That is, closures of entire factories, problems with logistics, etc. led to serious problems in the supply chain. Besides that, organisations in the industry often work with suppliers that manufacture components specifically designed for them and the products they sell. Consequently, a flexible change of suppliers is difficult or even impossible. The high level of supplier dependence makes the supply chain inflexible and prone to disruptions, which would have strong and direct impacts (Personal communication, April 2024).

As described in section 2.1, Shekarian & Parast (2020) outlined several risk categories, namely process, control, demand, supply, and environment risks. Based on the findings of this thesis, the author proposes that organisations in the Swiss watch industry are more prone to control, demand, supply, and environment risks. That is, risks associated with the control and demand category are present because delivery times (or lead time) are long. As a result, accurate planning and forecasting of business operations as well as customer

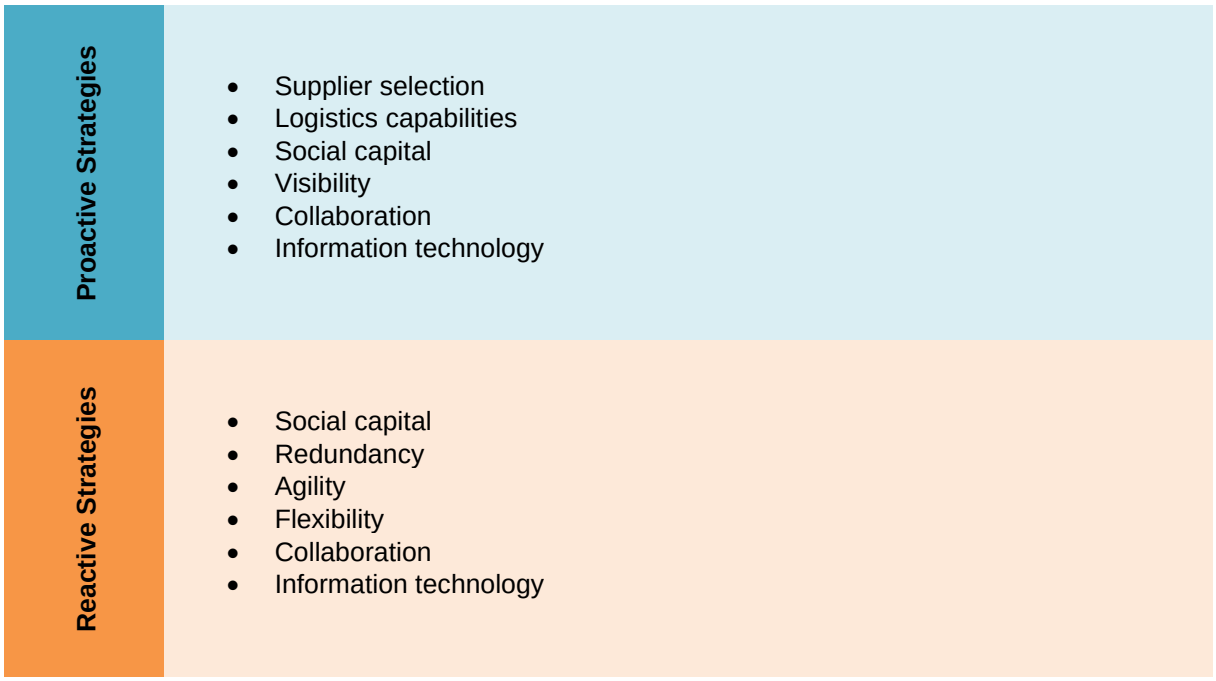
behaviour proves itself to be difficult. The nature of the delivery times further has an impact on the supply risk category. For instance, if suppliers do not meet the agreed deadline, disruptions in the supply chain might occur. Additionally, longer lead times make the supply chain prone to disruptions as it is harder to act and react to certain events. Lastly, the risks classified in the environment category are present in the Swiss watch industry. The interviews highlight the negative effect pandemic-related closures had on the supply chain. However, economic factors (included in the environment category) are not as influential as one may think. At most, the supplier side might be impacted more than the supplier side.

For organisations that have a high degree of supplier dependence, a backup stock (i.e., redundancy) is one of the few ways an organisation can prepare for, or minimise, disruptions. Redundancy is seen as one of the few ways because the watch industry, as outlined above, requires continuous advance planning and because many firms heavily depend on certain suppliers. So, in the event of sudden disruptions or problems with suppliers, redundancy should make sure that sufficient parts are available to avoid a halt in production. For other organisations, that are able to change suppliers more easily due to the nature of their products (e.g., standardised parts), having a good network (i.e., flexibility and collaboration) is another way to prepare for, or minimise, disruptions and their impact (Personal communication, April 2024).

Following that, close contact, cooperation, as well as good communication are of crucial importance when it comes to a quick recovery from disruptions. The factors mentioned allow the organisations to recognise (potential) disruptions within the supply chain at an early stage and thus enables them to come up with appropriate measures to counteract the problems. Specifically, this means that if a supplier informs the organisation on certain raw material shortages, the production of watches using other materials can be prioritised. Besides a good relationship with suppliers, the ability to adjust and be flexible with the decisions and actions is also crucial to recover (Personal communication, April 2024).

The following table below was created by comparing the previous studies and research (Tukamuhabwa et al. (2015); Scholten & Schilder (2015)) to these findings. Figure 9 provides an overview of the resilience strategies commonly used in the Swiss watch industry (it is based on the interviews and does not provide a complete list of strategies).

Figure 9: Strategies Used In Swiss Watch Industry



4.2.1 Proactive Strategies

Supplier selection: Organisations in the industry are generally heavily dependent on their suppliers. Therefore, a proper consideration and selection of suppliers is crucial and can positively influence the preparedness to disruptive events.

Logistics capabilities: Information-sharing and generally a close collaboration and communication help to better manage flows of information and supplies, which in turn leads to a more resilient supply chain.

Social capital: Again, effective communication proves itself to be of high importance. Furthermore, organisations that foster trust, cooperation, etc. can be better prepared for disturbances.

Visibility: Strategies that focus on the supply chain visibility are used by different companies to see whether disruptions in the supply chain are about to occur. Close collaboration with suppliers and effective communication positively influences the ability to identify disruptive events before they happen.

Collaboration: An excellent collaboration leads to smooth operations and better management of resources and capabilities, hence increasing the resilience.

Information technology: Companies in the Swiss watch industry use IT to evaluate their resilience and to support other strategies, such as collaboration, etc.

4.2.2 Reactive Strategies

Social capital: Effective communication, trust, cooperation etc. is crucial to react to disruptions. Thus, organisations in the industry emphasise this strategy.

Redundancy: The high level of supplier dependence and the associated lack of alternative options means that redundancy (backup storage) is one of the only effective resilience strategies that watchmakers pursue to guarantee a continuous production.

Flexibility: Flexibility in the sense of rapid and effortless changes also proves itself useful to build resilience. However, firms with a high level of supplier dependence cannot change their partners flexible. Despite that, different (flexible) adjustments such as an increase in the production of other products can be made.

Collaboration: An excellent collaboration leads to smooth operations and better management of resources and capabilities, hence increasing the resilience.

Information technology: Companies in the Swiss watch industry use IT to evaluate their resilience and to support other strategies, such as collaboration, etc.

4.2.3 Key strategies

Tukamuhabwa et al. (2015) highlight that key strategies to achieve resilience are related to flexibility, redundancy, collaboration, as well as agility. The interviews show that all these strategies are used in the Swiss watch industry. Hereby, it is noteworthy that organisations strongly emphasise the collaboration, which in turn has positive implications on the agility, redundancy, and flexibility. Spare inventory stock (redundancy) safeguards the production, if disruptions, such as problems with suppliers, shortages of components, etc., occur. Redundancy in combination with flexibility enables companies to change and use resources more effectively and may also support the continuation of production during disruptions. Collaboration, especially a good relationship with suppliers as well as a healthy level of communication does not only foster supply chain visibility, that is, the ability to identify problems along the chain, but also allows for flexible changes and adjustments.

Scholten & Shilder (2015) note that information-sharing, communication, etc. across the entire supply chain led to a stronger resilience. This finding is in line with the results of the interviews.

4.3 Organisational Culture

Before asking the interviewees questions about how their organisational culture influences the supply chain and the supply chain resilience, it was necessary to define their cultures first. The organisations describe their cultures as flexible with a family-like atmosphere that allows open communication, which is also seen as a cornerstone and a crucial aspect of the problem-solving within the organisation. A flat hierarchy, curiosity, and being open-minded further characterises the organisational cultures of the interviewed firms (Personal communication, April 2024).

The organisational culture does not only affect the work within a company but also how the organisation works with external partners. This assumption can be backed by the insights provided by the interviewed organisations, which say that the cooperation between themselves and their partners in the supply chain is in line with their own culture. Suppliers are seen as partners and the decision to collaborate is not based on financial reasons but rather on quality related criteria. Furthermore, one interview highlighted the importance of stability between the organisation and the partner (i.e., it is not desirable to change suppliers often). Overall, supplier reliability, friendly and constructive cooperation, as well as communication are of great importance. These factors are all positively influenced by the culture outlined above. In larger companies, however, this may be different and there is possibly more pressure on suppliers. In smaller companies, this works quite differently, as a win-win situation for both parties is desired (Personal communication, April 2024).

The organisational culture does not only impact the way an organisation works with its suppliers, but also how well the supply chain functions and how resilient it is. A close collaboration with suppliers has positive effects, as bottlenecks in procurement can be communicated at an early stage. This means that suitable measures can be taken in advance and possible interruptions can be mitigated. Furthermore, flexibility, open-mindedness and curiosity are effective ways to prepare and recover from disruptions (Personal communication, April 2024).

In section 2.2.5 the author mentioned the work of Whiteside & Dani (2020). In addition to that, figure 6 showed the relationship between the type of organisational culture and the key

strategies of resilience identified by Tukamuhabwa et al. (2015) and proposes how organisations should foster resilience. The interviews show that the Swiss watch industry relies on partners. Henceforth, the author proposes that firms within this industry are naturally more externally focused than internally. Furthermore, the author suggests that the emphasis should be put on certain cultural traits rather than on the types of cultures because the line between different types of cultures is not always easy to identify. That is, organisational cultures that foster communication, close collaboration, flexibility, curiosity, open-mindedness, etc. are proven to benefit the supply chain (and ultimately the resilience), whereas cultural traits that hinder communication, collaboration, flexibility, curiosity, and open-mindedness are assumed to have negative implications on the resilience. Additionally, certain levels of stability in the relationship are necessary to build trust between the organisation and its supplier.

4.4 Performance assessment

When it comes to evaluating the performance and resilience of a supply chain, the interviewed organisations use different tools and metrics. On the one hand, on-time deliveries are measured and analysed in the ERP system. It records exactly what was ordered, what was delivered, and when the deliveries were made. Therefore, the data related to on-time deliveries provide crucial information about the well-functioning of a supply chain. Moreover, the resilience can also be measured using these on-time delivery data. Another company, suggests, communication, efficiency, technical know-how, reliability, and transparency as key elements (Personal communication, April 2024).

Due to the complexity and increased effort involved, all interviewed organisations do not use metrics specifically designed to assess supply chain resilience. Henceforth, “normal” metrics to evaluate overall supply chain performance provide enough information about the resilience of the chain (Personal communication, April 2024).

As set forward in section 2.2.6, there are different ways to assess the resilience of a supply chain. Yu et al. (2020) provide a comprehensive framework to measure the different layers of resilience as provided by the research of Hohenstein et al. (2015), namely readiness, response, as well as recovery. However, the interviews showed that specific metrics to measure the resilience are often associated with an unproportional increase in effort and that typical metrics, to evaluate overall supply chain performance, are preferred. The author of this thesis acknowledges the theory, research, and framework described by Hohenstein et al. (2015), Behzadi et al. (2020), Yu et al. (2020), in section 2.2.6. Nevertheless, based on his

research in the Swiss watch industry, companies tend to employ simpler measurements to evaluate the resilience. Moreover, companies in this industry may not explicitly prioritise the assessment of resilience.

4.5 Main Findings

Q1) How can companies within the Swiss watch industry use or react to economic and cultural factors to build resilient supply chains?

Depending on the organisational culture, some companies may find it easier to work with other, external firms. Furthermore, cultural traits that foster communication, close collaboration, flexibility, curiosity, open-mindedness, and stability are proven to increase the supply chain's ability to prepare for, respond to, and recover from disruptive events – thus enhancing the resilience of the supply chain. Although economic events influence the economy as a whole and hence might influence the overall financial position of a company, in the Swiss watch industry, events such as currency fluctuations and inflation do not pose a great risk and do not impact the resilience of a supply chain to a notable extent.

Organisations can thus build resilient supply chains by fostering the beforementioned cultural traits. As a result of the company's emphasis on communication, close collaboration, flexibility, curiosity, open-mindedness, and stability, it is possible to establish a better work environment for internal parties. Moreover, the organisation improves the way it operates with external firms along the supply chain. That is, effective communication, open-mindedness, etc. allow for a better level of preparedness, for a better response, and finally, for a better recovery from disruptive events – hence increasing the resilience of the supply chain.

Q2) Does the importance of cultural factors change depending on the state of the economy?

Interviews showed that the organisational culture did not change due to disruptions, economic events, or other non-economic events. The interviewed organisations further highlighted that the culture is deeply rooted and may only be influenced by the leadership style. Put differently, if a new manager is appointed, the culture might change slightly, but the state of the economy does not influence the organisational culture as such (Personal communication, April 2024).

Q3) How do cultural aspects influence the supply chain? &
Q4) What cultural factors contribute to a resilient supply chain?

As introduced in the theoretical framework, the current literature is not consistent with its findings and some academics suggest that a certain type of culture enhances resilience, while another type hinders it. However, Whiteside & Dani (2020) note that every culture can enhance supply chain resilience through their own individual way. The interviews conducted show that in the Swiss watch industry, cultures that focus on the human or social aspect – that is, open communication, collaboration, open-mindedness, curiosity, etc. – achieve a good level of resilience.

5 Conclusions

The purpose of this thesis is to understand and analyse the concept of supply chain resilience in the context of the Swiss watch industry. Hereby, the focus of the thesis lies on the exerted influence of cultural factors (precisely organisational culture). Furthermore, the thesis considers economic conditions such as inflation or currency fluctuations and analyses how these factors play into the resilience of a supply chain.

First, the concept of supply chains was illustrated and defined as the up- and downstream flow of goods, services, money, and/or information from a source to a client, involving three or more units (Mentzer et al., 2001, p. 4). Then the potential problems that could occur were defined as “disruptions” and according to the work from Shekarian & Parast (2020), classified into five risk categories, namely process, control, demand, supply, and environment risks.

Following that, the thesis continues with the notation of resilience, moreover with the concept of resilient supply chains, which includes the preparation, response, and recovery from disruptions. Current literature defines the term resilience and the idea of a resilient supply chain in many different ways and sometimes includes a lot of other concepts. The definition applied in this thesis is consistent with the one provided by the literature review from Tukamuhabwa et al. (2015), which states that resilience is “The adaptive capability of a supply chain to prepare for and/or respond to disruptions, to make a timely and cost-effective recovery, and therefore progress to a post-disruption state of operations – ideally, a better state than prior to the disruption” (Tukamuhabwa et al., 2015, p. 5599). After presenting this definition, the thesis sheds more light on the concept of resilient supply chains by outlining pro- as well as reactive strategies that organisations can employ to have resilient chains.

Third, Tukamuhabwa et al. (2015), consolidated different findings and strategies and revealed that flexibility, redundancy, collaboration, and agility are key strategies/elements of resilience.

Fourth, one of the thesis objectives is to analyse whether economic conditions influence the resilience of supply chains. Therefore, it was found that inflation can increase the disruption risks as classified earlier by Shekarian & Parast (2020).

Besides the influence economic conditions have, the other objective is to evaluate what implications cultural aspects have in building resilient supply chains. Whiteside & Dani (2020) use a framework that incorporates the CVF, situational strength, power type, and resilience. The goal of their research is to see how different organisational cultures can enhance resilience. Henceforth, this thesis described the four distinct types of organisational cultures according to CVF and analyses how different cultures can achieve resilience.

One of the last parts in the theoretical framework deals with the performance assessment. Hereby the work from Hohenstein et al. (2015), Behzadi et al. (2020), and Yu et al. (2020) proved itself especially useful. The analysis of existing literature showed that, in addition to the TTR, RL, and LPR measures, organisations should focus on three dimensions while assessing the resilience their supply chain, namely readiness, response, and recovery. Furthermore, each of these dimensions has its own set of metrics to use.

Having set the theoretical framework about the supply chain, disruption risks, resilience, economic and cultural factors, as well as means to assess the supply chain and its resilience, the thesis turns its focus on the Swiss watch industry by briefly outlining the most important numbers and information.

The further research aims to gain additional insights into the Swiss watch industry, their supply chains as well as the resilience. By interviewing three different companies, the thesis provides meaningful information about possible supply chain disruptions. A key insight is that economic conditions such as inflation and currency fluctuations only pose a relatively small risk and that others, such as control, demand, supply, and environment risks are more likely to have negative implications for the organisations within the industry. Furthermore, the high supplier dependence and the long lead times are identified as problem areas inherent to the watchmaking business.

Next, pro- as well as reactive strategies employed by the interviewed firms are listed. A key insight here is that all firms emphasise the importance of effective communication and collaboration. Moreover, the use of resilient strategies associated with collaboration are proven to enhance flexibility, redundancy, and agility. As for the impact that the organisational culture has, the interviews show that certain characteristics favour the resilience. Therefore, cultures that foster communication, close collaboration, flexibility, curiosity, open-mindedness, etc are understood to enhance resilience.

Despite the extensive research from Yu et al. (2020) on the means to assess supply chain performance, the interviews suggest that measures specifically aimed at assessing the resilience are not used in the Swiss watch industry. Yet, “normal” measures such as on-time delivery, or communication, efficiency, technical know-how, reliability, and transparency are preferred.

Finally, the thesis answers the defined research and sub-questions and highlights the importance of certain cultural factors for the resilience of supply chains in the Swiss watch industry.

The current literature of supply chain resilience does not include many studies regarding the impact of cultural factors. Therefore, future research on this topic would be useful. Furthermore, this thesis is based on smaller firms in the Swiss watch industry, thus leaving room for interpretation regarding how the findings apply to larger organisations. Future research should include findings and insight from large firms and corporate groups to close the gap.

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Appendix 1. Interview Questions

Supply Chain:

1. How does your supply chain look like?
2. Is your company horizontally or vertically integrated?
3. How does the “Swiss-made” regulation affect your supply chain?
4. Is there anything special you would like to highlight regarding your supply chain?
5. Did your supply chain experience any disruptions due to economic events (e.g., currency fluctuations, inflation, etc.)?
6. Did your supply chain experience any other major disruptions that were not caused by economic events?
7. What kind of risks (that could cause disruptions) does your supply chain face?
8. How does your company prepare for potential supply chain disruptions (i.e., how does your company minimise the impact of unforeseen supply chain disruptions)?
9. How does your company ensure a quick recovery from supply chain disruptions?

Organisational Culture

1. How would you describe the culture within your organisation (e.g., is it flexible, strict, hierarchical, etc.)?
2. How does this culture show itself when working with partners in the supply chain?
3. Are there any cultural traits that enable your company to prepare and respond to supply chain disruptions?
4. Did your company have to adapt its culture as a response to certain market changes, regulations, or economic events?

Performance

1. What measurements (metrics) do you use to evaluate your supply chain’s performance?
2. If any, what metrics do you use to evaluate the resilience of your supply chain?

Appendix 2. Data Management Plan

The data gathered during the thesis process, especially relating to the information obtained by the conducted interviews, are locally saved on the authors notebook. Furthermore, to ensure a backup, the information is saved in Microsoft's cloud service (OneDrive). Both the notebook as well as the Microsoft cloud service are password protected and the author is the only person who has access. The data kept on the notebook as well as in the cloud service will be stored there for one year upon publication of the thesis. To further ensure the security of the data stored in the cloud service, a two-factor authentication is in place. Additionally, the information stored (both locally and on OneDrive) do not contain any personal information about the interviewees or their companies. The information consists of notes taken during the interviews, no sensitive information was written down.

The interviewees were informed about the use of the information and have agreed to provide their information for the exclusive use in this thesis.