COOPETITIVE VALUE CO-CREATION ALONG SUPPLY CHAINS FOR ACHIEVING RESILIENCE: INSIGHT FROM THE AUTOMOTIVE INDUSTRY

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ETHICAL DECLARATION

I hereby declare that I am the sole author of this thesis and that I have conducted my work in accordance with academic rules and ethical behaviour at every stage from the planning of the thesis to its defence. I confirm that I have cited all ideas, information and findings that are not specific to my study, as required by the code of ethical behaviour, and that all statements not cited are my own.

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ABSTRACT

COOPETITIVE VALUE CO-CREATION ALONG SUPPLY CHAINS FOR ACHIEVING RESILIENCE: INSIGHT FROM THE AUTOMOTIVE INDUSTRY

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Master's Program in Logistics Management

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In recent years, the global landscape has witnessed unprecedented disruptions, ranging from natural disasters to geopolitical tensions, significantly impacting the stability and operability of supply chains across various industries. In the literature, the notion of coopetition, the simultaneous pursuit of cooperation and competition, has emerged as a potential strategy for enhancing the resilience of supply chains. The study is motivated by the lack of empirical evidence on the consequences of coopetitive value co-creation on Supply Chain Resilience, specifically within the automotive sector. By focusing on coopetition, which integrates elements of both cooperation and competition, the research seeks to uncover how collaborative and competitive interactions among supply chain actors contribute to the co-creation of value and, subsequently, bolster the resilience of the overall supply chain. The research employs a qualitative content analysis method, utilizing Semi-Structured Interviews with experts from the automotive industry to gather actionable insights. Key objectives include identifying practices, challenges, and critical factors arising from coopetitive

interactions, as well as assessing their implications on Supply Chain Resilience. The findings of this research will contribute significantly to both literature and industry, offering valuable insights into yet unexplored dimensions of coopetitive value co-creation and its impact on Supply Chain Resilience in the automotive sector.

Keywords: coopetition, value, co-creation, supply chain, resilience, automotive industry.

ÖZET

DAYANIKLILIĞA ULAŞMAK İÇİN TEDARİK ZİNCİRLERİ BOYUNCA İŞBİRLİKÇİ REKABETE DAYALI ORTAK DEĞER YARATMA: OTOMOTİV ENDÜSTRİSİNDEN İÇGÖRÜ

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Aralık, 2024

Son yıllarda küresel manzara, doğal afetlerden jeopolitik gerilimlere kadar çeşitli sektörlerdeki tedarik zincirlerinin istikrarını ve işlerliğini önemli ölçüde etkileyen benzeri görülmemiş aksaklıklara tanık oldu. Literatürde, işbirliği ve rekabetin eş zamanlı olarak sürdürülmesi anlamına gelen işbirlikçi rekabet kavramı, tedarik zincirlerinin dayanıklılığını artırmaya yönelik potansiyel bir strateji olarak ortaya çıkmıştır. Çalışma, özellikle otomotiv sektöründe, işbirliğine dayalı değer yaratmanın Tedarik Zinciri Dayanıklılığı üzerindeki sonuçlarına ilişkin önceden araştırma yapılmamasından kaynaklanmaktadır. Araştırma, hem işbirliği hem de rekabet unsurlarını birleştiren işbirlikçi rekabete odaklanarak, tedarik zinciri aktörleri arasındaki işbirlikçi ve rekabetçi etkileşimlerin ortak değer yaratılmasına nasıl katkıda bulunduğunu ve bunun sonucunda genel tedarik zincirinin dayanıklılığını nasıl desteklediğini ortaya çıkarmayı amaçlamaktadır. Araştırmada, eyleme geçirilebilir bilgiler toplamak için otomotiv endüstrisinden uzmanlarla yapılan Yarı

Yapılandırılmış Mülakatlardan yararlanan nitel bir içerik analiz metodu kullanılmaktadır. Temel hedefler arasında işbirlikçi etkileşimlerden kaynaklanan uygulamaların, zorlukların ve kritik faktörlerin belirlenmesinin yanı sıra bunların Tedarik Zinciri Dayanıklılığı üzerindeki etkilerinin değerlendirilmesi yer almaktadır. Bu araştırmanın bulguları, hem literatüre hem de endüstriye önemli ölçüde katkıda bulunarak, işbirlikçi rekabete dayalı ortak değer yaratmanın henüz keşfedilmemiş boyutlarına ve bunun otomotiv sektöründe Tedarik Zinciri Dayanıklılığı üzerindeki etkisine dair değerli bilgiler sunacaktır.

Anahtar Kelimeler: işbirlikçi rekabet, değer, birlikte yaratma, tedarik zinciri, dayanıklılık, otomotiv endüstrisi.

I dedicate this thesis to my beloved wife and son. Your unwavering love, patience, and support have been my guiding light throughout this academic journey. To my wife, who stood by me with endless encouragement, and to my son, whose laughter and joy gave me the strength to persevere. I hope this achievement makes you proud and brings a smile to your faces.

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LIST OF ABBREVIATIONS

A2A: Actor to actor

B2B: Business to business

CVC-C: Coopetitive Value Co-Creation

DCV: Dynamic Capabilities View

FPs: Foundational Premises

NGO: Non-governmental Organization

RBV: Resource Based View

SCC: Supply Chain Collaboration

SCM: Supply Chain Management

SCRes: Supply Chain Resilience

SDL: Service dominant logic

SSI: Semi-Structured Interview

OEM: Original equipment manufacturer

TS: Tier Supplier

VC-C: Value co-creation

VC-D: Value co-destruction

CHAPTER 1: INTRODUCTION

Global supply chains have been disrupted in the past few years for various reasons, such as natural catastrophes, political instability, market conflicts, and the recent Covid-19 pandemic. This groving number of disruption may be traced back to the extensive human populations, transportation systems, and disruption-prone production plants (Wagner and Thakur-Weigold, 2018). According to Poberschnigg et al. (2020) the most common disruptions in the analyzed supply chain (SC) include manufacturing halts, shortages of products, delivery delays, supplier insolvency, and sales losses. These recent global disruptions have mostly impacted the mining, oil and gas, automotive, chemicals, electronics, aviation, and defense sectors (Azadegan and Dooley, 2021). For instance, the pandemic's disruptions have resulted in essential supply shortages and services, delayed shipments, and increased business costs. One example is the worldwide scarcity of semiconductor chips, which has impacted numerous industries, including automotive. According to Ramani et al. (2022), following Covid-19 in late 2020, the automotive industry experienced a chip shortage that was initially predicted to last until 2023 or 2024, with ongoing developments continuing to impact global SCs. Furthermore, the pandemic has caused major consequences for the food distribution network, resulting in food shortages and price rises. According to a study by Alabi and Ngwenyama (2023), the pandemic-induced lockdowns and restrictions on movement severely disrupted the critical movement of food from the farming areas to the ultimate users. They caused significant disruptions in the global food supply networks and exacerbated food shortages in several countries worldwide.

Disruptions do not just brings problems for enterprises waiting to convey or receive products, but they also have a substantial impact on the financial success of SC entities (Duong and Chong, 2020). These disruptions are primarily driven by factors such as port congestion, labor shortages, and fluctuating demand. For instance, the Red Sea crisis is a significant disruption to maritime and logistical dynamics. Over the last few years, trans-oceanic crossings and routes have been severely affected by extreme weather conditions, such as drought, which reduced the volume of the Panama Canal by 36%. Territorial disputes, including the Russia-Ukraine war and the Gaza-Israel crisis, have also contributed to these disruptions. Additionally, maritime-related incidents, like the 'Evergreen' incident that blocked the Suez Canal for six days in

March 2021 at a cost of $10 billion per day, have further strained global shipping routes (Notteboom et al., 2024).

In addition to recent disruptions, ongoing global warming will cause both irregular and chronic alterations. Global warming and weather-related disasters will cause more frequent and longer-lasting supply disruptions in all parts of the planet. Water as well as food famine, in especially, will increase potential supply risks to the health of individuals. Epidemics, social and political issues, and other massive dangers associated with food poverty can take place devoid of global warming, but they will undoubtedly be worsened by it (Azadegan and Dooley, 2021).

In conclusion, these instances demonstrate the significant impacts of recent disruptions on industries and SCs, emphasizing the importance for firms to create strong backup plans to alleviate the effects of future ones.

1.1. About the Research Problem

The intensity of the escalating aforementioned disruptions underscores the critical realization by businesses that their traditional contingency plans and procedures were not compatible or measured up to the magnitudes of the global size of the disruption per se (Munir et al., 2022). As the SCs get intricate with the increasing number of actors participating in the business, those are getting intertwined, and this situation inevitably pushes the companies to seek differentiation in an objective and value perception. Despite some similarities, any actor in the chain that operates in the same industry with an idiosyncratic structure may only cope with minor disruptions; but without collaboration or coopetition with their competitors to co-create value, it seems not possible to develop resilience per se against the massive disruptions that affect the majority of the global SCs. Moreover, Pettit et al. (2013) argue that collaboration is currently regarded as an important endeavor for resilience development.

According to Chakraborty et al. (2014) the notion of value co-creation (VC-C), which is extensively examined in the literature on service-dominant logic (S-DL), also supports a comparable insight based on a perspective of relationships and intends to promote the idea of collaborative value creation. According to the authors, value is co-created rather than created. The VC-C idea discovers that relationship profits accrue at the collaboration level for reciprocal advantages in terms of intercompany rent production.

Recently, as literature research and real-life examples show, both the horizontal and vertical collaboration among companies' SCs that operate in the same industry has started to have a substantial role in the VC-C for enhancing the Supply Chain Resilience (SCRes) in the event of disruptions and mitigating their effects (Lotfi and Larmour, 2022). For instance, British public health officials permitted members of the public to leave their homes to buy only critical needs, like food and medical supplies, as well as to get exercise within close geographical proximity in March 2020, but the British government ruled its citizens to stay at home to prevent the infection of Covid-19. As a result, consumers were actively seeking out supermarkets engaging in both brick-and-mortar and online channels. Thanks to the British government's approval, Supermarkets were able to run the business more efficiently, by sharing data about their inventory levels, arranging for closing periods, giving access to their SC networks, and lending workers between competitors (Crick and Crick, 2020). Two of the leading pharmaceutical companies operating in Türkiye, Abdi İbrahim and Novelfarma, collaborated successfully by signing a strategic cooperation agreement. They were able to produce the drug with the active ingredient Favipiravir, which was developed by Novelfarma and is included in the COVID-19 treatment protocol. This marked the first production of the drug in Türkiye (Aslanhan, 2020). With the R&D power and experience of Abdi İbrahim, the leader of Türkiye’s pharmaceutical industry, all preparations, including technology transfer, were completed in a record time of just one week. 200,000 tablets were donated to the Ministry of Health by Novelfarma, and the first export of the drug was made (Durmaz and Mistanoğlu Özatağ, 2023). During the collaboration, these competitors shared scientific data from research and clinical studies to speed up the process of developing treatments for illness.

This type of collaboration seen between competitors in the SC takes various forms, such as joint production planning and decision-making, shared resources, mutual support, and collaborative communication during emergencies (Alzate et al., 2022). Researchers such as Hosseinnezhad et al. (2023) have described this practice among suppliers as Horizontal Collaboration (HC) which has been shown to enhance resilience and mitigate SC disruptions. By pooling their resources, sharing information, and coordinating their activities, SC partners may strengthen their collective skills to react to and bounce back from disruptions. Collaboration, therefore, allows for a better-coordinated response to disasters and crises. According to Kessa et

al. (2021), HC practices can be applied as cooperative efforts involving two or more municipal administrations, two or more governments, or even two or more foreign nations. Azadegan and Dooley (2021) define such intergovernmental practices as macro-level collaboration efforts.

Based on literature and prior definitions, vertical collaboration (VC) differs from HC, as VC practice involves collaboration among firms at different levels of the SC while HC involves collaboration among firms at the identical SC level. VC refers to the coordinating and cooperating among different stages of the SC, manufacturers, vendors, distributors, and retailers are some examples. It involves the sharing of information, resources, and governance to augment the overall efficacy of the SC. The VC focuses on streamlining both inter-organizational and within-the-organization processes, mitigating the impacts and enhancing SCRes in the event of a disruption. Therefore, VC and HC are considered as two distinct approaches to collaboration within SCs.

Both horizontally and vertically, collaboration among SC actors is seen as a primary antecedent in enhancing SCRes in the face of breakdowns (Lotfi and Larmour, 2022). HCs and VCs among SCs enhance their resilience by creating a more flexible and robust network of suppliers and partners. Toyota, for example, depended on the assistance of its suppliers to obtain alternate sourcing and mitigate the impact of the crisis when it encountered supply interruption of automotive microcontroller units owing to the Tohoku Earthquake and tsunami that occurred in Japan in 2011 (Matsuo, 2015).

Besides all these success stories and evidence identified in the literature regarding horizontal and vertical collaboration and their role in enhancing SCRes, the link between HC, VC, and SCRes is poorly understood due to the scarcity of empirical studies in the literature (Bak et al., 2023), which calls for further research on SCRes, especially in SMEs and the impact of collaboration between SMEs in enhancing resilience. Hosseinnezhad et al. (2023) propose a new research direction by exploring secure resource-sharing strategies among suppliers as a form of HC to mitigate SC disruption. Duong and Chong (2020) draw attention to the need to research the effects of various disruption types on SC collaboration and the effects of various modes of collaboration on SCRes. Alzate et al. (2022) underlines the necessity for further empirical research to test the interactions between SC dynamic capabilities, HC, and SCRes. Finally, Geurts et al. (2022) call for further research on collaboration and

innovation during crises, particularly for identifying the factors that influence successful collaboration and innovation. Overall, the literature suggests that there is still much to be understood about the essence of collaboration in enhancing SCRes, and more research is needed to address these gaps.

While collaboration among SC actors is essential, it is not always simple to establish, particularly when the collaboration partners are competitors and if their rivalry remains after disruptions. Firms should also think about the aftermath of disruptions as the post-disruption period inevitably leads to the disintegration of the collaborations in the absence of a common goal or mutual benefits. Since SCs are complex networks with many collaborations and interconnections between different actors, processes, and resources, the focus should be on coopetitive value co-creation (CVC-C). CVC-C among SCs can help overcome this challenge. Coopetition, which is a blend of competition and collaboration, can lead to VC-C, which can enhance SCRes (Al-Omoush et al., 2023). There are numerous reasons why it is important to enhance SCRes. According to Al-Omoush et al. (2023), collaboration in the e-SC may enable joint creativity and VC-C. Similarly, Durach et al. (2020) found that supplier–supplier coopetition could enhance SCRes in the tetradic context. In addition, Hosseinnezhad et al. (2023) highlighted how HC among suppliers might help to reduce SC disruption. Thus, it may be deduced that CVC-C can contribute to SCRes by building collaborative relationships that enable knowledge and resource sharing, reduce risks, and enhance SC performance.

Real-life examples of CVC-C in global SCs during the pandemic demonstrate its importance. For instance, in Türkiye, to meet the increasing need for ventilators during the pandemic period 3D initiatives, firms are involved in coopetitive collaboration to co-create value and started to produce substantial gear and raw materials that are used in the production of ventilators. It can be said that these firms and their stakeholders, using their resources and sharing them (such as know-how, engineering, software, infrastructure, and production line), have created a service ecosystem to make the ventilator suitable for mass production as soon as possible (Yorulmaz, 2020) This kind of coopetition enables SCs to maximize their own potentials while mitigating deficiencies, leading to a more efficient and strong network in achieving a common goal as they have different value perceptions. Based on the research by Chakraborty et al. (2014), collaboration among healthcare service providers during the pandemic helps businesses perform and create value together better.

As the knowledge about CVC-C in enhancing SCRes in the event of disruption is a partially fresh area of inquiry and is limited to Covid-19, there are some research gaps in the literature. One literature gap is the scarcity of empirical proof of the effectiveness of VC-C among competitors in enhancing SCRes during disruptions from emerging economies (Abdalatif and Yamin, 2022). Additionally, Al-Omoush et al. (2023) underline the importance of more studies on the influence of SC collaboration on joint creativity and VC-C.

1.2. Aims and Research Questions of the Thesis

The automotive industry is an excellent example of an industry that has implemented collaborations among SCs and CVC-C to achieve SCRes during disruptions. This industry is particularly relevant as it has implemented coopetition models while operating in situations with increasing degrees of complexity and instability (Massari and Giannoccaro, 2021).

The automotive industry's dependency on collaboration highlights its importance and puts it at the center of this research as companies and actors are highly fragile and vulnerable to repetitive and unforeseen disruptions with increasing interdependence within global SCs yet indispensable to the economy. Therefore, this research's purpose is to address a research gap by investigating the CVC-C practices along automotive SCs for facilitating the realization of these practices for improving SCRes. The following are the research questions that lead to this thesis:

Q.1 What are the key elements and drivers that foster CVC-C practices in automotive supply chains?

Q.2 What are the CVC-C practices and their impact on SCRes in the automotive industry?

Q.3 What challenges and barriers hinder the implementation of CVC-C practices?

Q.4 What strategies and resilience capabilities address these obstacles?

To answer these research questions, qualitative content analysis method was employed for coding the data (Miles and Huberman, 1994; Seuring and Gold, 2012), obtained through semi-structured interviews (SSIs) (DiCicco-Bloom and Crabtree, 2006; Louise Barriball and While, 1994) in this research study. This approach allowed for a systematic examination and interpretation of textual data, aiming to uncover the CVC-C activities along SCs in achieving SCRes. The application of qualitative

methodologies, such as SSIs, facilitated a thorough investigation of individuals' experiences, perspectives, and perceptions providing rich and context-specific insights into the research topic (Gugiu and Rodríguez-Campos, 2007; Kallio et al., 2016).

The qualitative research was conducted with selected individuals in the automotive industry, as they possessed valuable expertise and knowledge in supply chain management (SCM). Purposive sampling (Palinkas et al., 2015) and accordingly snowball sampling (Naderifar et al., 2017; Noy, 2008) were employed to select participants who had relevant experience and diverse roles within the industry. SSIs were implemented to acquire qualitative data, allowing flexibility in exploring emergent themes and allowing participants to elaborate on their experiences and viewpoints (Patton, 2014). The interviews were guided by a predefined interview protocol developed based on established frameworks and best practices for constructing semi-structured interview guides (Gugiu and Rodríguez-Campos, 2007; Kallio et al., 2016). Qualitative content analysis techniques were used for transcribing and categorizing the interview data to determine recurrent patterns and themes pertaining to CVC-C and SCRes (Forman and Damschroder, 2007; Krippendorff, 2004). This rigorous analytical approach ensured both the validity and reliability of the findings through reducing bias among the researchers and enabling for a complete examination of the given subject.

The analysis is framed within a theoretical foundation combining Service-Dominant Logic (SDL), Resource-Based View (RBV), and Dynamic Capabilities View (DCV). SDL provides a lens to understand VCC among SC actors through resource integration and the exchange of services, defined as applying operant resources to create value, surpassing the static role of operand resources (Lusch and Nambisan, 2015). RBV highlights how leveraging unique resources, such as technology or expertise, can drive competitive advantage and resilience. Meanwhile, DCV underscores the importance of adaptability and continuous improvement in capabilities to meet the challenges of disruptions. Together, these theories offer a comprehensive perspective for understanding and analyzing the findings of this research.

1.3. Significance of The Research

As stated before, one of the pioneering industries is the automobile industry for the economy of both the other industrialized countries of the world and Türkiye. As a

result, one of the implications of this research is that it focuses on CVC-C ventures in automotive SCs. Industry, which has a technology and information-intensive nature and integrated structure, provides income to hundreds of thousands of people throughout the world through sales and wages as well as in Türkiye. In 2021, the global automobile manufacturing industry was estimated to be valued at around 2.74 trillion US dollars, and by 2031, the industry is predicted to expand to around 3.58 trillion US dollars (Automotive Market Size, Share [2023-2031] Report, 2024). As one of the major industries of production in Türkiye with the number one sector of exports, both in terms of economic output and as a pionner for other industries, it has an export volume of 25.5 billion dollars. In other words, approximately one-sixth of Türkiye's exports belong to the automotive industry. With this size, the automotive industry employs 250,000 people as the main industry and 200,000 as the sub-industry. When dealers, logistics, authorized and special services are included in these figures, employment reaches 1,250,000 (Türkiye Otomotiv Endüstrisi RAPORU, 2021). Thus, in the global market, there is an increasing growth in main automotive manufacturers and substantial sub-sector operations, in other words, the automobile industry is due to rising demand for cars in developing countries with increasing income per capita and rising demand for electric cars. When present and predicted market sizes are considered, the significance of the automotive sector is apparent, and research on the subject of this industry will help industry growth.

The automotive industry thrives in a highly competitive and interconnected global market, driven by advanced technologies, significant R&D, and complex SCs. This competitiveness is heightened by the emergence of electric vehicles, autonomous technologies, and strict environmental regulations (Cheong et al., 2016; Lutz and Bodendorf, 2020). These factors necessitate continuous innovation and adaptive strategies, particularly in coopetition settings where collaboration with competitors becomes critical for technological advancements and market positioning (Hani and Dagnino, 2021). For example, partnerships such as Tesla’s alliances with traditional automakers have showcased the strategic importance of coopetition in developing cutting-edge technologies while maintaining a competitive edge (Cheong et al., 2016).

The industry's globalized supply networks and reliance on just-in-time manufacturing practices make it particularly vulnerable to disruptions. Recent challenges exposed vulnerabilities in these networks, emphasizing the importance of resilience and adaptive strategies (Belhadi et al., 2021; Boysen et al., 2015). As a

result, collaborative practices, including coopetition, have emerged as critical mechanisms for addressing these challenges, enabling firms to share risks and resources while maintaining a competitive edge (Akpinar and Vincze, 2016).

To summarize, the research's relevance is evaluating the CVC-C for SCRes of the automotive industry that has never been studied previously. Furthermore, the automotive industry's dynamic competitive environment, coupled with its multiple and intertwined SC actors inevitably carries out CVC-C efforts. Finally, this master's thesis takes the viewpoint on CVC-C ventures along the automotive industry SCs that are traceable for achieving SCRes.

1.4. Outline of The Research

The study is separated into five sections. First, the focus is placed on the literature review of SCRes, SC collaboration in a competitive environment, vertical vs. horizontal SC collaboration, collaboration among competitors in the SC (coopetition), CVC-C for SCRes, and the theoretical framework of the study. The second section provides a thorough explanation of the study context, design, and methodology, offering insights into the automotive industry and the dynamics of coopetition among automotive companies. The methodology employed in the study, detailing the sampling and data collection methods, the implementation of qualitative content analysis and considerations of research reliability and ethics, is addressed in the third section, while the fourth section presents the findings, focusing on CVC-C activities within the automotive SCs. The final part concludes the thesis by synthesizing the general discussions and theoretical contributions, exploring practical implications, and addressing the limitations while suggesting directions for further research.

CHAPTER 2: LITERATURE REVIEW & THEORETICAL FRAMEWORK

This study adopts a thorough investigation of the interplay among coopetition, VC-C, and SCRes, aiming to explore the mechanisms by which these elements contribute to the development of robust and adaptable SCs. Recent literature provides widely recognized frameworks, such as SDL, the RBV, and the DCV, to better understand the interplay between coopetition, VC-C, and resilience within SCs. These perspectives are crucial for examining how SC actors navigate uncertainties, optimize resources, and foster innovation through coopetitive interactions. Coopetition, in particular, stands out as a strategic approach where collaboration and competition coexist (Bengtsson and Kock, 2000), creating unique opportunities for mutual VC (Ritala and Hurmelinna-Laukkanen, 2009), and resilient SCs (Bin Makhashen et al., 2020).

The focus of this literature review is to offer a thorough examination of SCRes, collaboration frameworks, and coopetition dynamics, particularly in the context of automotive SCs. The subsequent sections of this chapter will systematically address these themes, beginning with an exploration of SCRes and their critical importance in SCM. This is followed by an analysis of collaboration types, including both vertical and horizontal collaborations, and a detailed discussion on coopetition as a strategic approach for achieving resilience. A dedicated section on CVC-C further examines how collaborative and competitive dynamics intersect to create mutual value and enhance resilience. The chapter concludes by synthesizing SDL, RBV, and DCV to provide a comprehensive framework that underpins the study's research objectives.

2.1. Supply Chain Resilience

In recent years, SC disruptions have emerged as a critical area of concern for businesses operating in an increasingly complex and interconnected global economy due to various factors such as global epidemics, political unrest, and chip shortages (Tukamuhabwa et al., 2015). In the past twenty years, SCs have experienced a rise in complexity and interconnectivity, which has made them more susceptible to risks. As a result of the growing frequency of disruptions and disasters, both public and private sectors have made SCRes a top priority (Bak et al., 2023; Wieland et al., 2023; Wieland and Durach, 2021).

As the SCs increasingly get intricate with the number of actors participating in the business rapidly increasing, those are getting intertwined, inevitably this situation pushes the companies to create resilient SCs against uncertainties and unforeseen disruptions. The vulnerability of SCs to various disruptions has drawn substantial attention from researchers, practitioners, and policymakers alike. According to Ramani et al. (2022), disruptions can lead to significant negative consequences, including production delays, inventory shortages, and revenue losses. Consequently, organizations are striving to enhance their SCRes to lessen the impact of uncertainties.

SCRes has become a critical area of research and practice, particularly in the event of increasing global uncertainties and disruptions. Scholars and practitioners alike have recognized the urgency of building resilient SCs to ensure continuous operations and mitigate the impact of unforeseen events (Lotfi and Larmour, 2022; Munir et al., 2022; Pettit et al., 2010; Ponomarov and Holcomb, 2009; Shekarian and Mellat Parast, 2021; Wieland et al., 2023). Resilience, a widely explored concept in disciplines like economics, ecology, risk management, and psychology, holds particular significance in interdisciplinary areas like sustainable development, disaster, and SC management. In the context of the SC, resilience has gained renewed attention and evolved in its understanding over recent years (Pettit et al., 2013)

Classical approaches to resilience have often emphasized risk management, agility, and redundancy. However, the contemporary landscape underscores the importance of a more nuanced and collaborative perspective. The interconnected and interdependent nature of SCs necessitates a shift from traditional models towards more cooperative and competitive dynamics. SCRes enhances conventional risk management tactics such as vulnerability analysis, continuity planning, and risk assessment as a comprehensive and forward-looking methodology for mitigating SC risks. Unlike these approaches, resilience does not depend on risk identification and quantification, enabling it to address unanticipated disruptions and incidents (Scholten and Schilder, 2015). Recent SCRes research has shifted from engineering resilience, which focuses on stability, to social-ecological resilience, which emphasizes adaptability and change. This concept envisions supply networks as dynamic systems that use disruptions to drive development and innovation (Wieland and Durach, 2021). According to Pettit et al. (2010), SCRes involves an organization's ability in anticipating, responding, and recovering from disruptions, making it distinct from traditional risk management.

"Supply chain resilience is the capacity of a supply chain to persist, adapt, or transform in the face of change." (Wieland and Durach, 2021).

In the literature, no widely recognized definition of SCRes has reached total agreement among researchers (Alzate et al., 2022). Considering recent studies related to a specific topic, we often come across a term that is commonly used and referred to as SCRes. This term is widely recognized and used by researchers in the field to describe a specific concept or phenomenon. It is critical to comprehend the meaning and implications of this term to fully comprehend the discussions and arguments presented in the literature.

Table 1. SCRes Definitions

Authors	Descriptions	Year
Rice and Caniato	Resilience in the SC management is being capable of responding to an unforeseen interruption, such as an act of terrorism or a calamitous event and recovering regular functioning.	2003
Christopher and Peck	The SC's ability of recovering back from disruption and returning to its original configuration or transition to a preferable state is called SCRes.	2004
Sheffi	The ability of a corporation to bounce back from a major upheaval and its ability to resume normal performance quickly is referred to as resilience in the business world.	2005
Ponomarov and Holcomb	The ability of the SC to adapt to unforeseen circumstances, handle disruptions, and recovering back from them while keeping operations running smoothly at the necessary state of association and supervision over the organization and operations is referred to as SCRes.	2009
Pettit et al.	The proactive approach of SCRes can be used to supplement and improve conventional methods of managing risks and planning for business continuity.	2010
Scholten and Schilder	The concept of SCRes aims to minimize the effects of breakdowns by developing proactive techniques that enable the SC to respond while returning to its former or enhanced operating condition.	2015

Table 1 (Continued). SCRes Definitions

Tukamuhabwa et al.	A SC's ability to adjust to and handle unforeseen events, and efficiently recover from them, allowing for a return to normal operations - ideally, with improvements over the pre-disruption state.	2015
Hohenstein et al.	The capacity of the SC to manage unexpected breakdowns and to promptly react and return to possible disruptions, to return to their initial condition or transition to a better position, is known as SCRes. This helps to enhance customer relations, sales, and profitability.	2015
Hosseini et al.	SCRes stands for having the ability to resist, adapt, and recuperate from interruptions with the intent to fulfill clients' expectations and assure performance.	2019
Shekarian and Parast	The identification of strategies that facilitate a SC to respond to unforeseen breakdowns while returning to its initial operational position or even better is named SCRes.	2020
Wieland and Durach	Being capable of a SC to endure, adjust, or evolve in response to changes is known as SCRes.	2021

In the realm of SCRes, there exist numerous definitions attempting to encapsulate its meaning. However, among the plethora of definitions, the frequently mentioned one in scholarly articles stands out as the most authoritative:

> *"The adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function"* (Ponomarov and Holcomb, 2009).

In addition to its richness of definition, the literature consists of several proactive and reactive strategies influencing the SCRes are *agility, collaboration, information sharing, flexibility, disruption preparation (readiness), redundancy, integration, anticipation, improvisation, visibility, trust, risk management, adaptive capacity, and inventory management* (Soni et al., 2014; Tukamuhabwa et al., 2015). Numerous authors discuss these as essential strategies and skills for effectively managing and enhancing the resilience of SCs (Christopher and Peck, 2004; Pettit et al., 2013; Rice and Sheffi, 2005; Soni et al., 2014). The most often stated skills in these researches are

redundancy, flexibility, agility, visibility, adaptability, and collaboration (Poberschnigg et al., 2020).

While there is a diverse array of organizational practices that contribute to enhancing resilience, existing literature highlights flexibility, redundancy, agility, and collaboration as crucial organizational capabilities for enhancing a company's potential to respond effectively to disruptions in the SC (Blome et al., 2013; Bode and Macdonald, 2017; Christopher and Peck, 2004; Dubey et al., 2017; Jüttner and Maklan, 2011; Rice and Sheffi, 2005). They demonstrated that enhancing flexibility, bolstering the agility of the SC, fostering collaborative relationships within the SC, and establishing backup options (redundancy) exert the greatest impact on enhancing SCRes (Shekarian and Mellat Parast, 2021).

2.2. Supply Chain Collaboration (SCC) in a Competitive Environment

In the past decade, the traditional view of SCs as linear and isolated entities has evolved into a more interconnected and collaborative model. Technological advancements and developments in the field of logistics have paved the way for global trade enhancement, facilitating businesses in adopting new business models and gaining access to new markets through new partnerships. However, businesses are increasingly focusing on collaboration with suppliers, SC partners, and even with rivals in a manner that ensures high profitability and a competitive advantage. Partnerships often encompass relationships between two or more types of businesses in the SC. In the present dynamic and fluctuating landscape, SCC has evolved into a crucial strategy for firms seeking to prosper in a highly competitive environment (Cao et al., 2010; Cao and Zhang, 2011; Poberschnigg et al., 2020; Soosay and Hyland, 2015; Umar and Wilson, 2021).

The concept of SCC involves forging strategic alliances and partnerships among various stakeholders within the SC to enhance overall efficiency and competitiveness (Cao and Zhang, 2011; Simatupang and Sridharan, 2008; J. Zhang and Frazier, 2011). The extent of these interactions ranges from basic distance partnerships to exceptional alliances, including 'coopetitive' behavior where companies cooperate with their rivals (Bengtsson et al., 2010). The act of collaboration pertains to the ability to forging partnership among others towards a same objective, as defined by Pettit et al. (2010). Furthermore, Simatupang and Sridharan, (2008) recommend that collaboration involves broadening employees' understanding of the system to increase profits. To

achieve the desired outcome, members of a SC must possess a significant degree of trust, commitment, and willingness to share knowledge among themselves (Spekman et al., 1998). This shared vision is fundamental to the business's success and necessitates effective collaboration among SC members, as argued by Kampstra et al. (2006). Umar and Wilson (2021) define such SCC as an intricate concept rooted in inter-organization interactions. According to Singh and Power (2009), SCC is defined as:

> *"[...] two or more chain members working together to create a competitive advantage through sharing information, making joint decisions, and sharing benefits which result from greater profitability of satisfying end customer needs than acting alone."*

Aside from collaboration, numerous names are used to characterize various features and levels of SC relationships. Backstrand (2007) thoroughly investigated the ambiguity of these phrases and created a compilation of words and synonyms used to define these connections, as shown in Table 2.

Table 2. Frequently used phrases in studies while discussing collaboration in SCs, (Source: Backstrand, 2007)

Term	**Synonyms**
Relationship	Connection, association, correlation, alliance, interconnection
Interaction	Communication, cooperation, synergy
Collaboration	Association, participation, partnership, teamwork
Cooperation	Collaboration, participation, partnership, unity
Integration	Alliance, assimilation
Alliance	Coalition, collaboration, cooperation, partnership
Partnership	Association, cooperation, cooperative, corporation
Joint venture	Enterprise, corporation
Transaction	Deal, business, action, bond

In today's competitive atmosphere, collaboration among the SCs' is viewed as critical for SC's competitiveness, making it a major study priority. The rising number of published articles demonstrates the topic's growing importance in SCM. Since SCs contain various companies and tasks, their efficiency improves when partners collaborate and coordinate their efforts (Soosay and Hyland, 2015). SC partners freely exchange information and collaborate to increase visibility, minimize unpredictability, and boost competitive ability (Chen et al., 2013). Collaboration is vital for businesses to obtain a competitive edge and reduce total costs and unpredictability in the SC (Parast and Shekarian, 2019). Extensive collaboration can also assist in limiting SC disruptions and risks (J. Chen et al., 2013; Parast and Shekarian, 2019).

According to Beske and Seuring (2014), collaboration goes beyond mere cooperation. Swierczek (2014) defines SC integration as "*strategic collaboration in both intra- and inter-organizational processes, resulting in comprehensive integration*." Collaboration's substantial benefits include decision coherence and incentive harmony, which are required for successfully handling SC disruptions (Jain et al., 2017).

SCC literature primarily examines diverse relationship types and development stages, along with associated strategies and theories. Explored relationships include operational, relational, and entirely integrated models, while trust, commitment, reward systems, and power dynamics are frequently studied (Umar and Wilson, 2021). Simatupang and Sridharan (2008) highlight crucial collaboration elements: information sharing, decision congruence and compensation. Information sharing involves efficient exchanges, a decision alignment is an integrated approach, and incentive alignment pertains to the mutual risk and benefit sharing among SC partners.

Collaboration has been explored from many angles. Collaboration in the SC may be exhibited via behaviors such as sharing of information, collaborative planning, alignment of objectives, collective issue solving, risk-reward sharing, and resource sharing (Simatupang and Sridharan, 2002). Cao and Zhang (2011) conducted a highly referenced study on SCC, defining seven key aspects of collaboration: sharing of information, objective harmony, decision synchronization, dialog, shared expertise development, sharing of resources, and motivational alignment.

Collaboration, via trust and commitment, may operate as an adhesive, binding together diverse groups and allowing them to develop the competencies required for resilience. SCC interactions may be split into two significant groups: HC and VC. (see

Figure 1) (Barratt, 2004). Working with suppliers, internal teams, and customers is an example of vertical collaboration. Horizontal collaboration, on the other hand, comprises working with rivals, internal divisions, and non-competitors. There is both internal and external collaboration within these areas. Internal collaboration is concerned with the interaction of several departments to achieve smooth internal operations. Working with all external stakeholders with whom the company has a relationship is what external collaboration entails (Barratt, 2004; Umar and Wilson, 2021).

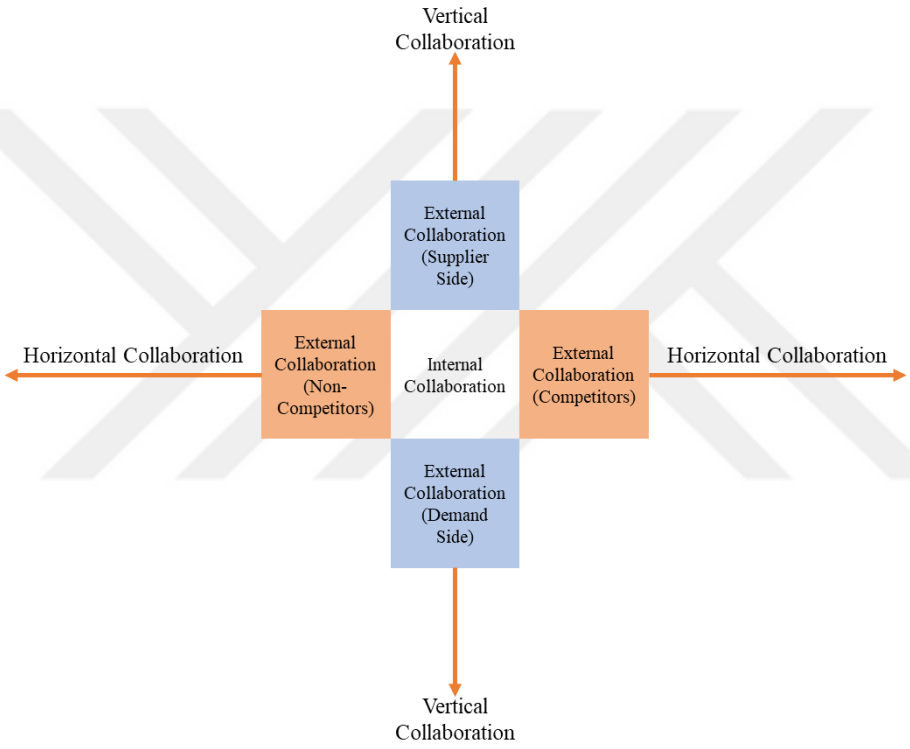

Figure 1. Types of collaboration, (Source: Barratt, 2004)

During a period of uncertainty, businesses collaborate horizontally with alleviation service providers, authorities, and rivals. Similar to that, vertically, these businesses must collaborate with their clients and vendors (Piboonrungroj and Disney, 2015). Scholten and Schilder (2015) examined the influence of collaboration on SCRes using this paradigm as a foundation. Despite extensive research on collaboration in literature, there is still a gap in its thorough conceptualisation within the framework of SCRes.

Collaboration is a crucial aspect of developing resilient SCs, according to empirical and conceptual SCRes research (Christopher and Peck, 2004; Pettit et al.,

2013). Despite experts accepting that collaboration can enhance SCRes, it is uncertain how collaboration influences SCRes.

SCC refers to the capacity of more than two independent enterprises to successfully collaborate in designing and carrying out SC activities toward mutual objectives (Cao et al., 2010; Scholten and Schilder, 2015). According to an analysis from 2013, 58% of SC outages are caused by tier-one suppliers, and these suppliers are among enterprises' top worries in the matter of resources or risk. According to Blackhurst et al. (2011), supplier's coordination with the customer may greatly lower the probability of an SC outage and avert the damaging consequences of the outage from spreading throughout the SC (Hosseini et al., 2019).

2.2.1. Vertical vs. Horizontal SC Collaboration

Collaboration is often seen as a crucial solution in various aspects of SC Management (SCM). SCM entails coordinating the flow of goods, info, and funds among different entities to enhance relationships within the SC. The key to building better relationships lies in understanding how entities within SCs collaborate. Collaboration is vital because if each organization in the SC focuses solely on optimizing its outcomes, sub-optimization occurs. The goal is to integrate objectives and activities across organizations for the overall benefit of the entire chain (Kampstra et al., 2006). Successfully determining the right strategy in a customer/supplier scenario requires a collective effort from all entities in the chain. Another important aspect is figuring out the most suitable strategies, especially since an entity is likely involved in multiple SCs (Gattorna, 2006). This complexity involves designing collaborative chains where financially independent entities work together to ensure successful interaction and provide coordinated outputs.

Vertical and horizontal SCC are two distinct approaches to fostering cooperation and coordination among diverse entities within a SC. These terms are often used in the context of SCM to describe the direction of collaboration and the entities involved.

A SC's interactions are classified as either vertical or horizontal. Vertical relations are inter-organizational relationships between entities at different layers that constitute a complete chain from the initial vendor to the final client. Vertical collaboration happens when one business broadens its ownership to include additional companies at different levels, focusing either upwards on the initial supplier or downwards to the

ultimate consumer (Christopher, 2005). To effectively observe vertical collaboration and enable downstream flow, the following figure (see Figure 2) was prepared.

Multiple studies have investigated SC collaboration from various angles. According to the study by Soosay and Hyland (2015), the bulk of the studies investigate VC from a dyadic perspective where the buyer-supplier collaboration is the most closely scrutinized field (Umar and Wilson, 2021).

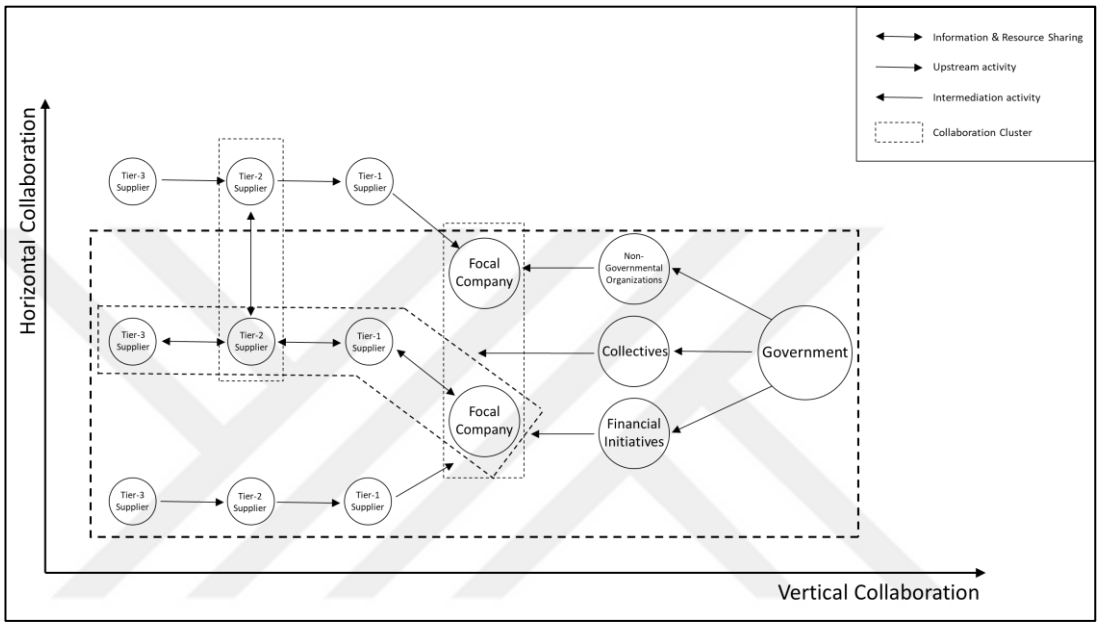

Figure 2. Collaboration clusters

HC involves collaboration and competition among same-stage firms, while vertical collaboration involves firms from different stages of the SC (Kessa et al., 2021; Lotfi and Larmour, 2022; Scholten et al., 2014; Umar and Wilson, 2021).

In HC, established functional management is more effective. in addressing opportunism compared to VC (Schmoltzi and Wallenburg, 2012).

Both horizontally and vertically, collaboration among SC actors is seen as a crucial element in enhancing SCRes in the face of disruptions (Lotfi and Larmour, 2022).

Businesses work horizontally with assistance providers, authorities, and with their rivals, and correspondingly, these enterprises must work with their suppliers and buyers vertically at the time of the crises or disruption (Piboonrungroj and Disney, 2015). Scholten and Schilder (2015) examined the influence of collaboration on SCRes using this paradigm as a foundation. Despite substantial studies on collaboration,

literature still appears to have a gap regarding its holistic conceptualization within the context of SCRes.

Chen et al. (2017) argues that research papers in literature rarely explored HCs with competitors and other entities, such as NGOs or transportation providers. Only three out of all the papers reviewed covered these partnerships. The majority focused on collaborations with suppliers and customers, internal collaborations, or a mixture of both. It is vital to notice that the papers did not cover and analyze collaborations with horizontal partners in depth.

2.2.2. Collaboration among Competitors in SC (Coopetition)

In recent decades, the dynamics of SCs have evolved, and the traditional boundaries between cooperation and competition have blurred. The concept of coopetition, defined as the concurrent act of collaboration and competition among firms in the SC, has gained prominence in academic literature (Gnyawali and Park, 2011; Katsaliaki et al., 2024; Nalebuff and Brandenburger, 1997).

> *"This phenomenon, according to which competing firms cooperate to create value and a bigger market for each participant, and then later compete for the created value, has been labeled "coopetition" "*(Ritala and Hurmelinna-Laukkanen, 2009).

Researchers have explored the concept of coopetition from various perspectives and provided diverse definitions (Yami et al., 2010). These definitions exhibit variations in their scope and focus. In a comprehensive sense, Brandenburger and Nalebuff (1996) describe coopetition as relationships within a "value net" (see Figure 3), where two rival entities can collaborate with a third entity, to function as completers. They view coopetition as a composite of distinct associations, distributing collaborative and competitive aspects among different participants (Bengtsson et al., 2010). In contrast, Bengtsson and Kock (2000) offer a more specific definition, characterizing coopetition as concurrent competition and collaboration between two firms, with different facets of the relationship allocated across various activities (Gnyawali and Park, 2011).

Additionally, Durach et al. (2020) addresses coopetition in a tetradic context involving supplier-supplier coopetition which has a common 2nd tier supplier as it

performs a significant function in enhancing resilience in the face of uncertainties. Aligned with these conceptual frameworks, the idea of coopetition within SC companies is perceived as a novel approach to addressing intricate and dynamic interactions, where both collaboration and competition coexist and are interconnected (Massari and Giannoccaro, 2021).

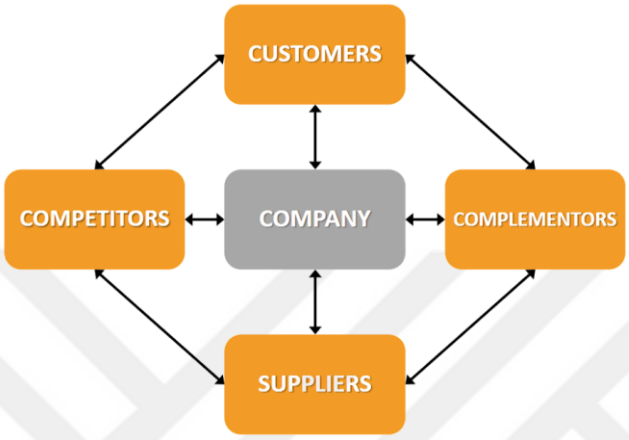

Figure 3. The Value Net (Source: Brandenburger and Nalebuff, 1996)

> *"Triggering horizontal coopetition, by managing the simultaneous pursuing of cooperation and competition among firms of the same stage, can determine high supply chain resilience"* (Massari and Giannoccaro, 2021).

It is vital to emphasize that the idea of coopetition encompasses both collaboration and rivalry, resulting in a contradictory scenario, no matter how they have horizontal or vertical collaborations in the SC (Bengtsson and Kock, 2014; Crick and Crick, 2020). Companies must be able to think contradictorily and build systems that allow them to sustain a modest degree of tension, no matter the seriousness of the contradiction (Bengtsson et al., 2016). Coopetition provides enterprises with both appealing prospects and the possibility of theft by the partner, creating a quandary that produces conflict among competitors (Gnyawali and Park, 2011). Coopetition capabilities, as stressed by Raza-Ullah et al. (2014), are characterized as *"the ability to control competitive tensions while creating joint value from collaboration"*

Rival companies have a rich history of collaboration to reduce expenses in manufacturing, distribution, and marketing. Recently, they have also collaborated in

research and development and innovation. Illustrative cases include alliances in the automotive sector where suppliers collaborate on separate initiatives yet compete for the same consumer (Massari and Giannoccaro, 2021), joint ventures for advanced elevators, and collaboration in the field of technology-intensive sectors. This coopetition phenomenon is gaining significance in various industries (Ritala and Hurmelinna-Laukkanen, 2009).

The automotive industry, characterized by its complex and globalized SC, has become a focal point for studying coopetition dynamics (Katsaliaki et al., 2024). Scholars argue that the traditional zero-sum approach to competition may not always be effective, especially in industries where interdependence is high, and disruptions can have cascading effects. Coopetition in SCs involves strategic collaborations that go beyond mere transactional relationships, fostering joint initiatives and knowledge-sharing among competitors.

A real-life illustration of SC Coopetition in the realm of innovation and co-creation involves the collaborative efforts between competitors Jaguar and BMW, both prominent players in the high-end automotive industry. Together, they have collaborated on the design and development of advanced electric drive units for the Range Rover and BMW electric vehicles. This collaborative initiative commenced in 2019, resulting in the successful completion of the electric drive units by the close of 2022. Anticipated to hit the market in 2025, the fully electric Range Rover and BMW cars are outcomes of this joint venture. It is noteworthy, however, that despite this collaborative endeavor, the companies have plans to independently manufacture their respective electric cars (Redazione, 2019). These instances underscore the significance of coopetition, a strategic approach that addresses the challenges posed by rapid business dynamics, heightened uncertainties, fluctuating economic conditions, and the widespread exchange of knowledge among organizations (Katsaliaki et al., 2024). Existing research has suggested that collaboration is more effective than competition in dealing with SC disruptions and improving resilience, from the perspective of coopetition (Bin Makhashen et al., 2020).

In summary, the literature on collaboration among competitors in SCs, or coopetition, underscores its relevance in addressing the complexities of contemporary business environments. Within the automotive industry, where SCs are intricate and global, understanding the mechanisms, challenges, and outcomes of coopetitive relationships is crucial for enhancing competitiveness and resilience. The studies

reviewed collectively contribute to an intricate cognition of how coopetition can be exploited strategically to overcome the challenges triggered by disruptions and uncertainties in the SC.

2.3. Coopetitive Value Co-Creation for SCRes.

In the face of escalating uncertainty, it has become indispensable for companies to formulate resilient strategies that will enable them to thrive in a highly competitive market. This study delves into the concept of SCRes and its intricacies, by concentrating specifically on the role of VC-C (Abdalatif and Yamin, 2022).

The literature on coopetition within SCs emphasizes the significance of VC-C as a key theme. VC-C entails the active involvement of multiple stakeholders in the collaborative design and creation of products and services. In the context of SDL, "service" is defined as the use of resources, such as skills and expertise, to the advantage of another actor. "Exchange" in this sense refers to the reciprocal exchange of services, in which players combine and utilize resources to produce mutual gains (Vargo et al., 2020). By working together, different participants can create value for each other. This kind of mutual VC can only happen when multiple actors collaborate and exchange resources. This idea is central to the concept of SDL, which argues that all businesses may be most effectively explained by looking at how they exchange services with each other (Lusch and Vargo, 2006; Vargo et al., 2020).

While traditional collaboration, including horizontal and vertical collaboration, and VC-C, share foundational principles of partnership and resource sharing, they diverge significantly in scope and objectives. Collaboration primarily focuses on aligning processes and optimizing resource use to achieve mutual goals within a defined framework (Cao and Zhang, 2011; Scholten and Schilder, 2015). For example, VC ensures smooth supplier-customer interactions, while HC fosters partnerships among competitors or non-competitive peers. These interactions primarily emphasize operational efficiency, information sharing, and trust-building among SC actors (Simatupang and Sridharan, 2008).

VC-C, on the other hand, transcends operational collaboration by fostering innovation and creating unique value propositions (Frow et al., 2016; Vargo and Lusch, 2017). Unlike collaboration, which operates within existing paradigms, VC-C thrives on dynamic, multi-actor interactions that integrate diverse sectors to create value for the greater good (Nardelli and Broumels, 2018). This approach shifts from a

linear manufacturing chain model to a more interconnected, accessible, and dynamic multi-player process (Ben Letaifa and Reynoso, 2015). It shifts the focus from achieving shared efficiency to enabling co-created outcomes, such as enhanced adaptability and resilience in SC ecosystems (Abdalatif and Yamin, 2022).

This approach, denoted as VC-C, has emerged as a robust business strategy. Consequently, understanding and harnessing the dynamics of VC-C becomes pivotal in enhancing SCRes. By integrating these principles, businesses can fortify their operations and adapt to the ever-changing market conditions, ensuring sustained success in the competitive environment. This approach promotes the participation of others in the process and holds promise for enhancing the outcome (Ranjan and Read, 2016). To fully appreciate the transformative potential of VC-C within SCRes, it is important to distinguish it from traditional collaboration.

The process of collaborating to create value is called VC-C, through which firms and customers jointly create value by engaging in shared activities and experiences (Galvagno and Dalli, 2014). In the context of SCs, VC-C involves collaboration among SC partners to deliver superior value to end customers. Co-creation activities can include joint product development, information sharing, and collaborative problem-solving (Chakraborty et al., 2014).

> *"VC-C, which is based on service-dominant logic, is often applied to service marketing, B2B marketing, and general business management practices, but it is rarely applied in the supply chain"* (Ju et al., 2020).

VC-C among SCs is crucial for achieving competitive advantage and resilience. By collaborating, firms can leverage their complementary capabilities and resources to create innovative solutions, reduce costs, and enhance customer satisfaction (Bonamigo and Frech, 2021; Dorn et al., 2016). Co-creation also enables SC partners to adapt rapidly to disruptions and changing market environments. Through shared knowledge and expertise, firms can identify new opportunities, develop agile strategies, and collectively respond to disruptions. This collaborative approach fosters trust, cooperation, and mutual understanding among SC partners, leading to long-term relationships and sustained competitive advantage.

"Collaboration guarantees co-create value for supply chain members" (Al-Omoush et al., 2023).

Research has shown that VC-C among SCs can enhance SCRes. Firms may tap into varied views, ideas, and talents by including numerous stakeholders in the co-creation process, which can increase their capacity to foresee and respond to changes. Co-creation activities also promote knowledge-sharing and learning within the SC, enabling partners to develop shared routines and processes that improve their collective resilience (Abdalatif and Yamin, 2022).

Many business processes have undergone major modifications as a consequence of the acceptance and rapid expansion of digital technology. Consequently, the paradigm of VC-C within networks comprising suppliers, partners, and consumers has transitioned from a company-centric approach to a more inclusive and collaborative model. Regarding this particular framework, the process of VC-C is influenced by both collaboration and competitiveness and VC is a process that requires collaboration, while capturing value is a process that necessitates competition (Nalebuff and Brandenburger, 1997). The abovementioned coopetition is seen as a mechanism through which firms can collaboratively create value that extends beyond what could be achieved through individual efforts (Raza-Ullah et al., 2014). Based on this, we offer a novel term "Coopetitive Value Co-Creation" (CVC-C), which acts as a unifying umbrella encompassing coopetition and VCC. CVC-C represents the dynamic process in which SC actors engage in simultaneous collaboration and competition to integrate resources, exchange knowledge, and create mutual value. It harmonizes the strategic interplay of collaborative innovation and competitive differentiation, fostering resilience, adaptability, and sustainable advantages within complex SC ecosystems.

"[…] a majority of the interfirm alliances today occur between competitors within the same industry and these alliances are largely coopetitive" (Rai, 2016).

Isolated value-creation strategies that were commonly used in the past are not as effective in today's emerging economy, according to X. Zhang and Chen (2008). As a result, more and more companies are looking to partner and co-create products and services with other businesses, as reported by Barrett et al. (2011). Nevertheless, there

is a limited exploration of inter-organizational VC-C within the SC domain. This scarcity stems from the initial conceptualization of VC-C, which originated with the idea that businesses should collaborate with individual customers to ensure their survival (Prahalad and Ramaswamy, 2000; Vargo and Lusch, 2004).

The core of VC-C within a service ecosystem, involving various actors such as customers, lies in the integration of resources and the exchange of services (Vargo and Lusch, 2017). In line with the SDL, businesses and their clients engage in an interactive process (Vargo and Lusch, 2004). Nevertheless, VC-C does not solely arise from the merging of resources and service transactions within a single customer-supplier relationship. Instead, it involves numerous actors within a service ecosystem, as emphasized by Lusch and Nambisan (2015) and Rahman et al. (2019). A notable example is the study by Dey et al. (2019), which highlights the collaborative nature of VC-C across multiple participants.

According to SDL, the traditional boundary between a company and a customer is less defined and instead promotes an actor-to-actor (A2A) perspective. This means that firms, customers, and stakeholders collaborate in pursuit of a shared objective, and all contribute to the innovation cycle. The network can be interpreted as a "meta-actor" in this context (Mele et al., 2014).

Frow et al. (2016) conducted research that acknowledges the engagement of diverse actors in their study, recognizing that an ecosystem comprises a wide range of stakeholders beyond simply customers and service providers. As per Clarke et al. (2013), an ecosystem encompasses "entities not typically identified as stakeholder groups, such as 'anti-clients,' activist groups, and competitors." VC-C activities can be seen between a business and its customers or business to business (B2B). The former concentrates on customers' contributions, while the latter involves other companies in jointly creating value. By collaborating, firms engaged in interfirm value co-creation can create value together while sharing their expertise and resources. Based on empirical evidence, interfirm VC-C positively affects firm performance by providing shared value (Tian et al., 2021).

The focus of previous studies has been primarily on VC-C within organizations instead of across companies (Osborne et al., 2013). As a result, there remains a gap in understanding the concept of VC-C, its pros and cons in a B2B setting, and its application among the actors engaging in the automotive SCs. In a B2B context, VC-C entails collaboration among managers from different areas and firms to devise

solutions that benefit all parties involved (Partouche-Sebban et al., 2022). This study, therefore, explores VC-C as a dynamic process within a service context. Here, stakeholders collaborate and have their resources integrated based on a mutually acknowledged value concept (Vargo and Lusch, 2008a), aligning with the principles of SDL theory.

Goetz et al. (2022) emphasize that the focus in VC-C within a SC ecosystem is not exclusively on customers. Ecosystems redefine the value concept and present a multilevel approach on propositions for value, VC-C, and value capture through collaboration and innovation structures. In the evolving knowledge-based economy, ecosystems differ from a conventional chain of value and transactional networks, where value becomes more knowledge-oriented, social, subjective, intangible, and complex (Pitelis, 2009). This transformation from a post-industrial economic approach expands the co-creation of value beyond a dyad to involve interactions among at least two socio-economic network actors (Pera et al., 2016). Consequently, VC-C undergoes a shift from a traditional economic system in a given manufacturing chain to a more inextricably linked, accessible, and dynamic process with various players (Ben Letaifa and Reynoso, 2015).

This collaborative environment characterizes the business ecosystem, which represents socio-economic networks that exceed conventional industry limits by co-creating exceptional value, as noted by Goetz et al. (2022). Firms should form partnerships with customers, competitors, and stakeholders to adapt and ensure sustained success in the dynamic business environment (Brandenburg, 2016). In line with the researchers, Goetz et al. (2022) argue that in an ecosystem, collaborative innovation redefines value on multiple levels. This shift transforms VC-C from a linear economic process within a production network to a more linked, open, and dynamic process that entails various players.

VC-C manifests in two primary categories: business-to-customer platforms, in which activities for co-creation concentrate on the business and customers of all kinds, and business-to-business platforms, in which businesses within both identical and distinct sectors collaborate to create value for the greater good (Chakraborty et al., 2014). Initial research predominantly focused on business-to-customer platforms, leaving studies on business-to-business value co-creation comparatively overlooked (Hein et al., 2019). Organizations formerly competed for resources, consumers, and market share with no regard for joint growth. Yet, to achieve long-term development,

the present inclination supports viable coopetition within a network (Braun et al., 2017). Firms must swiftly converge in a VC-C partnership to take advantage of resource integration and profit from the collaboration (Lusch and Nambisan, 2015; Ranjan and Read, 2016). Firms' performance can be positively impacted by value co-creation, which has been shown to result in benefits such as cost savings, effective resource utilization, and marketing through complementary services (Tian et al., 2021).

It is essential to look at many-to-many relationships to have a comprehensive understanding of VC-C, instead of focusing on dyadic connections. This viewpoint challenges the idea of VC-C being limited to supplier-customer interactions, as numerous studies have demonstrated the importance of examining value networks (Edvardsson et al., 2014), mobile application services, multi-stakeholder networks, the triadic approach of VC-C in maritime logistics (Vural et al., 2019), and B2B industrial relationships (Sales-Vivó et al., 2020). Recognizing that value creation occurs when activities involving providers, beneficiaries, and other stakeholders intersect, this master's thesis adopts a multi-actor approach to CVC-C practices in automotive SCs.

This CVC-C is essential for enhancing the overall competitiveness and resilience of the SC. The literature emphasizes that coopetition can lead to improved innovation, cost efficiency, and risk mitigation, which are critical factors in industries like automotive manufacturing.

Tukamuhabwa et al. (2015) suggested that the principles of SDL can be investigated by integrating them with the theoretical foundation of SCRes. In this regard, they identified Dynamic Capabilities View (DCV) as relevant. This integration is consistent with the Resource-Based View (RBV) methodology (Brandon-Jones et al., 2014; Rafati and Poels, 2017), which gives a holistic view of how collaboration promotes all SC partners. Chakraborty et al. (2014) argue that the value of SCC is co-created rather than created. Herrmann et al. (2015) provide more evidence, arguing that collaboration ensures co-created value for SC members.

2.4. Theoretical Framework of the Study

Building resilience within automotive SCs necessitates a nuanced understanding of collaborative practices. This research delves into the concept of CVC-C practices, where competing actors within the SC work together to generate mutual value (Rai,

2016). To fully explore this topic, a multi-theoretical framework that integrates three key perspectives is leveraged: SDL, RBV, and DCV (Kohtamäki and Rajala, 2016).

Following this, a study by Tukamuhabwa et al. (2015) addresses that the most frequently used theories are the DCV, RBV, and systems theory in SCRes literature (see Table 3).

Table 3. Theoretical approaches employed in earlier SCRes studies, (Source: Tukamuhabwa et al., 2015)

Theories	**Authors**
RBV	Ponomarov and Holcomb (2009), Blackhurst, Dunn, and Craighead (2011), Park (2011), Ponomarov (2012), Yao and Meurier (2012), Brandon-Jones et al. (2014)
DCV	Ponomarov and Holcomb (2009), Ponomarov (2012), Yao and Meurier (2012), Golgeci and Ponomarov (2013)
Systems Theory	Erol, Sauser, and Mansouri (2010), Blackhurst, Dunn, and Craighead (2011), Spiegler, Naim, and Wikner (2012)
Complex Systems	Allen, Datta, and Christopher (2006), Erol, Sauser, and Mansouri (2010)
Complex Adaptive Systems	Day (2014)

In exploring the phenomenon of CVC-C within the framework of SDL, scholars have highlighted its pivotal role in generating value through collaborative involvement (Lusch and Vargo, 2006). In line with the study conducted by Ranjan and Read (2016) discovered 53 articles in 26 journals matching the basis for their database of possible VC-C concepts. Out of this research, 21 mentioned SDL or a similar framework as an explanation for VC-C. SDL provides a conceptual framework for comprehending economic and social interactions by underscoring the significance of services as a means to deploy intangible resources such as knowledge and skills for the advantage of others, rather than tangible goods (Vargo and Lusch, 2017), fostering mutually beneficial relationship value generation through collaborative engagements and exchanges among various participants.

However, to delve into the practical manifestation of CVC-C within the automotive SCs, SDL alone proves insufficient in explaining the role of these practices for achieving resilience. It is essential to incorporate the theory of dynamic capabilities, which emphasizes the establishment of capabilities through collaboration both within and outside the organization. To comprehend how companies can work

together to generate value by utilizing business applications to organize tasks and ease coopetition, it is crucial to apply the theory of dynamic capabilities (DCs) also defined as dynamic capabilities view. DCV highlights the establishment of organizational capabilities by means of collaboration both within and outside the company (Al-Omoush et al., 2023). By adopting dynamic capabilities as the theoretical framework, we can understand how organizations can effectively develop and utilize their abilities to improve coordination and collaboration processes among SC members (Jiao et al., 2019). This inclusive approach enables organizations to achieve and improve their competitive advantages, meet the needs of consumers, and explore new markets (Alzate et al., 2022).

Scholars have widely used the notion of DCV in the context of the SC to analyze how enterprises and their SC partners act jointly and adjust their resources in responding to fast changing environment and unforeseen disruptions (Chowdhury & Quaddus, 2017; cited in Munir et al., 2022). The framework of dynamic capabilities is particularly pertinent for investigating how organizations realign their operations and assets in the aftermath of sudden shifts and disruption risks. (Chowdhury and Quaddus, 2017; El Baz and Ruel, 2021; Fan and Stevenson, 2018; cited in Munir et al., 2022). Previous research has demonstrated that DCs are essential to responding quickly to disruptions and achieving resilience (Aslam et al., 2020; Gunessee et al., 2018; cited in Munir et al., 2022). At this point, DCV complements SDL by acknowledging that collaboration is not static, but rather a process that requires ongoing development and adaptation.

While DCV provides a critical lens for understanding the importance of continuously adapting collaborative processes, it doesn't explicitly address the resources that fuel this adaptation. For instance, DCV highlights the need for continuous learning within the SC network. However, the effectiveness of this learning hinges on the resources available, such as skilled personnel, access to training programs, and data analysis capabilities.

Building upon the focus on collaboration and adaptation, RBV highlights the importance of the unique and valuable resources possessed by individual firms within the SC (Barney, 1991). These resources, tangible (e.g., manufacturing facilities, technology) or intangible (e.g., brand reputation, skilled workforce), can be leveraged collaboratively to develop a competitive edge for the entire SC network (Brandon-Jones et al., 2014; Dyer and Singh, 1998; Größler and Grübner, 2006). RBV

emphasizes the importance of identifying, developing, and effectively utilizing these resources within a collaborative framework to achieve improved performance and resilience within the SC (Barney, 1991; Cheng and Lu, 2017). By strategically leveraging these resources through CVC-C practices, firms within the SC can enhance their collective resilience (RBV complements both SDL and DCV). For instance, a firm with a strong brand reputation can leverage this resource to attract high-quality partners within the SC, fostering a more collaborative and adaptable network with a wider range of resources at its disposal.

Consequently, the integration of SDL, RBV, and DCV provides a robust and interconnected theoretical framework for understanding how CVC-C practices enhance SCRes. SDL focuses on resource integration and collaborative interactions among stakeholders, emphasizing value creation through service exchanges (Vargo and Lusch, 2008a). RBV highlights the strategic importance of leveraging both tangible (e.g., infrastructure) and intangible resources (e.g., trust, knowledge) to gain competitive advantage and resilience (Brandon-Jones et al., 2014). Meanwhile, DCV extends this perspective by addressing the dynamic adaptation and reconfiguration of resources to respond to rapidly changing environments (Teece et al., 1997). Together, these three lenses complement one another: SDL explains the foundational collaborative dynamics of VC-C, RBV focuses on leveraging unique resources for resilience, and DCV underscores the adaptability and innovation needed for resilience in disruptive contexts. This integrated approach offers a comprehensive understanding of how CVC-C practices can strengthen resilience in automotive SCs, which is further explored in the following sections.

2.4.1. Service-Dominant Logic

The article titled *"Evolving to a New Dominant Logic for Marketing"* introduced SDL to the marketing domain in 2004. Authored by Vargo and Lusch (2004), this pivotal work offers a distinctive and innovative perspective on the marketing discipline, marking a significant departure from conventional approaches.

The SDL encapsulates a vibrant and evolving narrative, portraying the ongoing process of VC-C through the integration of resources and the exchange of services (Vargo and Lusch, 2004). SDL defines "service" as the application of operant resources, such as knowledge and skills, to benefit others. This perspective shifts the focus from traditional VC centered on goods to dynamic interactions among SC actors

that foster mutual benefits (Lusch and Nambisan, 2015; Vargo and Lusch, 2004). Within the context of CVC-C, service exchanges include sharing technological expertise, collaborative problem-solving, and adapting processes, aligning with the principles of SDL to foster SCRes.

This conceptual framework was rigorously created by a growing community of researchers from numerous fields and different disciplines (Ballantyne and Varey, 2008; Vargo and Lusch, 2017). Positioned as a distinct perspective addressing both economic and social aspects of the world (Vargo, 2011), SDL sets itself apart from conventional marketing theories, which often lack empirically testable statements and clear normative judgments (Brown et al., 1991). In contrast, SDL boasts 11 foundational pillars (Vargo and Lusch, 2004, 2008a, 2016). Many marketing academics recognize its potential to usher in a new era of marketing theory (Vargo, 2018; Vargo, 2007).

The SDL viewpoint stresses that collaborative efforts across businesses can result in the development of improved value offerings by encouraging reciprocal learning. This, in turn, contributes to an overall improvement in their knowledge, skills, and capabilities. (Lusch and Vargo, 2006). According to Lusch and Vargo (2014), SCM comprises more than just delivering things; it also involves exchanging services. SDL promotes the sharing of knowledge, integration, customer interaction, connectivity, and innovation among SC players (Glenn Richey, 2009; Vargo and Lusch, 2016).

The integrated framework has experienced significant alterations since its beginnings, including the addition of key activities other than service exchange, such as resource integration. The framework has also emphasized the distinctive and experienced aspect of value, as evidenced by Vargo and Lusch (2008). The framework has lately shifted its attention to the function of institutions in VC-C. These discoveries are described in a set of five basic foundational premises (FPs) (see Table 4), which have now been enlarged by Vargo and Lusch (2016) to eleven axioms.

Table 4. The axioms and FPs of SDL, (Source: Vargo et al., 2008; Vargo and Lusch, 2016, 2017)

	Axiom
Axiom 1/FP1	Service is the primary premise for exchange
Axiom 2/FP6	Multiple players collaborate to create value, and the recipient is always involved.

Table 4 (Continued). The axioms and FPs of SDL

Axiom 3/FP9	All socioeconomic players are the integrators resource.
Axiom 4/FP10	The recipient always assesses value in a unique and phenomenological manner.
Axiom 5/FP11	Institutions and arrangements created by actors facilitate VC-C.

SDL, introduced by Vargo and Lusch (2004), provides a refreshing departure from conventional marketing theories, offering a vibrant narrative that emphasizes the ongoing process of VC-C through resource integration and service exchange. This conceptual framework, championed by a growing community of scholars across diverse disciplines (Ballantyne and Varey, 2008; Vargo and Lusch, 2017), extends beyond economic transactions to encompass social aspects, reflecting the complexities of modern business environments (Vargo, 2011). Within the context of SCM, SDL underscores the importance of collaborative endeavors in enhancing knowledge, skills, and capabilities across organizations (Lusch and Vargo, 2006). By emphasizing reciprocal learning and service exchange, SDL promotes a holistic approach to VC, encompassing knowledge sharing, integration, customer interaction, connectivity, and innovation among SC actors within "service ecosystems" (Glenn Richey, 2009; Vargo and Lusch, 2016). These ecosystems are defined as dynamic, self-adjusting systems of interconnected actors who collaborate under shared institutional arrangements to create mutual value (Akaka et al., 2013).

The automotive industry, with its complex SCs and collaborative interactions among competitors, suppliers, and service providers, exemplifies a robust service ecosystem. Here, resource integration is critical, as firms rely on shared knowledge, technology, and innovation to develop tailored solutions and address market demands (Hein et al., 2019; Lusch and Nambisan, 2015). For instance, in automotive SCs, collaborative initiatives such as implementing RFID-based information systems streamline logistics and enhance operational efficiency, reinforcing the interconnected nature of service ecosystems (Herrmann et al., 2015).

The relevance of SDL in this context becomes evident as automotive firms increasingly adopt coopetitive strategies, combining competition and collaboration to innovate and co-create value (Ritala and Tidström, 2014). Through shared platforms, knowledge exchange, and joint innovation efforts, these firms demonstrate the application of SDL principles, where value emerges from resource integration across

diverse organizational boundaries. This perspective not only highlights the strategic importance of service ecosystems in fostering innovation but also underlines their role in enabling firms to navigate the complexities of global markets (Vargo and Lusch, 2016). Consequently, SDL offers a comprehensive framework for understanding and leveraging the collaborative dynamics that drive value creation in the automotive industry.

However, while SDL provides valuable insights into the collaborative aspects of value creation, its explanatory power alone may prove insufficient in comprehensively understanding the dynamics of CVC-C for resilience within automotive SCs. Therefore, complementing SDL with the RBV framework becomes essential. RBV, as the cornerstone of our study, delves into how firms leverage their unique resources and capabilities to gain competitive advantage (Barney, 1991; Porter, 1985). By examining the sources of advantage over competitors, RBV offers insights into how companies achieve resilience through effective resource utilization and capability development. This aligns seamlessly with the aim of our thesis, which is to explore how coopetitive practices contribute to resilience along automotive SCs. Through RBV, we can delve into the diverse resources and competencies that underpin value creation efforts, particularly within the context of coopetition and collaborative endeavors (Das and Teng, 2000; Grant and Baden-Fuller, 2004). Moreover, RBV sheds light on the interplay between knowledge sharing, competitive advantage, and firm-specific capabilities, crucial aspects in understanding the nuances of CVC-C within SCs (Barney, 1991; Teece et al., 1997).

In conclusion, while SDL illuminates the collaborative nature of VC-C, RBV enriches our understanding by emphasizing capabilities and resources in driving an advantage in competition and resilience. Together, these complementary frameworks provide a robust theoretical foundation for exploring CVC-C practices along automotive SCs, thereby advancing our understanding of how firms navigate the complexities of their environment to achieve resilience.

2.4.2. Resource Based View

We adopt the RBV as fundamental theoretical basis for our study. The determination of sources of advantage over competitors is a significant study issue in strategic management (Barney, 1991; Porter, 1985), and this competitive advantage is gained through certain capabilities and resources that a company holds or may obtain.

It is possible to gain insights into how companies achieve a competitive edge over their competitors by examining their resources and skills (Barney, 1991; Nandi et al., 2020; Newbert, 2008). Commodities that the organization has access to or own are defined as resources. These resources can be classified as tangible (operand), like infrastructure, and intangible (operant), such as the exchange of information (Brandon-Jones et al., 2014; Größler and Grübner, 2006). The integration of individual resources into a bundle is necessary for the development of capabilities that results in an advantage in competition. This is supported by research conducted by Brandon-Jones et al. (2014), Newbert (2008), and Sirmon et al. (2008).

The RBV, often known as the RB theory of business, evolved as a supplement to industrial organization approach (Porter, 1985). RBV provides a unique approach in that it focuses on in-house sources of long-term competitive advantage and seeks to understand the causes of performance differences between enterprises in identical industries (Kraaijenbrink et al., 2010). The primary definition of the organization's resources is the one below:

> *"[...] all assets, capabilities, organizational processes, firm attributes, information, knowledge, each controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness"* (Barney, 1991).

RBV theory presents a contemporary perspective on generating and providing increased customer value. It seeks to elucidate the competitive advantage and consequently better performance found in businesses, with focusing on the bond across value for customers., competitive advantage, and enhanced performance (Clulow et al., 2007). RBV recognizes several procedures, such as efficient production methods, cost-cutting tactics, and a strong emphasis on customer service, as ways for businesses to provide value to their consumers. The theory asserts that a firm's competitive precedence hinges on its substantial resources, specifically intangible assets like trust among clients and relationships, as well as capabilities such as expertise and abilities (Clulow et al., 2007). These crucial assets meet the needs of consumers, leading to value creation and a sustained competitive edge (Toms, 2010). As a result, companies are encouraged to adopt a resource-based approach and prioritize resource development (Andersén, 2010).

RBV theory explores how businesses can enhance customer value to gain a competitive advantage and improve performance. It emphasizes the importance of efficient production, cost-cutting, and strong customer service as a means to deliver value. The theory emphasizes that a firm must create 'value' within the competitive setting and in alignment with customer needs (Little, 2004). This differs from the SDL approach. According to the theory, a firm's competitive advantage relies on substantial resources, particularly intangible assets like trust and relationships, along with capabilities such as expertise (Clulow et al., 2007). These assets meet consumer needs, creating value and sustaining a competitive edge (Toms, 2010). Therefore, companies are advised to adopt a resource-based approach and prioritize resource development (Andersén, 2010).

Bowman and Ambrosini (2003) classify three forms of value creation in resource development: inert, human, and enduring capital inputs. In the context of inert operations, firms convert components, ingredients, and data into products and services, thereby creating use value. Human inputs, including employees, their expertise, and acquired knowledge, contribute to labor, informal networks, and key elements of organizational culture. These inputs have the potential to generate new values that lead to revenue. According to the RBV framework, value capital goes beyond traditional assets like machinery and buildings to encompass domestically produced assets like unique systems, bespoke technology, and brands (Bowman and Ambrosini, 2003). The contributions by businesses are consistent with the valuable, uncommon, non-imitable, and non-replaceable features of RBV resources, resulting in a sustainable competitive advantage.

The RBV is useful for understanding and framing how uncertainties and disruptions may be minimized and SCRes therefore utilized (Blackhurst et al., 2011; Cheng and Lu, 2017). Managing resources through buffering and connecting through bridging diminishes uncertainties and reduce the consequences of interruptions, while SCRes is employed through resource reconfiguration (Ambulkar et al., 2015). According to RBV, SCRes is the performance outcome. SC disruptions can have serious and long-term economic consequences (Hendricks and Singhal, 2005), and resilience can be built to reduce risks to organizational performance (Brandon-Jones et al., 2014). Furthermore, numerous academics connect capabilities and assets to SCRes measurements that favorably influence SCRes, resulting in a competitive edge. (Brandon-Jones et al., 2014; Dubey et al., 2019; Rajesh, 2019). Consequently, we

adopt an RBV approach to explore how SC actors create SCRes (Barney, 1991; Cheng and Lu, 2017).

The RBV significantly contributes to this study in two ways. Firstly, it improves our conceptualization of CVC-C by highlighting the interchange and integration of valuable mutually beneficial resources across companies in collaboration (Das and Teng, 2000; Grant and Baden-Fuller, 2004). Secondly, it emphasizes the significance of diverse resources and competencies in understanding the particular performance disparities in the adoption of value. (Barney, 1991; Teece et al., 1997).

First, inter-organizational collaboration is cost-efficient and effective in terms of resource and capability utilization (Grant, 1996). This requires firms to access resources and capabilities beyond their boundaries (Grant and Baden-Fuller, 2004).

Secondly, competitive advantages can be analyzed using the RBV, which focuses on firm-specific differences. The protection of innovations and core knowledge is important in collaboration between competitors (Knudsen, 2007). This knowledge sharing between competitors can be problematic as it can be used in both collaboration and competition, i.e. coopetition (Bengtsson and Kock, 2000). Absorptive capacity, or the ability to acquire and utilize knowledge from outside sources, also varies among firms (Zahra and George, 2002). These two capabilities demonstrate how a corporation can create novel value through collaboration while preserving its competitive edge.

In summary, the RBV asserts that coopetition involves a unique approach to creating value by utilizing the overlap in resources and capabilities of competitive firms, allowing for collaboration, knowledge sharing, and complementary learning. Firm-specific capabilities in acquiring and protecting knowledge affect the competitive benefits reaped from such relationships.

2.4.3. Dynamic Capabilities View

Teece et al. (1997) presented the RBV paradigm, which was later refined into the DCV. Owing to this research, "dynamic" encompasses the ability to refresh competencies to keep up with environmental shifts. The terminology of "capabilities" emphasizes strategic management's critical role in modifying, combining, and reorganizing resources, corporate expertise, and specific skills to successfully face environmental issues. The capabilities or unique qualifications refer to the characteristics, skills, procedures, knowledge, and abilities that enable a company to reach better efficiency and maintain its advantage over competitors.

"[...] The notion lies at the heart of the organizational ability to enact change in a systematic and fruitful way" (Romme et al., 2010).

The notion, like the RBV, focuses on basic concerns such as skills and business performance, but from a dynamic viewpoint. The theory addresses the constraints of the RBV while also dealing with the challenges of fluctuating environmental dynamics and long-term competitive advantage (Yao and Meurier, 2012). Therefore, the DCV is regarded as an additional approach for understanding dynamic market circumstances compared to the RBV (Dubey et al., 2023).

Since RBV is often perceived as static, scholars have effectively delved into combining RBV with DCV in SC literature (Aslam et al., 2020; Dubey et al., 2019). This fusion has recently been applied to examine the ramifications of disruptions in the SC during global disruptions. In a notable instance, El Baz and Ruel (2021) demonstrated how this approach aptly investigates the coordination and reconfiguration of organizations' capabilities and resources in response to the SC risks stemming from the disruptions (Queiroz et al., 2022).

The DCV offers a theoretical basis for this research, providing insight into how organizations can adapt and thrive in dynamic and uncertain environments. DCs refer to an organization's ability to proactively develop and leverage resources to adapt to changing conditions. Developing dynamic capabilities is instrumental in enhancing an organization's competitiveness and providing its sustainability. DCs enable businesses to effectively respond and adapt to evolving environmental circumstances while enhancing their competitive advantage (Y. Lin and Wu, 2014). Based on this broad definition, dynamic capabilities encompass widely recognized organizational and strategic processes recognized for their potential to transform resources into value-creating strategies (Eisenhardt and Martin, 2000).

This framework suggests that organizations that possess strong DCs are more likely to achieve resilience in SCs, as they can quickly respond and adapt to disruptions and reconfigure their resources to maintain competitive advantage (Alzate et al., 2022). This theoretical framework suggests that organizations with strong DCs are better equipped to achieve resilience in their SCs (Yao and Meurier, 2012).

Helfat and Peteraf (2009) and Teece (2007) incapsulate DCs into three categories: sensing, seizing, and reconfiguring (or transforming). Dynamic capabilities may be

defined as organizational and management procedures that aid companies in detecting threats and opportunities, seizing them, and rearranging the resources to meet the circumstances.

> *"[…] dynamic capabilities are multi-faceted, and firms will not necessarily be strong across all types. A firm might excel at sensing new opportunities but be relatively weak at identifying new business models to exploit them. Or a firm might be good at developing new business models yet be mediocre at implementing and refining them"* (Dubey et al., 2023).

In today's fast-paced business environment, organizations are constantly challenged to adapt to sudden shifts. Reacting quickly and successfully to environmental problems like demand fluctuations and SC disruptions is crucial for maintaining a competitive edge. Exceptional capabilities are required in today's corporate climate, and conventional skills are inadequate; instead, DCs must be acquired to successfully adapt to SC disruptions (Kähkönen et al., 2023). As businesses navigate the challenges of SC disruptions, it is crucial to recognize the relevance of DCs in effectively responding to these issues and ensuring long-term success. Furthermore, in the face of unanticipated threats and disruptions, enterprises' improved capacities to perceive and respond to variations in SC demand and supply, as well as alter production and delivery capabilities, are crucial for developing the ability in VC-C (Al-Omoush et al., 2023).

By leveraging DCs, firms can adapt and reconfigure their resources and processes to lessen the consequences of interruptions and seize opportunities that arise (Helfat and Peteraf, 2009). These dynamic capabilities involve sensing shifts in the external setting, seizing opportunities, and reconfiguring resources accordingly (Siems et al., 2021). Moreover, DCs enable firms to enhance their resilience and capacity to recuperate from disruptions by continuously learning, innovating, and building adaptive capacity. Furthermore, they enable firms to proactively identify and address potential risks and vulnerabilities in their SCs, allowing them to better prepare for future disruptions (Barreto, 2010). In summary, DCs are essential in today's business environment as they enable firms to effectively respond to SC disruptions, enhance resilience, and ensure long-term success (Stadtfeld and Gruchmann, 2023).

> *"[…] dynamic capabilities assist in enhancing supply chain resilience, depending on the environment in which the organization operates."* (Dubey et al., 2023).

DCV, stemming from the refinement of the RBV, offers a dynamic perspective on organizational capabilities, emphasizing the critical role of strategic management in adapting to environmental shifts (Teece et al., 1997). Unlike the RBV, which may be perceived as static, DCV recognizes the need for firms to continuously refresh competencies and reconfigure resources to maintain competitiveness in dynamic market circumstances (Yao and Meurier, 2012). In the context of our thesis, DCV provides a theoretical framework for understanding how organizations can proactively develop and leverage resources to adapt to the uncertainties and disruptions inherent in automotive SCs (Y. Lin and Wu, 2014).

Dynamic capabilities encompass a range of organizational processes aimed at detecting threats, seizing opportunities, and reconfiguring resources to meet changing conditions (Helfat and Peteraf, 2009; Teece, 2007). This adaptive capacity is essential for achieving resilience in SCs, enabling firms to respond swiftly and effectively to disruptions while maintaining their competitive advantage (Alzate et al., 2022). By leveraging DCs, organizations can enhance their ability to sense changes in the external environment, seize opportunities for value creation, and reconfigure their resources and processes accordingly (Siems et al., 2021). Moreover, DCs enable firms to continuously learn, innovate, and build adaptive capacity, thereby enhancing their resilience and capacity to recover from disruptions (Barreto, 2010). Thus, DCV offers valuable insights into how organizations can navigate the complexities of automotive SCs and thrive in an environment characterized by rapid change and uncertainty.

In summary, DCV provides a theoretical lens through which we can explore how CVC-C practices contribute to resilience in automotive SCs. By understanding the role of dynamic capabilities in enabling firms to adapt and respond to disruptions, we can advance our understanding of how organizations can effectively collaborate and co-create value to achieve resilience. Therefore, by integrating SDL, RBV, and DCV, we aim to develop a comprehensive theoretical framework to guide our investigation into CVC-C practices along automotive SCs, ultimately contributing to both theory and practice in the field of SCM.

CHAPTER 3: METHODOLOGY

This chapter outlines the research methodologies used in this study. Given the complexity of SCM, a multi-method approach is essential to thoroughly explore SC phenomena (Golicic and Davis, 2012). We investigate the dynamics of CVC-C and their impact on SCRes in the automotive industry using qualitative data analysis. Central to our methodology are SSIs for deep insights.

We began with a purposeful sampling approach (Eisenhardt, 1989; Flick, 2022), initially selecting five companies to provide an overview, following Charmaz's (2006) guidance. The sample was expanded through snowball sampling (Naderifar et al., 2017; Noy, 2008), refining the selection criteria with each interview to add diverse perspectives (Glaser, 1978). This iterative process allowed the interview guide to evolve and capture emerging themes (Charmaz, 2006).

Each interview was recorded and entirely transcribed for analysis (Fawcett et al., 2014). As themes emerged consistently across interviews, we reached data saturation (Charmaz, 2006; Corbin and Strauss, 2008). The coding process included open, focused, and theoretical coding stages (Charmaz, 2006). Two researchers independently conducted open coding to structure the data (Charmaz, 2006; Corbin and Strauss, 2008).

During theoretical coding, we aligned data with various theoretical perspectives that emerged during analysis (Langley, 1999). This approach, recommended by Corbin and Strauss, (1990, 2008), Fendt and Sachs (2008), and Suddaby (2006) allowed us to compile these theories into a comprehensive framework. Our inductive approach, guided by Strauss and Corbin (1990), Charmaz (2006), and Alvesson and Sköldberg (2009), involved iterative data collection and analysis, synthesizing empirical data with existing theory (Alvesson and Kärreman, 2007; Dittrich and Seidl, 2018).

To substantiate findings of this study, we relied "power quotes" in the text and "explanatory quotes" in tables, following Pratt's (2008, 2009) guidelines. This methodology ensures robust and well-supported descriptions of the themes and the emerging decision model.

By integrating these methodological approaches, this study aims to provide a nuanced perception of CVC-C practices and their implications for SCRes in the automotive industry.

The automotive industry was chosen for this study due to its prominent role in SCM and its unique blend of competitive and collaborative dynamics. The industry demonstrates different kinds of coopetition, including horizontally, vertically, and mixed. Historically, rivalry has dominated VC between OEMs and suppliers due to power imbalances that foster coopetition (Akpinar and Vincze, 2016). However, the industry's shift toward modular SC architectures and reliance on Tier-1 suppliers for subsystems has introduced symbiotic dependencies, particularly under external pressures such as stringent regulatory requirements and technological shifts (Yeung, 2024). HC has increased after the abolition of geographical constraints on trade, resulting in major industry convergence (Akpinar and Vincze, 2016).

These dynamics are further shaped by the transition to Industry 4.0, where automation, digitalization, and advanced technologies redefine production and organizational processes. This transition enables firms to enhance flexibility, adapt to fluctuating demands, and pursue sustainable manufacturing goals (Lin et al., 2018). Simultaneously, the industry contends with growing environmental and consumer pressures , demanding innovative strategies such as new product development and effective SCM measures to sustain competitiveness (Fan and Iqbal, 2022). Additionally, strategic alliances and coopetition emerge as critical approaches to navigating market globalization, optimizing resource use, and responding to rapid technological advancements (Chalhoub, 2007).

These evolving dynamics underscore the automotive sector’s suitability for exploring CVC-C and their implications for SCRes. The intricate balance of collaboration and competition within this industry provides an ideal context for examining the interplay of strategic frameworks, resilience capabilities, and market-driven innovations. This connection to the industry's evolving landscape is elaborated further in the following chapter.

3.1. About Automotive Industry

In a highly competitive and challenging business landscape, the automotive industry stands out as a benchmark for other sectors, particularly in SC Management (Cox, 1999; Fan and Iqbal, 2022; Thomé et al., 2014). Therefore, to delve into the CVC-C practices for achieving resilience among the automotive SCs, our study requires a brief overview of the automotive industry and its dynamics.

Businesses increasingly navigate dynamic and interconnected ecosystems. The automotive manufacturing sector, specifically, is facing substantial structural shifts that are expected to disrupt its whole value chain in the upcoming decades, resulting in high interdependence.

The sector exhibits great localized integration at the operational scale, but there is also a rising tendency toward global value chain interactions. This transformation is resulting in a distinctive structure in which value chains in diverse levels are intertwined (Jullien and Pardi, 2013). This integration trend is causing changes in the SC dynamics of the industry. The sector is predicted to become more complex and diverse as a result of an expanded value chain driven by developing mobility ideas. The variety of versions has grown in tandem with the demand for bespoke, individual automobiles. The advancements in manufacturing technology and enhanced consumer accessibility have not only led to greater responsiveness and faster shipping times (Christopher, 2011; Coronado Mondragon et al., 2006), but have also triggered a transformative impact on customer preferences within the automobile industry. This shift is particularly pronounced with the emergence of digital products and services. The integration of new technologies is not only reshaping the landscape but is also creating opportunities for established corporations to venture into burgeoning sectors, fostering competition with innovative entrepreneurs (Verevka et al., 2019).

All of these issues, collectively with the worldwide dissemination of vendors and consumers, result in increased SC complexity (Christopher, 2011; Coronado Mondragon et al., 2006). This amplified chain will include a substantially higher number of operations than the existing automotive value chain. Such modifications increase rivalry with existing companies while also bringing new competitors such as clean car component suppliers and software providers for autonomous driving. Furthermore, collaboration with rivals is required to unite growing interconnected networks (Gao et al., 2016).

The automotive industry, particularly one of the leading sectors, relies largely on their customers, OEMs, and other organizations such as competitors and suppliers for economic stability (Lutz and Bodendorf, 2020). This influential industry also serves a vital role in the global economy, consuming a substantial amount of oil, steel, and glass. It is the second largest one, following the aircraft sector, in terms of utilizing products from other sectors. A one percent growth in the automotive industry leads to a one and a half percent GDP growth in developed countries, contributing five to ten

percent to the GDP. The automotive suppliers' industry is crucial for the mass production of OEMs, supplying most of the assembly parts (Saberi, 2018). Given that a car can have up to 6,000 components, organizational capabilities and managerial skills are crucial in the sector to maintain the proper flow of components, data, and currency to avoid SC disruptions and the ensuing pricey delays in manufacturing (Boysen et al., 2015; Falsafi et al., 2018), while maintaining competitive and creative for value.

The automobile sector has successfully implemented streamlined ideas such as just-in-time and just-in-sequence delivery for logistics and manufacturing operations (Boysen et al., 2015). Following a series of dedicated efforts to improve efficacy, automobile SCs have grown into intricate and extensively globalized systems, distinguished by complicated grids comprising multiple tiers (Belhadi et al., 2021; Xu, 2020). Subcontracting automobile VC to qualified suppliers resulted in a 25% drop in the added value at automakers and complicated SCs that extend various regions (Ishida, 2020; Lechler et al., 2020). For example, Toyota relies on a network of over 2,100 suppliers spanning three tiers to support its 50-plus global manufacturing facilities. Notably, more than 30% of these suppliers are based in foreign countries (Kito et al., 2014).

Researchers have previously identified SC challenges the automobile sector encountered. Especially during the pandemic period, SCs experienced significant disruptions as spatially scattered suppliers remained consistently and unpredictably unable to fulfill requests (Ishida, 2020), similar to Toyota SC example mentioned above. Constrained transport capacity and shutdowns of facilities posed additional barriers for OEMs (Belhadi et al., 2021). From the consumer side, vehicles sold first decreased as retailers shuttered and global travel was constrained (Nikolopoulos et al., 2021; Remko, 2020). Following the lockdown, the automotive sector witnessed unusually excessive demand, resulting in significant bullwhip impacts (Spieske and Birkel, 2021).

The obtained research insights, in the context of disruptions, mainly focus on the industry level rather than offering a holistic and interconnected perspective of the entire SC Network. This broader viewpoint would enable the examination of dyadic connections and dynamics of customers and providers across multiple tiers. The difficulties outlined prompted corporate executives to recognize a lack of stability in their SC Networks. This realization prompted a strategic focus on enhancing the

SCRes, as highlighted by Remko (2020) and Wieland (2021). Investigations into strategies to address pandemic-related challenges in the automotive sector have advanced, with a specific emphasis on measures within organizations (Hoeft, 2021). The current literature has advanced the examination of measures to address the global epidemic challenges in the car manufacturing sector, with a particular emphasis on organizational strategies (Hoeft, 2021), collaboration and sourcing approaches (Belhadi et al., 2021; Ishida, 2020), practices related to the circular economy (Nandi et al., 2020), and technological integration (Belhadi et al., 2021; Spieske and Birkel, 2021).

In conclusion, the industry is fiercely competitive and in continual motion, as seen by numerous prominent alliances, bankruptcy cases, and organizational changes. To maintain their existence, automakers must be as effective as possible at all stages of the SC (Christopher, 2022; Seidel et al., 2005).

3.2. Coopetition Among Automotive Companies

Abovementioned coopetition, a concept that combines collaboration and competition, has been increasingly observed among automotive companies. The automotive industry, facing challenges such as a shortage of fossil fuels, global warming concerns, and rising competition from new markets, is realizing the need for collaboration and cooperation in order to remain competitive (Langner and Seidel, 2009).

Changes in the kind of coopetition have been noted in the automobile sector, which includes horizontal, vertical, and mixed coopetition. OEM-supplier interactions have always been competitive due to power inequalities (Akpinar and Vincze, 2016). The relationship between OEMs and their first-tier suppliers has recently shifted into power-balanced coopetition, as they have begun to engage more in collaborative R&D, product development, and production operations (Akpinar and Zettinig, 2008). Similar modifications occur in horizontal coopetition. Removing local trading restrictions, such as in the European Union, has led to increased competitiveness among OEMs, culminating in grouping of industries (Akpinar and Vincze, 2016)

Tesla Motors-Daimler AG Alliance: The Tesla Motors-Daimler AG alliance is an exemplary case of coopetition in the automotive industry (Cheong et al., 2016). In this alliance, both companies collaborated in the development of electric vehicle technologies while also competing with each other in the market. This alliance,

established in 2009, allowed Tesla to gain access to Daimler's resources and expertise, while Daimler benefited from Tesla's innovative and visionary approach to electric vehicles. The collaboration between Tesla Motors and Daimler AG not only fostered the advancement of electric vehicles but also enhanced the competitive position of both companies in the market (Cheong et al., 2016).

Porsche-Volkswagen Alliance: A substantial deal was reached by the two automotive titans in 2002, resulting in the joint production of the Porsche Cayenne, Volkswagen Touareg, and Audi Q7 on a common platform at VW's Bratislava facility in Slovakia. By 2004, Porsche was heavily reliant on Volkswagen, buying around 25% of its components from the latter. This collaboration progressed further in 2005 when both businesses allied to lead hybrid powertrains. VW also produced body shells for the Porsche Panamera at its cutting-edge factory in Hannover. The collaboration extended to R&D as well as manufacturing, creating an atmosphere in which VW could achieve long-term cost reductions and expand its market presence across many categories (Akpinar and Vincze, 2016).

Tesla Motors-Toyota Alliance: The Tesla Motors-Toyota alliance is another noteworthy example of coopetition in the automotive industry. In this alliance, Tesla and Toyota collaborated on the development of electric vehicles, specifically the 2012 RAV4 EV. The collaboration allowed Toyota to enter the electric vehicle market quickly and leverage Tesla's expertise in the field (Wikipedia, 2023). By collaborating with Tesla, Toyota was able to accelerate the development and release of the RAV4 EV, an all-electric cross-over sport utility vehicle that met the growing demand for electric vehicles. The Tesla Motors-Toyota alliance exemplifies how coopetition can result in the successful development and launch of innovative electric vehicles.

Coopetition in the automotive industry, that companies co-create value while competing for a portion of it (Akpinar and Vincze, 2016), has numerous benefits and impacts on the participating companies as well as the industry as a whole (Cheong et al., 2016). Therefore, this research aims to explore real-life practices of coopetition among automotive companies (Grochowski and Ohlhausen, 2016), and their impacts on the resilience of industry SCs.

3.3. Sampling And Data Collection

The collection of qualitative data necessitates a proper sampling approach and data collection method. Purposeful (judgmental) sampling (Eisenhardt, 1989; Gill,

2020; Patton, 2002; Suri, 2011), and then snowball sampling (Naderifar et al., 2017; Noy, 2008; Parker et al., 2019) methods were utilized, as these approaches are ideal for qualitative research. In addition, semi-structured interview (SSI) method is chosen to thoroughly investigate the topic, as this method provides greater freedom and allows for deeper exploration of expert explanations and interpretations (Kallio et al., 2016).

Purposeful (judgmental) sampling and then snowball sampling approaches allows you to choose samples for scenarios with established parameters. In this regard, we established four sample criteria that potential organizations and experienced people must fulfill to be included in our study (Charmaz, 2006). First, we defined the automobile sector by focusing on the European Union and Türkiye's automotive industries. In both locations, the automobile sector is structured by an association. The European Automobile Manufacturers' Association (ACEA) comprises Europe's 15 main vehicle manufacturers (ACEA, 2024), where the European Association of Automotive Suppliers (CLEPA) brings together more than 100 leading suppliers of vehicle parts (CLEPA, 2017). In comparison, Automotive Manufacturers Association (OSD) in Türkiye have 13 main vehicle manufacturers (OSD, 2024), and Automotive Suppliers Association of Turkey (TAYSAD) represents more than 500 members of Turkish automotive supplier industry (TAYSAD, 2024).

Secondly, we focused on OEMs and the initial two tiers of the SC in our target firms. Consequently, we amended the websites of firms inside these four groups to eliminate those that do not provide parts for automotive SCs. As a result, we eliminated organizations that focus on mobility solutions, information technology, engineering, and supplementary automobile accessories. We reached the businesses online or through contacts on their internet pages.

Thirdly, we stipulated those interviewees to have experience with automotive logistics and SC management. Considering not every organization has an SCM branch, we expanded our criteria to include managing directors or industry analysts who were willing to address our questions (Glaser, 1978). Finally, interviewees were required to assess the state of automotive SCs through CVC-C practices. This ensured consistency in the interviewees' positions whether they have experience with the issue. Consequently, we collected 16 interviews with individuals meeting our sample criteria through SSIs.

Researchers widely use SSIs when potential respondents have specific expertise and knowledge of the issue (Göçer et al., 2023). The selection of SSIs as the primary

method of collecting data was based on their ability to gather rich and detailed insights from participants, allowing for a deeper understanding of their experiences, perspectives, and practices (Hollweck, 2016; Kallio et al., 2016; Kiel et al., 2017).

We relied on SSIs, which provide greater flexibility than structured interviews and let the researcher comprehend and delve into the experts' responds and implications (Easterby-Smith et al., 2018; Robson and McCartan, 2017; Saunders et al., 2009). In light of our participants' different professions and backgrounds, this flexibility was also necessary. Additionally, in keeping with our research aim, the objective of a SSI is to obtain illuminating and instructive comments. (Runeson and Höst, 2009).

SSIs enable respondents to freely share their thoughts and feelings while also allowing the interviewer to propose subjects and inquiries based on the demands of the interview procedure (Kiel et al., 2017). To facilitate interviews, a SSI protocol was created and adapted from prior research (Gugiu and Rodríguez-Campos, 2007). This protocol ensured consistency in data collection while allowing flexibility for participants to express their unique viewpoints.As a result, in SSIs, participants are often picked for their experiences and viewpoints contributing to the in-depth examination of the research issues (Matthews and Ross, 2010).

We developed a comprehensive questionnaire to guide the interviews, consisting of 40 open-ended questions. It began with a comprehensive literature review to identify key themes and gaps relevant to the study, ensuring the initial drafts covered topics such as SC dynamics, resilience, collaboration, coopetition, and CVC-C. Recognizing the complexity and theoretical nature of these topics, we provided an information form to participants with concise explanations of key concepts. This form ensured a baseline understanding of terms such as SC resilience and coopetition, fostering clarity and enabling meaningful discussions. The development of the questionnaire was an iterative process spanning three months, guided by my thesis advisor and domain experts. Questions were phrased to be open-ended, encouraging detailed and reflective responses while avoiding bias.

The refinement of the questionnaire was guided by feedback from the initial interviewees, whose insights improved the clarity, relevance, and flow of the questions. Adjustments were made to streamline topics, incorporate follow-up prompts, and enhance its robustness as a tool for gathering rich, nuanced data. These early interviews also highlighted the importance of pre-interview briefings to establish a shared understanding of theoretical frameworks. Participants were assured of

confidentiality and provided consent for session recordings, which were later transcribed for systematic analysis (Bernard et al., 2016). Additional notes taken during or after the interviews were included to capture contextual details.

The combination of purposeful and snowball sampling with SSIs ensured the collection of rich, reliable data. The iteratively refined questionnaire and rigorous processes, including confidentiality and transcription, provided a solid foundation for exploring CVC-C and SCRes within the automotive industry.

Table 5. Interview sample size

#	Interviewee's ID	Role	Education level	Years of Experience in the Automotive Industry	Disruptions Experienced	Interview Duration
1	OEM1	Domestic Part Supply Manager	Bachelor's degree	11 years	The European Debt Crisis (2009), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021), Türkiye–Syria earthquakes (2023)	92 min
2	OEM2	Purchasing Executive	Master's degree	5 years	Lehman Brothers (2008), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021)	55 min
3	OEM3	Logistics Network Design Leader	PhD	16 years	Lehman Brothers (2008), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021)	61 min
4	TS1	Senior Planning Engineer	Bachelor's degree	8 years	COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021)	56 min
5	OEM4	Import Material Planning and Control Specialist	Bachelor's degree	6 years	COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021)	68 min
6	OEM5	Senior Internal Logistics Specialist	Master's degree	10 years	COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021), Türkiye–Syria earthquakes (2023), Aegean Sea earthquake (2020)	60 min
7	TS2	Sales and Marketing Manager	Associate degree	15 years	COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021), Geopolitical Disruptions (2014)	76 min
8	TS3	R&D and Support Service Director	Bachelor's degree	21 years	National Economical Crisis (2000), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	54 min

Table 5 (Continued). Interview sample size

9	TS4	Country Manager	Bachelor's degree	20 years	COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	63 min
10	OEM6	Vice President and Executive Board Member	Bachelor's degree	28 years	Mediterranean earthquake (1999), Lehman Brothers (2008), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	113 min
11	TS5	General Manager	PhD	15 years	Factory Fire (2017) COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	61 min
12	TS6	General Manager	Associate degree	19 years	Turkish economic crisis (2018–current), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	98 min
13	OEM7	Supply Quality Engineering Leader	Bachelor's degree	18 years	Lehman Brothers (2008), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	195 min
14	TS7	Logistics Manager	Bachelor's degree	29 years	Mediterranean earthquake (1999), Lehman Brothers (2008), Turkish economic crisis (2018–current), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	82 min
15	TS8	Sales Engineer	Bachelor's degree	2 years	Mediterranean earthquake (1999), Lehman Brothers (2008), Turkish economic crisis (2018–current), COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	82 min
16	OEM8	Aftermarket Solutions Analyst, Senior Expert Uptime & Maintenance	PhD	30 years	COVID-19 Pandemic (2020-2023), Global Chip Shortage (2020-2021),	64 min

Table 5 indicates the interviews' sample size. The selection group includes 4 distinct sorts of industrial actors, 16 firms, and 16 interviewees.

3.4. Qualitative Content Analysis

Qualitative content analysis is a systematic approach to analyzing textual data and extracting meaningful insights from it (Creswell et al., 2007; Forman and Damschroder, 2007). This method enables researchers to identify patterns, themes, and relationships within the data collected through interviews (Miles and Huberman, 1994). By utilizing qualitative content analysis, this research aims to find out the

perspectives, experiences, and perceptions of participants regarding CVC-C practices in achieving SCRes in the automobile industry SCs.

Qualitative content analysis involved several iterative stages, including data preparation, coding, categorization, and interpretation (Krippendorff, 2019; Patton, 2014). Initially, the transcribed data from the SSIs was organized and prepared for analysis. Subsequently, the data was coded, whereby meaningful units of information were identified and labeled according to predefined codes or emergent categories. This coding process involved an inductive approach (Alvesson and Sköldberg, 2009; Gioia et al., 2013; Kiel et al., 2017), allowing for the emergence of new codes and categories from the data (Krippendorff, 2004).

The data gathered from SSIs was examined qualitatively. Initially, the transcribed interview data was read and reread to gain familiarity with the content. Next, meaningful units of data were identified, and coding was conducted using inductive approach, allowing for the emergence of new codes and categories directly from the data (Alvesson and Sköldberg, 2009; Gioia et al., 2013).

Following coding, the categorized data was organized into themes and patterns (Charmaz, 2006; Miles and Huberman, 1994), facilitating the identification of key findings and interpretations. Data analysis involved a constant comparative method, where data was compared across interviews, seeking similarities, differences, and relationships. This iterative process of analysis ensured rigor, reliability, and validity in the findings(Alvesson and Kärreman, 2007; Dittrich and Seidl, 2018).

3.5. Reliability of the Research

Content categorization must be consistent and reliable for effective analysis. As Krippendorff (2004) emphasizes, content analysis achieves greater reliability when it is stable, reproducible, and accurate. To ensure robust data analysis in this study, SSIs were employed, which, while allowing flexibility, often result in unstructured data due to the respondents' diverse expressions and responses. Addressing this challenge, the study utilized a systematic approach involving open, axial, and selective coding to identify and refine patterns and themes in the data (Fawcett et al., 2014).

The analysis commenced with open coding to generate first-order concepts from the interview data. These concepts were subsequently refined into higher-order categories through axial and selective coding, creating a structured hierarchy of themes (Bernard et al., 2016). This iterative process ensured that categories and themes were

continuously validated against emerging data, improving the reliability of findings (Eisenhardt, 1989). The inductive coding approach facilitated the identification of meaningful patterns while maintaining a consistent theoretical framework (Gioia et al., 2013).

To enhance methodological rigor, at least two researchers independently conducted the coding process. Any discrepancies in interpretations were resolved through collaborative discussions, ensuring that the final coding framework accurately reflected the data (Seuring and Gold, 2012). This collaborative approach not only minimized individual researcher bias but also enhanced the robustness of the analysis.

The study further incorporated triangulation by examining multiple data sources (Denzin, 2017). These included field notes, publicly available industry reports, and internal documents, which were compared against interview data to identify consistencies and discrepancies. Such triangulation ensured a comprehensive evaluation of the findings and bolstered the study's credibility. Additionally, special care was taken during data collection as participants were assured of confidentiality to formulate neutral, unbiased interview questions that let participants freely voice their opinions and reducing the likelihood of response bias (Eisenhardt and Graebner, 2007).

To further enhance reliability, respondents with expertise and experience in the automotive industry were purposively selected (Eisenhardt, 1989; Gill, 2020; Patton, 2002; Suri, 2011). This included OEMs and suppliers, representing diverse SC players. Following this, the snowball sampling method was employed (Naderifar et al., 2017; Noy, 2008; Parker et al., 2019), allowing initial respondents to recommend additional participants who met the study's criteria. This approach ensured a broader and more diverse pool of insights. Their multi-actor perspectives enriched the examination of CVC-C practices and their implications for SCRes. The triangulation of multiple viewpoints allowed for a more comprehensive and credible analysis of how SC actors co-create value with competitors.

This study utilized qualitative content analysis to provide a structured mechanism for identifying core themes and patterns in the interview data (Miles and Huberman, 1994). This method’s emphasis on iterative refinement and theoretical alignment further ensured that the findings were both consistent and reliable (Patton, 2014). To demonstrate the study's reliability, the approach proposed by Halldórsson and Aastrup (2003) and Shenton (2004) was applied (see Table 6).

Table 6. Reliability of the study.

Criterion	Category
Authenticity	- Triangulation of data sources, including interviews, industry reports, and organizational documents.
	- Interviews conducted with industry experts possessing substantial experience in automotive SCs.
	- Iterative validation of coding and themes against theoretical frameworks to ensure alignment and reliability.
Contextual Relevance	- Semi-structured interviews employed to explore participant perspectives in-depth.
	- Inclusion of diverse participants, such as OEMs and suppliers, to capture multi-actor perspectives.
	- Comprehensive descriptions of coopetitive practices and their impact on SCRes.
Dependability	- Detailed documentation of research methodology, including sampling, data collection, and analysis processes.
	- Iterative coding process with open, axial, and selective stages to refine emerging themes and patterns.
	- Collaborative review of coding results to minimize researcher bias and enhance consistency.
Objectivity	- Triangulation of findings with external industry reports and secondary data sources for validation.
	- Use of standardized interview guides to ensure consistency across interviews.
	- Acknowledgment of study limitations and reflection on potential biases and their mitigation.

3.6. Ethical Considerations

Ethical concerns were addressed at all stages of the research process. All participants provided written authorizations, confirming that their participation, confidentiality, and anonymity was voluntary. The research study complied with relevant ethical guidelines and regulations, ensuring the preservation of participants' rights as well as data management that is accountable.

To maintain ethical standards in our study, we followed the principles outlined by (Bell and Bryman, 2007), which include ensuring participant well-being, respecting privacy, obtaining informed consent, protecting anonymity, avoiding deception,

declaring affiliations, maintaining honesty and transparency, fostering reciprocity, and preventing misrepresentation.

Along with our study, these principles were strictly followed. In the interviews conducted, we maintained the privacy of respondents and got clear permission using Participant Information Forms. Respondents were briefed on the study's objective and history. To ensure privacy, anonymous identities were used in data citing, and all records and transcription were discreetly preserved and swiftly erased after the study. The research's main goal was confirmed to be academic, with no competing interests engaged.

CHAPTER 4: FINDINGS

We identified six themes through SSI analysis specific to CVC-C process in automotive SCs such as industry-specific issues to CVC-C, challenges and barriers, CVC-C practices, drivers to CVC-C Practices, impacts of CVC-C, strategies and resilience capabilities for CVC-C.

In the course of analyzing the data, the SSIs are coded, and an outline of each step is illustrated in Table 7. The interviewee responses were thoroughly analyzed, andthe roles of automotive SC actors within CVC-C practices were systematically defined. We conducted the analysis through four steps and started by identifying 331 first-order codes accompanied by quotations and presented them in the textual explanations under the relevant sections. After this step, first-order codes were summarized using 271 second-order codes. In the subsequent stage, we formed 32 categories by grouping second-order codes under similar topics. Ultimately, we placed these categories under six major themes to provide a holistic view.

Based on our initial findings the theme of Industry-specific Issues to CVC-C Practices encompasses critical areas such as Economic Dynamics, Distinctive Standarts, Product Complexity, and Talent and Knowledge Acquisition. These third-order codes emerged from a rigorous coding process that began with the direct responses of interviewees and culminated in a nuanced understanding of the unique challenges encountered by the automotive sector in the context of CVC-C.

As the second theme of our findings, challenges and barriers to CVC-C practices incorporates a wide spectrum of issues, including communication issues, legal and regulatory issues, and others. These findings not only reveal the specific barries to CVC-C but also identifies potential areas for targeted intervention and improvement.

The findings additionally revealed several drivers for CVC-C practices, including coopetitive attitude and approach, contractual commitments and responsibilities, and market expansion, in fostering effective collaboration. Furthermore, the findings identified specific CVC-C practices caused by the aforementioned industry-specific issues and barriers, such as information sharing, joint ventures, know-how sharing, and resource sharing, all of which are required for effective CVC-C.

This study eventually identified crucial strategies and resilience capabilities through the SSIs that are essential among rival firms for overcoming challenges and ensuring successful CVC-C practices. All of these findings served as a foundation for

the study in Chapter 5, which delves deeper into their ramifications. Table 7 lists six themes and their related third-order codes for CVC-C practices.

Table 7. Themes of CVC-C Process in Automotive Supply Chains.

#	Theme	Category
1	**Industry-specific Issues to CVC-C Practices**	Economic Dynamics
		Distinctive Standarts
		Product Complexity
		Talent and Knowledge Acquisition
2	**Challenges and Barriers**	Communication Issues
		Cross-cultural and Organizational Issues
		Information Sharing Issues
		Joint decision-making Issues
		Legal and Regulatory Issues
		Profitability and Quality Issues
		Resource Issues
		Technological Adaptation Issues
		Workforce Capability and Mindset Issues
3	**Drivers to CVC-C Practices**	Strategic Coopetitive Mindset
		Market Expansion
		Production Efficiency
4	**CVC-C Practices**	Information Sharing
		Joint Venture
		Know-how Sharing
		Resource Sharing
5	**Impacts of CVC-C**	Improved Information Sharing
		Improved Trust Building
		Industrial Sustainability
6	**Strategies and Resilience Capabilities for CVC-C**	Adaptive communication strategies
		Awareness of Cultural Diversity
		Legal and regulatory compliance management
		Relationship-building
		Structured Information-Sharing Governance
		Agility
		Collaboration
		Flexibility
		Trust

4.1. Industry-specific Issues to Coopetitive Value Co-Creation Practices

The automotive sector has become increasingly complex and varied as a result of an expanding value chain driven by evolving mobility concepts (Alzate et al., 2022; Kleindorfer and Saad, 2005). It is also fiercely competitive, as evidenced by numerous alliances, bankruptcies, and organizational changes, making efficiency throughout the SC critical for automakers' survival (Christopher, 2022; Seidel et al., 2005).

In parallel with these, the majority of interviewees mentioned that the complexity and diversity of products intensified with the technological advancements and requirements distinguishes the sector from the others in fulfilling the customer demands. Additionally, some interviewees underlined that significant investments are needed with high quality standarts. We analyzed also that the sector bound to just-in-time manufacturing with mistake intolerance and stringent safety measures leading to limited flexibility.

Besides, we observed that the fierce competitive landscape in the industry inevitably pushes the actors into talent acquisition and learn by benchmarking from their rivals as the industry itself has an expanding, complex and intricate SC. We carefully investigated the distinguishing factors of the automotive industry, including the remarks of diverse actors, for capturing the customized insights. The confidential content analysis offered a thorough grasp of industry-specific issues laying behind the CVC-C practices.

SSIs were conducted regarding industry-specific issues. Table 8 illustrates respondents’ remarks, second-order codes, categories in detail grouped under the theme “Industry specific issues”.

Table 8. Sample Codes of Industry-specific Issues

#	Theme	Category	Second-Order Code	Evidentiary Quotation
1	Industry-specific Issues to Coopetitive VCC	Economic Dynamics	Economic role of the automotive sector	"[...] t is a sector with a very significant workforce, therefore, it can be seen as the locomotive of national economies." (OEM 1)
2	Industry-specific Issues to Coopetitive VCC	Distinctive Standarts	Quality expectations and investment intensity	"[...] the quality expectations are very high, it needs to be of high quality, and at the same time, the investments are very high." (OEM 2)
3	Industry-specific Issues to Coopetitive VCC	Distinctive Standarts	Safety as a primary concern	"[...] safety is paramount in the automotive industry [...] There are very high-level safety systems in the automotive sector." (TS 8)
4	Industry-specific Issues to Coopetitive VCC	Product Complexity	Product customization and variability	"[...] in the low-volume luxury vehicle segments, the next vehicle produced hardly resembles the previous one." (TS 5)
5	Industry-specific Issues to Coopetitive VCC	Product Complexity	Product customization and variability	"[...] the products are tailored for each customer. There is a huge variety with respect to the specification [...]." OEM 8)
6	Industry-specific Issues to Coopetitive VCC	Talent and Knowledge Acquisition	Dissected benchmarking on competitors' products	""We have one of each of our competitors' cars in our workshop [...] we buy them, and they do the same thing [...] We strip them down to the bone, figuring out what they've used here [...]." (OEM 7)

The industry-specific issues are identified in subheadings based on the qualitative content analysis conducted through SSIs.

4.1.1. Economic Dynamics

The findings indicate that economic dynamics constitute a significant issue within the automotive industry and play a determinant role in CVC-C practices observed in the automotive SCs. Table 9 provides a detailed breakdown of the second and first-order code associated with this issue.

Table 9. Sample Code of Economic Dynamics

Second-Order Code	**First-Order Code**
Distinctive economic dynamics	Significant investments requirements leading to a limited number of players.

The analysis of the SSIs reveals that high investment requirements in tooling and product development create significant considerations for entry and limits in the number of players in the market are explained by OEM 2 followingly. OEM 2's response is that the automotive industry's investment requirements and costs are significantly varied from the other industries.

> *"Both tooling and product development investments are substantial, resulting in few players in the industry. Consequently, procurement dynamics vary greatly between industries, such as those seen in IKEA compared to Volvo. Supply chains also differ significantly depending on the industry, whether it's pharmaceuticals, furniture like IKEA, or automotive."* (OEM 2)

4.1.2. Distinctive Standarts

We observed that "distinctive standarts" emerges as a significant concern from the interviewees' responds. Table 10 provides sample codes for a detailed breakdown of the second-order, and first-order codes associated with the distinctive standarts.

Table 10. Sample Codes of Distinctive Standarts

Second-Order Code	First-Order Code
Mistake intolerance	Consequences of mistakes as direct financial impacts
Just-in-time manufacturing and production constraints	Just-in-time manufacturing and constraints in adapting production changes to sales commitments.
Stringent standards with limited flexibility	Stringent standards with limited flexibility in compliance compared to other sectors.

A prominent issue that arose from the explanations of TS 1 was the direct financial cost of mistakes, particularly in a high-stakes industry like automotive, where tight standards and close interaction with OEMs are necessary.

> *""Absolutely, the cost of mistakes is very high; it directly translates into financial costs. That's why it's not a sector where making mistakes is acceptable because we work directly with OEMs."* (TS 1)

Similar to this differentiating aspect of this sector in comparison to others, tight compliance standards limit firms' capacity to depart from established norms, as detailed by TS 8 below.

> *"There are many standards in place, and you can't deviate from them too much. Because, yes, you're the one responsible for something, but at the end of the day, it could be Volkswagen that has to answer. So, you have to operate within certain standards. It's not like that in the food, electronics, or auditing sectors. It's not as standardized to this extent."* (TS 8)

These strict compliance standards were echoed by several respondents in the SSIs. Additionally, OEM 4 emphasized that how production changes are constrained by the sales commitments made in advance, making errors difficult.

> *"With assembly line production and more of a just-in-time approach, products are sold in advance, and the necessity of products arriving according to that sales*

commitment and date, actually, we can say that production changes are a bit more difficult." (OEM 4)

4.1.3. Product Complexity

SSIs reveal that “product complexity” emerges as a significant concern from the interviewees’ responds. Table 11 provides sample codes associated with these distinctive standarts for a detailed breakdown of the second-order, and first-order codes.

Table 11. Sample Codes of Product Complexity

Second-Order Code	First-Order Code
Complexity of items and product diversity	High item count and product differentiation compared to other sectors.
Variability and complexity of product offerings	High degree of product diversity and variability
Comprehensive product features and cost efficiency	Exceptional complexity at relatively low prices enabled by efficiency.
Extensive production volume and its effects on procurement	High production volume demands analysis, pricing, documentation, and strict qualification standards.

In line with the responds of the several interviewees, the need to manage thousands of parts for vehicle production, as highlighted by OEM 3, underscores the necessity to handle the broad product range and ensure seamless production. This complexity is further supported by TS 8, who points out that the degree of variation in product offerings in accordance with the customer demands adds another layer of complexity to the production process.

" As far as I've observed in the automotive sector, firstly, there are many more components than other industries. In other words, you need to use at least 1000 different parts to manufacture a car. In fact, due to the repetitive use of some parts, there are products with up to 10,000 parts. Because of this diverse product tree and the wide variety of products, there is also a great differentiation. So, you might be producing maybe 8, 10, or even 30 different vehicles from what I listed.

There is differentiation. Therefore, the number of items being tracked, the number of sub-details forming the product tree, is very high." (OEM 3)

"It's incredibly complex. Product variety, of course, varies, but it varies significantly." (TS 8)

The capacity to produce extremely complex cars at a reasonable cost illustrates the value of using common technology breakthroughs and skills throughout the SCs. This kind of efficiency in the face of substantial product complexity, as indicated by several interviewees, is made feasible by modern manufacturing technology and accumulated experience, as demonstrated by OEM 6.

"Within 1.3 tons, you're selling a product with incredible complexity, from the music system to the heating, cooling, upholstery, safety features, sheet metal, tires, engine, and so on. A ton of 1.3 tons, and you're selling it for $20,000; nothing in the world is this cheap. This is achieved with incredible efficiency. At every stage, from the supply chain to the performance of the aftermarket and internal production system, it's the result of incredible design, know-how, production technology, engineering, and accumulated knowledge." (OEM 6)

TS 6 goes on to reinforce these explanations by how high production quantities require precise planning and documentation, emphasizing the importance of coordinated efforts in efficiently managing large-scale production.

"The most prominent feature is the high volume of production compared to other sectors, excluding computer and electronic groups. This high volume reflects on suppliers, requiring extensive analysis, serious price evaluations, significant documentation, and qualification criteria for operational capabilities, which is the most distinctive characteristic." (TS 6)

4.1.4. Talent and Knowledge Acquisition

SSIs reveal that “talent and knowledge acquisition” is a key concern among the interviewees’ responds. Table 12 provides sample codes associated with this issue for a detailed breakdown of the second-order, and first-order codes.

Table 12. Sample Codes of Talent and Knowledge Acquisition

Second-Order Code	First-Order Code
Talent competition and workforce migration	Talent migration from established firms to new entrants intensifies workforce acquisition.
Learning from competitors and talent acquisition	Intense competition to learn from and seek to recruit talent from their competitors.

The quotations from several respondents illustrate the competition for talent and the strategic recruitment of skilled workers from competitors are a critical concern especially with the emergence of new entrants disrupting the established market dynamics. As indicated by OEM 4, the arrival of new enterprises has increased competition for talented individuals, resulting in a transfer of talent from older organizations.

> *"While Renault and Tofaş were leading companies, with the emergence of TOGG as a new brand, some of our colleagues, both white-collar and blue-collar workers, transitioned here, creating competition in terms of workforce acquisition."* (OEM 4)

Enterprises' fierce competition to learn from and hire outstanding personnel from their rivals further promoted by TS 5's explanations.

> *"A rival is a rival. You look to learn from them and steal talent from them. One of the points where competition is very fierce in general."* (TS 5)

4.2. Challenges and Barriers to Coopetitive Value Co-Creation Practices

We intensely observed in the responses that the implementation of CVC-C practices across the automotive SC is riddled with several barriers, notably owing to the intrinsic complexity of handling competitive pressures while striving for collaborative resilience. These tensions often result in reluctance to share critical information or intellectual property, with firms fearing that such exchanges could compromise their competitive advantage. SSIs revealed that this paradox of coopetition places a strain on communication, reluctance to share resources and

information, and decision-making processes, eventually hindering the full potential of CVC-C efforts.

Moreover, organizational and cultural differences further exacerbate these challenges as highlighted by several participants. These disparities are especially pronounced amongst organizations from various areas or organizational sizes, complicating the management of collaborative ventures and overcoming cross-cultural communication hurdles. Several interviewees pointed these cultural problems as significant hurdles, especially when working with partners who operate under different regulatory or market settings.

This study reveals that the “legal and regulatory constraints” also add another layer of complexity to CVC-C. The need for legal safeguards surrounding data protection, intellectual property, and antitrust compliance introduces additional hurdles that must be carefully managed. Legal frameworks that govern the sharing of sensitive information are often ambiguous when it comes to coopetition, and these ambiguities create a sense of uncertainty, further limiting full engagement. The participants often noted that legal consultations and negotiations consume considerable time and resources, detracting from the efficiency of their coopetitive efforts.

Additionally, technological adaptation and information-sharing barriers emerge as critical hurdles through SSIs. The rapid pace of technological change, coupled with varying levels of digital maturity among SC partners, often results in a fragmented approach to innovation and problem-solving. Respondents frequently remarked that companies are hesitant to share proprietary technologies or data platforms, fearing a loss of competitive edge, coupled with misaligned technological capabilities among partners represent a significant challenge to coopetitive practices.

The insights from these interviews revealed that the automotive industry must address these challenges to unlock the full potential of CVC-C. A focused approach to building trust, aligning organizational cultures, navigating legal frameworks, and advancing technological capabilities is necessary to mitigate these barriers and foster more effective collaboration among competitors.

The insights from these interviews reveal that these challenges mentioned above underscore the complexities of coopetition in practice. Evidentiary quotations, second-order codes, and categories identified under the theme of "Challenges and Barriers to CVC-C." are presented in Table 13.

Table 13. Sample Codes of Challenges and Barriers

#	Theme	Category	Second-Order Code	Evidentiary Quotation
1	Challenges and Barriers	Communication Issues	Communication barriers	"Communication problems are definitely a major issue. I believe it significantly slows down processes." (TS 8)
2	Challenges and Barriers	Communication Issues	Communication barriers due to diverse time zones	"The time zone in Turkey is different from Romania's. For example, our different production facility in Slovenia is also different from the one in France [...]." (OEM 1)
3	Challenges and Barriers	Cross-cultural and Organizational Issues	Disparities in corporate policies and practices	"[...] their (rival) company management policies are different from ours." (OEM 3)
4	Challenges and Barriers	Cross-cultural and Organizational Issues	Resistance to change stemming from cultural differences	"[...] You can't change a German's plan. If you mess with a German's plan, they lose it." (TS 7)
5	Challenges and Barriers	Information Sharing Issues	Reluctance to share valuable know-how	"Naturally, how are we going to give away our know-how or information for free." (TS 4)
6	Challenges and Barriers	Information Sharing Issues	Unfair prioritization based on biased information sharing	"[...] It can be an unfair process, such as not providing accurate information or prioritizing whoever has higher production criticality." (OEM 4)

Table 13 (Continued). Sample Codes of Challenges and Barriers

#	Theme	Category	Second-Order Code	Evidentiary Quotation
7	Challenges and Barriers	Information Sharing Issues	Lack of timely and reliable information	"[...] when there's a problem or a crisis, you need to receive accurate and reliable information. If you don't, that crisis will lead to something much bigger [...]." (TS 8)
8	Challenges and Barriers	Joint Decision-making Issues	Uncertainty in joint ventures on project allocation	"For Tofaş, in recent years, the uncertainty surrounding the Stellantis process and the lack of clarity in projects have created difficulties." (OEM 4)
9	Challenges and Barriers	Legal and Regulatory Issues	Antitrust regulations and market control prohibitions	" [...]Volvo Trucks wanted to acquire Scania before, but in the end, there is this antitrust law [...] We cannot merge and become a monopoly or share our prices with each other [...]." (OEM 2)
10	Challenges and Barriers	Legal and Regulatory Issues	Challenges in navigating competition laws	" [...] Communication becomes very difficult due to competition law [...]." (OEM 3)
11	Challenges and Barriers	Legal and Regulatory Issues	Governing legal constraints on collaborative efforts	"[...] within the OEM industry, there are strict laws and regulations on what you can collaborate on and not." (OEM 8)
12	Challenges and Barriers	Profitability and Quality Issues	Continuous development costs due to shortened product lifecycles	"[...] Now, with increasing competition [...] Every three or four years, they completely change the product. This also means a continuous product development cost." (OEM 3)

Table 13 (Continued). Sample Codes of Challenges and Barriers

#	Theme	Category	Second-Order Code	Evidentiary Quotation
13	Challenges and Barriers	Profitability and Quality Issues	Pricing misalignment and production line conflicts	“ [...] when we create a similar production line, now Coşkunöz's (rival firm) pricing strategy changes [...] If I try to produce this on Coşkunöz's line, or try to use the same thing, then other problems will start to arise." (TS 7)
14	Challenges and Barriers	Profitability and Quality Issues	High standard expectations with zero-error and low costs	"You need to maintain the same standard at high volumes with low cost...you also need to minimize errors to near zero [...]." (TS 4)
15	Challenges and Barriers	Resource Issues	Challenges in sourcing materials during crises	“ [...] shortages in the supply of raw materials, embargoes imposed due to wars in countries, and blockages in the supply chain." (TS 6)
16	Challenges and Barriers	Resource Issues	Sourcing challenge due to shipping delays	“ [...] during the steel crisis from the Far East, there were many problems in sourcing raw materials due to delays in ships and containers." (OEM 1)
17	Challenges and Barriers	Resource Issues	Disruption induced shipping issues	"[...]Excessive freight costs were experienced during these crisis situations, and due to extended lead times [...] products couldn't be delivered to the vehicles." (TS 6)
18	Challenges and Barriers	Technological Adaptation Issues	Market competition and electric vehicle penetration	"Electric vehicles becoming more popular and people leaning towards electric vehicles created competition indeed [...]." (OEM 4)

Table 13 (Continued). Sample Codes of Challenges and Barriers

#	Theme	Category	Second-Order Code	Evidentiary Quotation
19	Challenges and Barriers	Technological Adaptation Issues	Catching up the ever-growing demands and technological advancements	" [...] there are constantly evolving demands. In addition to this, there are the advancements brought by Industry 4.0, and the future of autonomous vehicles." (TS 2)
20	Challenges and Barriers	Workforce Capability and Mindset Issues	Decreasing availability of skilled labor	"[...] the problem coming from education, the number of people who can be employed in the industry is decreasing." (TS 6)
21	Challenges and Barriers	Workforce Capability and Mindset Issues	Egocentrism induced problems	"If one side (rivals) constantly claims 'I know best', it could lead to errors [...]." (OEM 1)

The following subheadings highlight “Challenges and barriers to CVC-C practices” based on the qualitative content analysis conducted through SSIs.

4.2.1. Communication Issues

The analysis of SSIs reveals that “communication isses” poses as a significant barrier to the implementation effective CVC-C. Table 14 provides sample codes associated with this challenge for a detailed breakdown of the second-order, and first-order codes.

Table 14. Sample Codes of Communication Issues

Second-Order Code	First-Order Code
Centrality of Communication challenges	Communication challenges as a root cause affecting every aspect of effective coopetitive initiatives
Communication barriers due to violation concerns	Communication avoidance as a barrier to potential collaborations due to concerns about competition compliance
Communication barriers due to diverse time zones	Coordination and communication challenges due to time zone complexities

The importance of communication in enabling efficient and successful collaboration among industry actors was underscored by several respondents. Therefore, communication issues are identified as a fundamental barrier to effective CVC-C practices in the automotive SC. OEM 2 highlights followingly that communication is the root cause of most problems, impacting every aspect of the SC, from product development to logistics.

> *"I think the root cause of every problem is communication. Wherever you touch, it starts with communication. Whether it’s product development, the supply chain, or logistics, communication is always at the core. Once you solve that, everything else follows."* (OEM 2)

These communication challenges, sometimes founded in coopetitive compliance, can lead to avoidance of communication, hindering possible collaboration. This hesitation to interact explicitly reduces the possibilities for information exchange and collaborative problem solving. As OEM 3 explains, businesses tend to avoid contact

in order to prevent potential breaches of competition rules, posing a huge hurdle to CVC-C initiatives.

> *"People prefer not to communicate at all to avoid doing anything that might violate competition. This, I think, somewhat hinders potential collaborations."* (OEM 3)

The communication issues, particularly those involving time zone disparities, were highly mentioned by the interviewees. We observed that this issue affects communication efforts since missing a vital meeting time might cause decision-making and operational delays. OEM 1 encompasses the problems of coordinating with partners in other areas, such as Europe and the Far East, where time zones make scheduling difficult to coordinate.

> *"When dealing with Europe, for example, you can have a nine-hour window for meetings, but when dealing with the Far East, you might have seven or six hours. During that time, you have to make your calls. If you can't make it, or if you have five hours, you might miss their working hours because they finish their shift."* (OEM 1)

4.2.2. Cross-cultural and Organizational Issues

The study reveals that "cultural and organizational issues" are substantial hurdles to collaboration, adaptability, and work consistency among multinational partners. Table 15 outlines the second, and first-order codes related to these challenges.

Table 15. Sample Codes of Cross-cultural and Organizational Issues

Second-Order Code	First-Order Code
Challenges in cross-cultural coopetition	Managing cultural differences and fostering collaboration between automotive companies from diverse backgrounds
Limited investment in cultural alignment	Limited investment in aligning organizational culture and vision.
Work ethics and cultural differences	Varied approaches to work completion by different cultures

Successful collaboration requires a mutual understanding and adaptation to the cultural disparities to foster a productive working relationship.Whereas, these cultural differences, as mentioned by interviewees, sometimes lead to misunderstandings and misalignments in work processes, affecting the overall efficiency and effectiveness of CVC-C efforts. Followingly, OEM 2 emphasizes the challenges that arise when companies from different cultural backgrounds attempt to work together.

> *"In such collaborations, a significant issue is cultural conflict, meaning, let's say you are forcing a Swedish company to work with a Japanese company, for example. There can be significant cultural differences there. Even within small Europe, between Germany and the Netherlands, there are incredible differences, let alone between Sweden and France, for example. So, there can be a very serious problem in terms of culture. Both sides need to learn how to work with each other."* (OEM 2)

Aligning corporate culture and vision in the automobile sector is frequently observed that it is hampered by insufficient expenditures in cultural alignment and strategic internalization initiatives. TS 3 points out that, while acknowledging the need for cultural structure changes, many businesses continue to confront challenges as a consequence of insufficient attempts to internalize these changes, resulting in continued impediments to cooperation and productivity.

> *"There is a point that constantly requires improvement. It's about the cultural structure, the stance of the company, the company's vision. These areas are truly very dynamic, and require significant energy for internalization. Moreover, the number of companies investing the necessary energy in these areas in today's corporate profiles is not very high. In this sense, these are obstacles, significant obstacles, and major barriers."* (TS 3)

These findings are supported by OEM 6's thorough reaction to these issues in how cultural expectations vary, with certain cultures taking a more flexible attitude to work hours, which can lead to differences in project timeframes and expectations.

"For example, a Japanese doesn't leave until the job is done. A European might say, 'My workday ends at five, we'll continue tomorrow, let it be like this.' Such things exist culturally." (OEM 6)

4.2.3. Information Sharing Issues

The findings indicate that "information sharing issues" are observed as critical challenge hindering the CVC-C practices. Table 16 presents the second, and first-order codes related to these issues.

Table 16. Sample Codes of Information Sharing Issues

Second-Order Code	First-Order Code
Balancing information sharing and confidentiality	Managing confidentiality levels in coopetitive initiatives while balancing information sharing and organizational privacy.
Risks associated with information leakage	Concerns about information sharing and the risk of information falling into the hands of competitors
Risk of sharing highly specific information	Reluctance to share product-specific information due to the perceived risk.

We observed that concerns about maintaining confidentiality and protecting proprietary information significantly hinder collaborative efforts. Respondents frequently mentioned a delicate balance in which organizations are sometimes unable to regulate the amount and type of information they offer to avoid jeopardizing their competitive edge. For instance, when companies enter partnerships, such as detailed by OEM 1, the level of information shared is restricted to production-related details only.

"Let me give you an example with Karsan, each time we establish a partnership, the level of information shared is limited to only what is required for production. Beyond that, confidentiality is strictly maintained because every company has its own unique information and data that cannot be compromised." (OEM 1)

Plus, the industry is highly aware of the hazards associated with information leaking to rivals, as emphasized by both TS 2 and TS 1. The reluctance to share

knowledge freely originates from a concern that rivals would use this information, producing a climate in which collaboration is addressed with caution.

"Actually, the biggest obstacle right now is this: information sharing, you know, the risk of information falling into the hands of competitors, is the most challenging and uncertain situation for all organizations." (TS 2)

"Absolutely, because it's a product-specific item, no one is willing to provide information on these details... because such information sharing on very specific matters is risky." (TS 1)

4.2.4. Joint Decision-making Issues

The analysis through SSIs reveals that "joint decision-making issues" are a substantial impediment to the automotive industry's competitive processes, affecting project allocation, communication, and the efficiency of collaborative efforts. The sample second and first-order codes associated with these issues are presented in Table 17.

Table 17. Sample Codes of Joint Decision-making Issues

Second-Order Code	First-Order Code
Conflict in determining project allocation	Disagreements among companies in model selection and project allocation.
Need for higher-level approvals and convincing large corporations	Need for approvals from higher-level management channels. Local management cannot independently propose collaboration with competitors.

Some respondents mentioned that joint decision-making challenges frequently develop when businesses seek to assign projects and define the models to be used across various organizations. The complexities of coordinating these choices, along with each entity's various interests and methods, can result in conflict and uncertainty. As emphasized by OEM 4, disagreements over project allocation and model prioritization cause stress among enterprises, impeding the pace of collaborative projects and making alignment difficult.

"I think determining the models among companies, determining which projects will be implemented in which firms, of course, creates conflict environments." (OEM 4)

We observed that higher-level approvals are frequently necessary for such projects, particularly in large businesses where local and corporate management may not always be in complete agreement. In line with the statements of OEM 4, OEM 6 exemplifies the bureaucratic hurdles that local management faces when seeking to propose collaborative projects.

"So, here in the local management of Toyota Turkey, we can't just go to Renault or Ford and propose collaboration. It needs to be handled through higher-level channels. And of course, since the companies are very large, there needs to be something significant to convince those channels." (OEM 6)

4.2.5. Legal and Regulatory Issues

The findings identify that "legal and regulatory issues" pose significant challenges hindering CVC-C practices. The sample second and first-order codes associated with these issues are presented in Table 18.

Table 18. Sample Codes of Legal and Regulatory Issues

Second-Order Code	First-Order Code
Challenges in navigating competition laws	Adherence to competition regulations and potential penalties in collaborative efforts
Lack of regulatory compliance information	Lack of information on legal issues leading to risk aversion and communication avoidance
Legal and regulatory limitations on ownership rights	Co-ownership requirements for production in China
Legal imposition of the requirement for a competitor partner	The demand for a French partner raises questions about its purpose, whether it's a covert clause or for brand protection, complicating collaboration.

We discoreved that legal compliance, particularly with competition laws, imposes constraints on firms, as any perceived violation can result in severe penalties. Respondents emphasized the need to ensure that organizations' collaboration do not

break anti-competitive legislation, which hinders collaborative project planning and implementation. For example, OEM 2 emphasizes the potential penalties connected with competition rules, emphasizing the significance of legal examination in any joint venture.

> *"For such collaborations to take place, competition is ultimately a very serious issue, and you can face very serious penalties. Firstly, it needs to pass through the competition board."* (OEM 2)

We discovered that this violation risk is triggered by a lack of clear legal information, further complicating organizations' decision-making processes. Companies that lack clarity or partial awareness of regulatory standards take an unduly cautious approach, restricting communication and information sharing in order to prevent potential infractions as emphasized by OEM 3 besides many other participants.

> *"Also, due to the incomplete knowledge or understanding of these laws, there may be some barriers such as taking a step on the very safe side to avoid violating them, like not engaging any communication."* (OEM 3)

Furthermore, this study reveals that region-specific restrictions constrain enterprises' flexibility in managing worldwide joint ventures. Strict ownership requirements and protective legal clauses limit corporations' control over joint initiatives, reducing their capacity to maximize competitive tactics in international marketplaces. OEM 6 exemplifies these constraints from China, while TS 2 shares comparable problems in France, stressing how such rules affect the form and administration of international relationships.

> *"You cannot produce in China unless 50% is owned by Chinese."* (OEM 6)

> *"However, a difficulty arose. It was said that in order for us to work with you, your company must have a French partner. What do they call this? Is it a secret clause? Or is it to protect their own brand, not just limited to the organization? The country legally preserves this process."* (TS 2)

4.2.6. Profitability and Quality Issues

The findings indicate that “profitability and quality” as one the major concerns pose a significant barrier to CVC-C practices. The sample second and first-order codes associated with these issues are presented in Table 19.

Table 19. Sample Codes of Profitability and Quality Issues

Second-Order Code	First-Order Code
Multifaceted investment needs amid profitability challenges	Navigating Euro 7 regulations and competition requires simultaneous investments despite profitability challenges.
Workload and cost pressures	Balancing component counts and stock levels demands close monitoring, adding workload and cost pressures.
Profitability challenges in high-volume production	High-volume production faces profitability challenges due to costly parts and budget constraints.
Zero-error expectations on production continuity	Significant costs incurred and efficiency losses due to interruptions, leading to dissatisfaction among customers.

We found that meeting legal expectations, such as complying with Euro 7 rules, requires companies to invest in numerous areas at the same time, putting a burden on profitability. These regulatory demands force firms to manage environmental compliance while maintaining competitiveness, creating barriers to seamless coopetitive initiatives as highlighted by OEM 2.

> *"Euro 7 is coming for both diesel and internal combustion engines. New fuel restrictions mean that ultimately we need to reduce carbon dioxide emissions. Automotive companies need to invest in multiple areas simultaneously. Profitability levels are already set, and because of intense competition in the market, they are going through a challenging period."* (OEM 2)

Additionally, several respondents mentioned that balancing component costs and stock levels adds further complexity to SCM, where companies have to continuously track their SCs to respond to varying needs; nevertheless, this requirement increases operating expenses and workload. OEM 3 describes the impact of such demands, demonstrating how they impede efficient cooperation by increasing operational burdens and complicating collaborative procedures.

"That is, you need to work with minimal stock. One of the difficulties and differences of the supply chain in automotive compared to other sectors is this. Therefore, closer monitoring requires more urgent action. This actually means a bit of both labor and cost burden, I think, is actually the biggest reason for the difficulty and fragility in the automotive industry." (OEM 3)

We observed that companies are further compelled to operate with thin margins due to budget restrictions, causing them to prioritize short-term profitability above long-term, sustainable competitive activities. TS 8 underlines how financial constraints prevent enterprises from fully engaging in competitive strategies, as the focus remains on immediate profits to ensure sustainability.

"The sector faces challenges due to high product volume and the associated costs. Despite individual products being more costly than standard items, financial constraints, particularly budget limitations, are critical. Calculations focus on how to profit from even a 0.01-dollar margin. Despite the minimal profit per unit, high demand ensures overall profitability when scaled. However, there's a limitation on exceeding the allocated budget." (TS 8)

Alongside the financial constraints, we observed severe financial and operational consequences of failing to meet stringent quality and delivery requirements in CVC-C practices. Even minor delays can result in considerable expenditures and missed sales opportunities, stressing the need of efficiency and precision in SC operations, as stated by OEM 7.

"I know that when a part was flown by helicopter to the factory in Bursa from Istanbul, the cost of renting the helicopter was 5,000 liras. While working at Renault, we were producing a car every minute, so every ten minutes of downtime essentially cost us ten cars because those were sold cars. Along with customer dissatisfaction, there is something terrible." (OEM 7)

4.2.7. Resource Issues

According to analysis of SSIs, "resource issues" are found to be the most prevalent obstacle hindering CVC-C practices. The sample second and first-order codes associated with these issues are presented in Table 20.

Table 20. Sample Codes of Resource Issues

Second-Order Code	First-Order Code
Sourcing related challenges due to Far East dependency	Dependency on a few suppliers in distant locations, leading to difficulties in sourcing materials.
Resource prioritization challenges	Governmental intervention on prioritization of resources in response to natural disasters
Challenges in sourcing materials during crises	Instances of facing difficulties in sourcing materials during crises, such as the pandemic and the Ukraine War.
Driver shortage related distribution difficulties	Pandemic-induced driver shortages as a factor affecting transit times, quality, and timing in product distribution.

We observed that these issues, which stem from reliance on global suppliers, logistical constraints, and resource allocation during crises, pose substantial risks for automotive firms. Many of the interviewees indicated that such dependencies impede sourcing efforts, especially during disruptions such as the semiconductor chip crisis and global pandemic-induced lockdowns, which generate delays and cost hikes exacerbated by driver scarcity as stated by TS 2 and OEM 3.

> *"The biggest challenge within the sector lies in its supply chain. Today, the main suppliers are in the Far East, namely China and Taiwan. For instance, in a chip crisis, we see how the inability to source chips for automobiles has impacted prices over the past two years." (TS 2)*

> *"Due to the size of the product, actually, distributing our product, which is a vehicle, has become an increasingly difficult activity in recent years, especially in terms of the supply chain. Driver problems have become effective in recent years, especially after the pandemic, with drivers turning to other jobs."* (OEM 3)

Recent geopolitical conflicts alonside the far-east dependencies, such as the Ukraine War, complicate collaborative activities. OEM 4 demonstrates how these geopolitical crises generate hurdles.

> *"During the pandemic period, we faced difficulties in sourcing materials, especially from Italy, due to the policy of many places. Similarly, in my previous workplace, we experienced challenges during the Ukraine War in sourcing parts from Ukraine." (OEM 4)*

This analysis also demonstrates that this issue is not confined to global uncertainty. Firms encounter issues when governmental involvement influences resource availability during these periods as seen in OEM 1's respond.

> *"The earthquake we experienced in the Southeastern Anatolia region affected us because sheet metal manufacturers usually place their orders every 6 or 8 weeks, and the process goes on like that. For example, in June and July, the local sheet metal manufacturers were pressured by the government to prioritize sending sheets to that region for container construction." (OEM 1)*

4.2.8. Technological Adaptation Issues

The analysis of SSIs reveals that "technological adaptation issues" are significant concerns for most of the participants when implementing collaborative efforts. The sample second and first-order codes associated with these issues are presented in Table 21.

Table 21. Sample Codes of Technological Adaptation Issues

Second-Order Code	First-Order Code
Challenges in adaptation to technological shifts	The shift to electronic components and varied powertrain options poses challenges for auto firms.
Challenges in adaptation to technological shifts	Challenges associated with the adoption of autonomous systems and emerging technologies
Technical discrepancies and incompatibilities	Product-specific technical differences causing incompatibility and compulsory maintenance recalls.

This study reveals that the transition from traditional mechanical components to modern electronic alternatives, such as battery-electric and self-driving systems, poses a significant challenge for businesses. The wide range of powertrain options, along with rapid technical improvements, puts significant pressure on automobile manufacturers to react quickly. Both OEM 2 and TS 8 identify these adaptation pressures as major difficulties.

> *"While there used to be more mechanical parts in the past, now it's entirely shifting towards electronic components. Therefore, there are various alternatives such as connectivity, autonomy, and powertrain options like battery-electric, fuel cell-electric, or hydrogen."* (OEM 2)

> *"I believe the biggest challenge is coping with technological advancements, as the industry progresses rapidly. Companies need to swiftly integrate these advancements into their production processes to remain efficient."* (TS 8)

Additionally, we discovered that product-specific technological disparities pose major barriers to cooperative endeavors, as seen by the difficulties encountered while cooperating on diverse vehicle systems. Even seemingly insignificant components, like gasoline filters, may become important areas of divergence across firms, necessitating costly redesigns and revisions to harmonize technology across brands, as highlighted by OEM 6 followingly.

> *"We had to recall the BMW motor three times. We recalled the cars, one month after production started, then two months, then three months later. It was all due to a single part, the fuel filter, which needed to be developed specifically for BMW engines because the fuel system in BMW is different from our Toyota fuel systems. In Toyota, we send it with positive pressure. We pressurize it from the fuel tank. Whereas in BMW, it's sucked in by the engine. So, there's a difference, and the fuel filter needs to be designed differently for that."* (OEM 6)

4.2.9. Workforce Capability and Mindset Issues

The findings indicate that “workforce capability and mindset issues” greatly impede CVC-C operations. The sample second and first-order codes associated with these issues are presented in Table 22.

Table 22. Sample Codes of Workforce Capability and Mindset Issues

Second-Order Code	First-Order Code
Workforce limitations and quality control issues	Workforce limitations result in difficulties in meeting production demands and addressing quality issues.
Challenges in collaborative efforts due to self-interest	Risk of collaboration breakdown due to companies' self-focused viewpoints.
Persistence of individualistic attitudes	The persistence of an individualistic mindset characterized by self-interest and competitiveness
Generational differences in collaborative mindset	Divergent approaches of different business generations in collaborative efforts.

Analysis reveals that the diminishing supply of trained personnel poses a significant challenge, particularly in terms of maintaining production quality and satisfying demand. Similar to the several pespondents, OEM 5 stresses how workforce restrictions lead to repeating mistakes and obstacles in addressing production issues.

> *"Some companies are unable to do something, they cannot meet the entirety, the workforce is not enough. Quality errors keep occurring incessantly. They are unable to overcome those problems."* (OEM 5)

Furthermore, we observed that the prevalence of individualistic and self-interest-focused mindsets among organizations hampers collaborative efforts. OEM 3 and TS 2 demonstrate how these viewpoints create a barrier to collaboration, as enterprises prioritize their own interests, lowering the transparency and trust required for competitive tactics.

> *"Companies' self-focused or self-interest-focused perspectives may disrupt this collaboration."* (OEM 3)

"Previously, everyone always had the mindset of 'me'. It still exists. The mindset of 'let me be, let me survive, let me sell, let my product be sold' never ends, anyway." (TS 2)

Aside from the ego-centric perspective, we observed that generational disparities create complexity and hinder CVC-C practices. As demostrated by TS 6, older generations are frequently less likely to exchange knowledge or invest in new technologies than younger generations, which influences organizations' desire to actively participate in competitive initiatives.

"Business owners born in the '50s and '60s don't move in the same direction as those born in the '80s and '90s, generally speaking. Businesses owned by individuals from the '80s and '90s are more inclined to share information because they understand that even if they don't share, they can obtain it from elsewhere in the technology age." (TS 6)

These findings show that addressing workforce limitations and mindset concerns is critical for successful collaborative ventures.

4.3. Drivers to Coopetitive Value Co-Creation Practices

The findings reveal that the industry leverages a variety of strategic drivers that promote CVC-C as well as industry-specific issues. Most recurrent driver identified in the interviews is the "*strategic coopetitive mindset*" through coopetition. Several Respondents higlighted that this motivation manifests when firms possess similar cultural and organizational structures show willingness to engage in collaborative efforts more than the others. Also, some of the respondents explained this attitude as the positive side effects of the existing successful examples of mergers. Collaborating with competitors is described as a win-win scenario in terms of collaboratively managing financial and technological burdens, gaining industry support, and ensuring collaborative competitiveness than battling against present mergers alone.

The analysis of the SSIs revealed that the pursuit of "*market expansion***"** also plays a vital role in fostering the CVC-C practices. By collaborating, companies access new markets and customer segments, diversifying opportunities and spreading risks. Respondents noted that these strategies minimize operational risks and optimize

resources, fostering resilience and sustainable growth. Alonside these motivations, "*production efficiency*" emerged as another significant driver through the interviews. As noted by respondents, organizations are motivated by cost savings, reduced mistakes, and improved overall production performance, which can only be achieved via effective resource utilization, knowledge transfer, and collaborative production methods.

This study reveals that these drivers illustrate the changing nature of competitive practices in the automobile industry, emphasizing the necessity of strategy alignment, production efficiency, market expansion, and a collaborative attitude as critical factors for CVC-C. Table 23 highlights the comprehensive observations, second-order codes, and categories related to the subject "Drivers of CVC-C Practices."

Table 23. Sample Codes of Drivers to CVC-C Practices

#	Theme	Category	Second-Order Code	Evidentiary Quotation
1	Drivers to CVC-C Practices	Strategic Coopetitive Mindset	Selective collaborative mindset	"[...] you continue with coopetitive firms (rivals) with whom you can create shared value." (TS 6)
2	Drivers to CVC-C Practices	Strategic Coopetitive Mindset	Impact of mergers on coopetitive initiatives	"[...] the process of mergers in some companies (rivals) led other firms not part of these groups to consider similar mergers." OEM 4
3	Drivers to CVC-C Practices	Strategic Coopetitive Mindset	Pragmatic approach in coopetition	“ [...] both sides approach each other more amicably because it's a win-win situation, ultimately resulting in collaboration, and both sides win.” (OEM 1)
4	Drivers to CVC-C Practices	Strategic Coopetitive Mindset	Mutual benefits and outcomes	“ .[...] I also run my brand with much lower costs according to their (rival) standards. In this way, they also sell a product in this market." (OEM 5)
5	Drivers to CVC-C Practices	Market Expansion	Utilizing a foreign market presence	"[...] being a product for overseas markets, we see it as a gain for our country. Directly selling abroad increases our exports." (OEM 4)
6	Drivers to CVC-C Practices	Production Efficiency	Collaborative advantage in producing error-free products	"Unlike us, they (rival) were able to produce flawless products, which we couldn't [...].they actually did what Rollmech couldn't.” (TS 8)
7	Drivers to CVC-C Practices	Production Efficiency	Production efficiency through sharing and optimization of resources.	" [...] you saved maintenance for at least a thousand of them [...] you're increasing efficiency by focusing on a single thing." (OEM 7)

Drivers to CVC-C Practices are identified in subheadings based on the qualitative content analysis conducted through SSIs.

4.3.1. Strategic Coopetitive Mindset

The detailed analysis of the SSIs reveals that the "strategic coopetitive mindset" is highlighted by several respondents as an important driver of CVC-C activities in the automotive SCs. The sample second and first-order codes associated with these motivations are presented in Table 24.

Table 24. Sample Codes of Strategic Coopetitive Mindset

Second-Order Code	First-Order Code
Inevitable collaboration for sectoral continuity	The competitor is seen as a supportive entity until the process is rebuilt for continuity.
Pragmatic approach in coopetition	Positive corporate culture encourages coopetitive practices for mutual gain during disruptions.
Mutually beneficial agreements	The agreement between rivals was not directly risky but rather lucrative and it prevented a significant investment.
Mutual benefits and brand enhancement	Coopetitive outcomes boost brand value and production, creating a win-win scenario.
Shared needs driving collaboration for mutual benefit	Collaboration aims to promote sustainability and benefit everyone equally.

This study reveals that companies recognize each other as potential collaborators rather than competitors, further joint efforts can build mutual support networks that enable both sides to achieve mutual benefits and ensure continuity within the industry. This openness and positive approach to collaboration allows firms to shift their focus from competition to cooperation, especially during challenging times as highlighted by TS 4 and OEM 1.

> *"Of course, Sectoral cooperation has a significant contribution to sectoral continuity. Though you may be competitors during a particular project, the other player who appears as a competitor during that process doesn't remain your competitor anymore because, later, this process is rebuilt; they become a*

supporter. I generally think about it from the perspective of sectoral continuity." (TS 4)

"In situations like this, both sides approach each other more amicably because it's a necessity. This ultimately results in collaboration, and both sides win." (OEM 1)

We observe that the majority of interviewees are encouraged by the mutually beneficial effects of CVC-C activities. Respondents emphasize that organizations may use their capabilities to produce better results by partnering on investments, lowering financial risks, and seeking mutually beneficial partnerships. OEM 6 and OEM 1 both stress the financial benefits of collaboration, showing how strategic partnerships may reduce unnecessary spending while enhancing operational efficiency. Furthermore, OEM 8 emphasizes these answers by emphasizing how collaboration in new technological projects, like as electrification, may enhance both sustainability and mutual success.

"It was an agreement that didn't directly pose a risk to BMW and was quite profitable. But as I said, Toyota accepted such an agreement because, in the end, it prevented a million-euro investment." (OEM 6)

"I think it has had a positive impact for both sides, Samsung and Renault, because people have started to see Samsung on the roads, and for Renault, every car produced is an added value, a contribution, the more you produce, the better it is for us; in my opinion, it can be a win-win operation for both sides." (OEM 1)

"I believe that the Traton Group and the AB Volvo Group, they saw that we all need an electrical charging infrastructure in Europe in order to do electrification. So they have even formed a company with one of the companies and promoting the other. So it's a common need, which is not hindering sustainability, of course. So that's a clear motivation, I would argue." (OEM 8)

These findings are pivotal in driving CVC-C practices. By leveraging these drivers, firms can enhance operational resilience, foster enhanced collaboration, and achieve co-created value within the automotive SC.

These findings reveal that a strategic coopetitive mindset, underpinned by mutually advantageous agreements, cost-saving partnerships, and shared aims, is a strong driver of CVC-C activities. Firms may use these tactics to decrease financial risks, save money on operations, and create mutual success in the automotive SC.

4.3.2. Market Expansion

The findings demostrate that “market expansion” emerges as a significant driver among the responses of the interviewees. Table 25 illustrates the second- and first-order codes related to market expansion.

Table 25. Sample Codes of Market Expansion

Second-Order Code	First-Order Code
Coopetitive brand strategy for market expansion	Utilizing Samsung branding for Renault-produced vehicles in the Far East Reanult facility to highlight brand identity in joint productions.
Coopetitive brand strategy for market expansion	Production of Peugeot Partner-class-like vehicles for Toyota with shared parts and minor visual modifications for the market existence in the EU.

The study reveals that the joint branding methods, which use multinational relationships and manufacturing synergies, enable organizations to enter new markets while preserving brand identity. As highlighted by OEM 1, utilization of local alliances for joint productions allows enterprises to tailor their products to localized markets while maintaining control over brand image.

> *"Renault’s production is also present in the Far East, but there are cars with the Samsung brand, not Renault, in the Far East. Under the Samsung brand, again, one of Renault’s products is from one of Renault’s subsidiaries, joint ventures with Samsung, but there, in South Korea, to highlight their own names, their own brands, there are cars under the Samsung brand."* (OEM 1)

Furthermore, collaborative brand strategies are identified by several respondents, in which corporations share manufacturing facilities and make small brand tweaks to

benefit each other's strengths in regional markets. OEM 6 exemplifies how this approach enabled the Japanese brand “Toyota” to enter the European market with Peugeot automobiles, filling a product gap and maximizing resources.

> *"Toyota does not have a product range like Doblo or Peugeot Partner in that class worldwide. It is a segment entirely developed for Europe and Europe-oriented. Toyota had a gap in our product offerings in this segment, and currently, Toyota-branded cars are still being produced on the Peugeot Partner line."* (OEM 6)

4.3.3. Product Efficiency

The analysis of qualitative content shows that "product efficiency" is a crucial motivator in the interviewees' responses. Table 26 illustrates the second and first-order codes for product efficiency.

Table 26. Sample Codes of Product Efficiency

Second-Order Code	First-Order Code
Reduction of errors and human intervention through know-how sharing	Transferring know-how and automating processes, leading to minimized errors and reduced human intervention.
Low-priced production related performance and quality concerns	Potential quality and performance issues due to low-priced production.

We observed through interviews that applying learned processes and optimizing production elements through collaborative designs across different car models reduces variation, streamline production, and increases efficiency. As illustrated by OEM 4 and OEM 7, this shared manufacturing technique reduces mistakes while also saving money by focusing on key parts and standardizing production.

> *"If there is a learned know-how in these systems, applying it to the other company actually automates processes, minimizes error levels, and minimizes the human factor. This will always provide an advantage for every company."* (OEM 4)

> *"In the same league, Clio, Micra, Mitsubishi's Delta, Renault Clio, and Dong Feng are all cars of the same width, okay? We take the cars on the variable band,*

lift them up in the air, and take them out. One variability is gone... you're increasing efficiency by focusing on a single thing." (OEM 7)

4.4. Coopetitive Value Co-Creation Practices

Based on the findings, collaborative relationships let organizations to pool resources, co-develop breakthrough technologies, and manage SC disruptions together. We observed that these coordinated efforts manifest in various forms such as information, know-how, and resource sharing alongside the joint ventures.

The study reveals that "knowledge sharing" is the most extensively utilized method within CVC-C. Respondents often highlight that sharing critical market, technological, and operational data with competitors enables businesses to streamline their production processes and minimize inefficiencies. The free flow of information promotes openness, allowing all stakeholders to alter their operations in reaction to fluctuations in demand or SC disruptions. In addition to this,“Know-how sharing” was another prominent practice mentioned by the interviewees, where firms collaborated on enhancing production techniques or addressing technological challenges, allowing for a faster innovation cycle.

Another important practice identified by the SSI analysis is "joint ventures," which are especially frequent in the development of innovative automotive technology. Respondents stated that companies frequently pool their resources to co-develop electrified and autonomous car technology. We observed that these partnerships not only reduce the financial burden associated with R&D costs but speed up time to market for new innovations. Additionally, “resource sharing” was highlighted by respondents as a critical practice, especially during SC disruptions. Companies utilize their unique resources by sharing manufacturing facilities, transportation networks, and even raw materials, assuring operational continuity in times of crisis.

This study reveals that these competitive practices are widely utilized by industry actors specifically in the face of uncertainties alongside the regular times. Table 27 highlights the detailed remarks, second-order codes, and categories related to the subject "CVC-C Practices."

Table 27. Sample Codes of CVC-C Practices

#	Theme	Category	Second-Order Code	Evidentiary Quotation
1	CVC-C Practices	Information Sharing	Sharing of knowledge and expertise	“ The TMS project, which we supported between Renault and Tofaş in previous years [...]Renault was benchmarking Tofaş." (OEM 4)
2	CVC-C Practices	Information Sharing	Information sharing through collaborative meetings	“ [...] We had such a meeting with them (rival) in the past, where their managers and our managers exchanged information, workflows, and so on." (TS 1)
3	CVC-C Practices	Joint Venture	Joint venture establishment through joint investment	" [...] in order to lower or share the risks and share the investments, AB Volvo and Daimler agreed on collaborating through a specific company.” (OEM 8)
4	CVC-C Practices	Joint Venture	Collaborative alliances and mergers	" There was a merger called an alliance. [...] Tofaş joins a larger, broader group called Stellantis, including many parts like Citroën." (OEM 4)
5	CVC-C Practices	Know-how Sharing	Strategic alliance for technological exchange	"We have a strategic alliance with Isuzu [...]they will use our technology for future heavy-duty offers." (OEM 2)
6	CVC-C Practices	Resource Sharing	Joint production facilities	“ [...] we (Ford) will have a collaboration with Volkswagen [...]So, there is actually collaboration in terms of product development.” (OEM 3)
7	CVC-C Practices	Resource Sharing	Joint production facilities	"[...] four companies, including ours which owned the branding, collaborated. These firms were also competitors." (TS 8)

CVC-C Practices are highlighted in subheadings based upon the qualitative content analysis performed using SSIs.

4.4.1. Information Sharing

The findings highlight that "information sharing" is a core practice for CVC-C within the automotive SC. Table 28 illustrates the second and first-order codes related to information sharing.

Table 28. Sample Codes of Information Sharing

Second-Order Code	First-Order Code
Best practice-sharing	Collaborative benchmarking and idea sharing among competitors for continuous improvement
Best practice-sharing	Strategic alliance among competitors in addressing quality issues and optimizing sales strategies in exchange.
Cross-company benchmarking for system applicability	Rivals benchmark projects for use in their own or competitors' systems.

Benchmarking and best practice-sharing emerged as critical components of this information exchange through the inquiry of the responses. We observed that businesses frequently benchmark their procedures and initiatives against those of their rivals to identify opportunities for improvement and innovation. By doing so, they leverage the expertise of their rivals to enhance their own operational capabilities. These companies not only exchange knowledge at a benchmark level, but they also actively participate in each other's processes through on-site visits, helping to raise internal standards by adopting successful techniques from rivals. Along with other participants, OEM 1 and OEM 4 highlighted how benchmarking initiatives allow organizations to learn from each other's systems, resulting in mutual gain and operational development.

> *"Ford, Hyundai, Toyota, Fiat are our competitors, yes, but no one avoids talking to each other as competitors. In fact, companies not only exchange advice on benchmark-level practices but also visit each other to exchange ideas on how well everyone is doing on a particular topic. We also host them to inspect a good idea we have, and they try to improve it on their side. Likewise, we collaborate with*

them to see how we can improve, and such collaborative efforts are ongoing between companies." (OEM 1)

"When there is a project or system that is not present in our company but exists in Ford, or vice versa, we support each other by benchmarking the applicability of that system within our own company or their system." (OEM 4)

Furthermore, this study reveals how organizations may work together not only to benchmark but also to co-create solutions that would be difficult to address individually. Both companies overcome considerable challenges with product quality and market strategy by exchanging expertise and tactics. As exemplified in detail by OEM 7, collaboration with rival firm enabled both companies to address long-standing quality issues by pooling their strengths.

"When we formed an alliance with Nissan, we discovered that the faulty car variations in our line took more than three months to be resolved at Nissan. But Nissan was struggling, you see? [...] When we joined forces, although Nissan had high-quality cars, they couldn't sell them, so what we did with Nissan was to learn about process improvements or problems that didn't move to n+1, and we provided them with sales strategies, but it doesn't work without a real partnership." (OEM 7)

These findings illustrate that by exchanging insights and best practices, auto makers may boost their operational resilience and improve product standards, emphasizing the importance of shared knowledge in solving industry challenges.

4.4.2. Joint Venture

The findings reveal that "joint venture" is frequently utilized practice among the SC actors. Table 29 illustrates the second and first-order codes associated with this practice.

Table 29. Sample Codes of Joint Venture

Second-Order Code	First-Order Code
Joint venture establishment through joint investment	Collaborative ventures amidst industry transformation for shared investment in new technologies
Joint venture establishment through joint investment	Collaborative venture to collectively address challenges in lithium-ion battery production.
Joint production facilities	Co-owned plant with dual production lines, each serving both companies, led by joint coordinators.

The analysis of the interviews revealed that joint ventures play a critical role in tackling large-scale projects, such as the development of electric vehicle infrastructure, fuel cells, and battery production. Collaborating on these large investments allows companies to distribute the financial burden and fast-track the introduction of new technologies into the market as emphasized by OEM 2 and OEM 7 followingly.

> *"...for example, there is currently collaboration. In terms of fuel cells or charging stations, Daimler, The Traton Group, and Volvo, the three largest competitors in Europe, have come together to establish Cell Centric. So, they are currently working together on the fuel cell side. Because it is a period of complete transformation right now, it requires very large investments. Therefore, these three major companies are investing together in this area in Europe."* (OEM 2)

> *"We're diving into production. Battery, the battery business is one where currently, the nose is in the clouds for battery manufacturers. In this Li-Ion battery realm, there's a consortium of battery producers, with 25% being Chinese, Northvolt, which is Swedish at the same time, and a triple consortium consisting of Chinese, Swedish, and three German companies. So, you're compelled because the battery business is something entirely different. We're doing this in battery production."* (OEM 7)

We observed that another critical area where joint ventures have proven effective is in production facilities. Firms are building joint production lines to produce automobiles, particularly in sectors that need large investment or where production quantities are insufficient for individual enterprises to manage individually, as

emphasized by OEM 6. These joint production ventures enable enterprises to maximize manufacturing efficiency by using each company's knowledge while spreading the related risks and expenses.

> *"There's a Toyota-Mazda plant established in the United States a few years ago. It has two lines, one producing Toyota vehicles, specifically the Corolla Cross, and the other producing Mazda SUVs. The management team includes coordinators from both Mazda and Toyota."* (OEM 6)

These findings demonstrate that joint ventures enable enterprises to maximize manufacturing efficiency by using each company's knowledge while spreading the related risks and expenses.

4.4.3. Know-how Sharing

The analysis of SSIs reveals that " know-how sharing" is widely utilized practice within CVC-C. Table 30 illustrates the second and first-order codes for this practice.

Table 30. Sample Codes of Know-how Sharing

Second-Order Code	First-Order Code
Know-how sharing for Different/New Product Development	A strategic partnership between Ford and Volkswagen for joint product development.
Know-how sharing for Different/New Product Development	Collaboration with mask manufacturers supports know-how transfer, coordination, and training for new products.

We observed that know-how sharing enables companies to leverage each other's expertise to develop new products and improve processes. Several respondents noted that this practice allows firms to benefit from their competitors' advancements, thereby accelerating innovation and improving overall industry standards, especially when entering new product lines or manufacturing processes. In line with these statements, both OEM 3 and OEM 1 emphasized how know-how sharing facilitated product development and process optimization by enabling companies to draw on each other’s technical expertise and resources.

"You know, we will have a collaboration with Volkswagen. We will produce a vehicle together here in Kocaeli. In the product development phase, they are developing some of our products, and we are developing some products on their behalf. So, there is actually collaboration in terms of product development." (OEM 3)

"By collaborating with mask manufacturing companies, we obtained know-how on how the production is done, because we hadn't previously made such a product. By taking know-how from the manufacturer, receiving support from them on how it is made, and by sharing information about the necessary parts for this product, we ensured successful production." (OEM 1)

These findings demonstrate that know-how sharing prospers CVC-C by allowing firms to enhance their product development processes and address new market challenges.

4.4.4. Resource Sharing

The analysis of the SSIs reveals that "resource sharing" is recognized by several respondents as the most common CVC-C activity among the SC actors. The sample second and first-order codes associated with this practice are presented in Table 31.

Table 31. Sample Codes of Resource Sharing

Second-Order Code	First-Order Code
Resource exchange for uninterrupted production	Shipping delays prompt rivals to temporarily borrow raw materials to prevent production halts.
Material supply collaboration during unexpected events	Despite the disruption closure, the company maintained material supply by collaborating with competitors.
Joint production facilities	Production of Peugeot Partner-class vehicles for Toyota as the Proace model, featuring shared parts and minor visual changes.
Production optimization through resource pooling	Coopetitive production optimization through reciprocal manufacturing agreements and resource pooling.
Joint engine development and sourcing	Collaboration for sourcing engines from the competitor and participating in their development.

We observed that resource sharing manifests in collaborating on the usage of raw materials, infrastructure, and technological knowledge. The respondents highlighted that sharing both operand and operant resources is highly beneficial in managing unexpected SC disruptions and production challenges. As highlighted by OEM 1 and TS 4, this activity helps companies maintain production continuity by borrowing or exchanging materials and parts during crises or supply shortages.

> *"They lent us 10 tons of material, and with that 10 tons of raw material, we carried out our granular production without stopping the lines. As soon as our shipment arrived, we immediately passed on the product we received to our business partner, the raw material we borrowed."* (OEM 1)

> *"There was a major accident at a French steel company's foundry in Europe. Due to this accident, the French government shut down the foundry for investigation, and they remained closed for 6-8 months. These were one of the largest companies in the world. However, during this period, they continued material supply, as their competitors provided materials to them."* (TS 4)

In addition to these statements, OEM 7' response revealed how firms collaborate to exchange critical parts, and technological knowledge while leveraging rival's technology developments to produce those components that meet their own requirements.

> *"We acquire engines from BMW, including various versions such as V6 and V8, tailored to our specifications. The design of our front cockpit is aligned with these engines. Additionally, we have involvement in the development phase of these engines. We commit to purchasing 150,000 units annually from BMW, showcasing a collaborative approach in the industry despite being competitors."* (OEM 7)

Furthermore, findings reveal that utilizing joint production facilities emerges as an effective kind of resource sharing in which firms share industrial infrastructure to improve production efficiency and save costs. This collaborative effort helps organizations reach their production goals while keeping prices down. Both OEM 6

and OEM 1 illustrates how shared facilities allow firms to produce different vehicle models by sharing resources, while still retaining their competitive edge.

> *"Toyota does not have a product range like Doblo or Peugeot Partner in that class worldwide. It is a segment entirely developed for Europe and Europe-oriented. Toyota had a gap in our product offerings in this segment, and currently, Toyota-branded cars are still being produced on the Peugeot Partner line. Toyota Proace, sold in both Europe and Turkey, is essentially Peugeot-made, with only minor cosmetic changes. They are produced in the Peugeot factory but come out with Toyota branding, featuring the Toyota emblem."* (OEM 6)

> *"We shifted the production of Renault Megane to Karsan. For the vacancies opened up on our lines, for the past two or three months, we have been producing Mitsubishi Colt in that gap. Yes, in the coming period, we will also produce different vehicles, but this border could be a perfect example of this. With Mitsubishi, we are actually like rivals, but both in terms of market and sales points, different vehicles, different, how should I say, are preferred in countries, so if the Renault Megane, Renault Clio goes to one region, then the Mitsubishi Colt goes to another region. Such a production agreement was made, and both in Mitsubishi and our side, both opening new projects and making room on their lines, and by producing two similar vehicles in the same production facility, optimization was achieved. Price, production cost, labor, quality, and since they are similar cars, costs were minimized and production started in our factory."* (OEM 1)

4.5. Impacts of Coopetitive Value Co-Creation

The analysis of the SSIs demostrates that the aforementioned CVC-C practices have a variety of consecuences, the most notable of which are information sharing, trust building, and long-term sustainability, all of which contribute to the SC's overall robustness and agility.

One of the most prominent impacts identified through the interviews is the “improved information sharing” between competitors. Respondents highlighted that well balanced and effective collaborative efforts among rival firms consecuently enables more agile and responsive SCM. The information sharing that takes place as a

result of these collaborative efforts not only improves operational coordination but also promotes a sense of mutual dependence, with each party benefiting from the combined pool of knowledge and data.

Additionally, we observed that “improved trust building” emerges as a critical impact of CVC-C practices. While establishing trust among rivals might be difficult, research revealed that constant collaboration, whether in joint projects, resource-sharing agreements, or co-development activities, helps to generate and consolidate trust. This trust is critical for building long-term partnerships and limiting the hazards associated with opportunistic conduct. The majority of participants indicated that when enterprises participate in repeated successful cooperative initiatives, early apprehensions give way to a deeper degree of confidence and dependability, which strengthens the overall SC network.

This study further reveals that the pursuit of “industrial sustainability” has been considerably affected by collaborative activities. As unforeseen disruptions tighten and operational difficulties are exacerbated by the fluctuations, automakers are increasingly collaborating to solve these problems. Respondents frequently emphasized that collaborative efforts to achieve ultimate sustainability in operations and manufacturing not only minimize the financial and technological burdens associated with innovation, but also position the industry as a whole to meet global environmental norms.

In summary, the findings of this study are critical in ensuring that automotive SCs remain resilient, adaptable, and capable of satisfying market and environmental demands. These impacts will be thoroughly explained in the following section. Table 32 demonstrates extensive descriptions, second-order codes, and categories related to specific outcomes of CVC-C practices.

Table 32. Sample Codes of Impacts of CVC-C

#	Theme	Category	Second-Order Code	Evidentiary Quotation
1	Impacts of Coopetitive VCC	Improved Information sharing	Enhanced trust and information sharing through close relations	“ [...] Ermetal is a company we like, and they like us [...] We say, 'Come on, buddy, let us explain it to you.' You can benchmark there." (TS 7)
2	Impacts of Coopetitive VCC	Improved Trust Building	Enhanced trust through direct interaction and legal agreements	"[...] agreements are signed after face-to-face (environment of trust) meetings in competitive environments or partnerships." (OEM 1)
3	Impacts of Coopetitive VCC	Industrial Sustainability	Resource allocation for operational continuity	"[...] it provided us with the opportunity to continue production on the customer's lines without interruption." (TS 5)
4	Impacts of Coopetitive VCC	Industrial Sustainability	Diversification of market opportunities for sectoral continuity	"[...] in the chip crisis, for example, the defense industry became a lifeline for companies working in the automotive sector." (TS 6)

4.5.1. Improved Information Sharing

Considering the detailed analysis of the interviews, “improved information sharing” emerges as one of the key impacts of CVC-C. Table 33 outlines the second and first-order codes related to improved information sharing.

Table 33. Sample Codes of Improved Information Sharing

Second-Order Code	First-Order Code
Enhanced information sharing through direct interaction	Face-to-face meetings and production site visits facilitate mutual understanding of production processes.
Improved relationships and information sharing in online meetings	Online meetings during the pandemic fostered closer relationships and improved information sharing.
Increased information sharing through collaborative efforts	Evolving practices and improving communication lead to increased information sharing among companies.

The content analysis revealed that face-to-face meetings and site visits are critical to this process. Through these interactions, interviewees mentioned that businesses better understand one another's manufacturing methods, which is essential for enhancing efficiency and teamwork. This expands our understanding of how businesses can more effectively coordinate their workflows and improve information exchange by physically monitoring how various operations are managed. Followed by several others, OEM 1 underlined how crucial personal interactions are to enhance the information sharing capacity.

> *"During the agreements with Karsan, of course, online meetings were held, but we also had face-to-face visits to each other. There were meetings and face-to-face discussions both from Oyak Renault's side and from Karsan's side, visits to the production lines. We gained an idea of how the other side visited the production lines. Both sides visiting each other's production lines, we call it 'post' in our terminology, seeing the areas where parts are made, the appearance of those posts, the layout of the parts, warehousing, we experienced these mutual logistics. I can give examples of these. Field visits are important. I believe these can be effective."* (OEM 1)

Additionally, the SSIs have given us a detailed understanding of how the recent disruptions have led to a shift towards online meetings and, despite the challenges, have improved knowledge sharing in new and unexpected ways. The quality of information exchanged during meetings has improved as a result of businesses embracing remote work and establishing more intimate, casual interactions that promote greater transparency and trust. Supporting these findings, OEM 7 pointed out how virtual meetings built stronger personal connections, which contributed to better information sharing.

> *"When online meetings related to work began, everyone shared small snippets from their homes, like a child barging in, someone wearing pajamas, background noise from a pet, or a cat walking on the mouse or keyboard. It was said that these incidents led to more intimate and heartfelt meetings. Nobody knew how to handle the pandemic, so we found the right way through trial and error. According to what was said, many genuine relationships were built during that time, which I believe applies to my meetings as well."* (OEM 7)

Furthermore, we observed that as collaborative efforts increase among the industry players, companies are encouraged to share more data and insights, which helps them better prepare for challenges and disruptions. TS 6 demonstrated how improved communication and changing procedures result in more information sharing, which strengthens the SC's overall resilience.

> *"As practices evolve and vertical and horizontal collaborations develop, communication increases, resulting in increased sharing among companies, thereby positively affecting the resilience of the supply chain."* (TS 6)

These findings demonstrate that the efficacy and efficiency of interactions between SC partners rise in parallel with increased business collaboration. This boost in overall resilience enables firms to better coordinate their processes and react to problems more quickly. The SC collaborates more easily as a result of more direct and digital information sharing.

4.5.2. Improved Trust Building

The content analysis of the interviews highlighted that “improved trust building” is a significant outcome of the CVC-C processes. Table 34 outlines the second, and first-order codes related to improved trust building.

Table 34. Sample Codes of Improved Trust Building

Second-Order Code	First-Order Code
Enhanced trust and information sharing through close relations	Personal relationships facilitate mutual trust and information sharing through benchmarking.
Enhanced trust through direct interaction and legal agreements	Face-to-face interactions and legal agreements play crucial role in fostering mutual trust.
Trust building within contractual frameworks	Creation of a trust environment through contractual agreements in horizontal collaborations.

Inevitably the process of CVC-C brings rivals closer, as their shared goals require them to rely on each other’s strengths. Over time, this reliance fosters a deeper level of trust, which further enhances collaboration as these rival firms, through repeated collaborative efforts, begin to trust each other’s capabilities, fostering mutual respect. TS 7 highlighted how trust among rivals grows more genuinely when relationships are developed through collaborative practices like benchmarking.

> *"Depending on the relationship with rival firms, it gets a bit specific. Let me put it this way, Beyçelik has a board of directors. Let's say, for example, Ermetal is a company we like, and they like us, the bosses are friends... When Ermetal asks us, let's say, 'Hey, how do you manage warehouse logistics? How does addressing work in the warehouse?' We say, 'Come on, buddy, let us explain it to you.' You can benchmark there."* (TS 7)

Alongside the deep relationship-based trust, we observed that when opponents work together under clear and formal agreements, a sense of trust is naturally inherited as a key result of these contractual frameworks. OEM 1 emphasized that formalizing trust through contracts provides an atmosphere where both parties can function confidently, knowing that their common interests are safeguarded. This response is further supported by OEM 3’s explanations.

"Online meetings may not be as effective as face-to-face meetings. Seeing each other in person, you know, in those mutual human relationships, even shaking hands can signify a lot of things, it can even show mutual trust, maybe it can highlight trust, I think. Moreover, in the work done, since partnerships are formed, this is also addressed at the legal level for both parties. As long as there is a legal agreement, both parties will move in a more secure manner." OEM 1

"Horizontally, maybe there aren't many examples with the companies we collaborate with, as I said, but a trust environment is established within the framework of agreements." (OEM 3)

4.5.3. Industrial Sustainability

The results of the coding process revals that "industrial sustainability" is the foremost outcome of CVC-C practices. Table 35 illustrates the sample of second and first-order codes linked with this outcome.

Table 35. Sample Codes of Industrial Sustainability

Second-Order Code	First-Order Code
Interconnected benefits leveraging industrial sustainability	Interconnected benefits driving production and economic value.
Long-term sustainability beyond project completion	Sustained profitability through production and spare parts support.
Positive outcomes of continuous operations and localization	Continuous operations and engagement in localization make stronger and enable more investments.

As companies collaborate through coopetitive practices, their combined efforts often create a ripple effect that influences various aspects of their operations, including production stability, workforce retention, and broader economic contributions. These collaborations not only benefit the companies involved but also have a wider impact on the industry by promoting long-term sustainability. The positive outcomes of these efforts are not confined to the duration of the project; rather, they continue to add value well into the future, particularly through ongoing support services such as after-sales and spare parts management. OEM 1 and OEM 4 both pointed out that the impacts of

these coopetitive engagements extend beyond the initial project, ensuring profitability and operational resilience over the long term.

> *"...production continuity, continuity of workforce, contribution to the country's economy, all of these actually continue one after the other like dominoes, they affect each other. As they are piled on top of each other, they all create another added value, frankly."* (OEM 1)

> *"During this process, profits are generated through production. Then there is the spare parts process. After the production project is completed, support and value creation actually continue in the spare parts section for the next 10 years. This is not just within the project scope; it also means value creation for after-sales, which again translates to profitability."* (OEM 4)

Moreover, we observed that continuous operations and engagement in localization efforts help strengthen industrial sustainability by reducing reliance on foreign suppliers and ensuring the resilience of the automotive SCs. These localized efforts not only make companies more independent but also allow them to reinvest in their operations, further contributing to sustainability. TS 6 pointed out how localization, particularly in countries like Turkey, enhances the overall resilience of the SC and makes companies more competitive in the long term.

> *"As the company continues its operations, it strengthens itself and makes further investments. Therefore, in Turkey, for example, if there is a procurement from a foreign supplier for a project in the main industry of fastener production, you act diligently to localize it immediately. Hence, this enhances the resilience of the supply chain."* (TS 6)

4.6. Strategies and Resilience Capabilities for CVC-C

The SSIs allowed for a comprehensive evaluation of the participants' knowledge and expertise about strategies and resilience capabilities that enable addressing the obstacles of CVC. These strategies and resilience capabilities are identified to answer the fourth research question.

Throughout the coding process of interviews, several novel and effective strategies were identified, with some mentioned more frequently, underscoring their critical role in enabling both collaboration and resilience in this highly competitive industry. One of the most frequently highlighted strategy by the respondents was "structured information sharing governance". We observed that this approach is essential for overcoming legal and operational challenges related to the secure exchange of sensitive information. Respondents emphasized that establishing clear governance protocols helps mitigate the risks of opportunistic behavior and ensures transparency in data sharing. By creating formalized structures for information exchange, firms are able to collaborate more openly without compromising their competitive advantages. This governance framework is particularly effective in reducing the communication barriers that often hinder CVC-C initiatives.

"Awareness of cultural diversity" was another strategy that respondents frequently mentioned as crucial for navigating cross-cultural and organizational barriers. In global SCs, misaligned cultural expectations can lead to conflicts and miscommunications, making collaboration difficult. Respondents emphasized that fostering an understanding of cultural differences helps firms align their operational goals and work practices. By promoting cultural awareness, companies can better navigate diverse partnerships and enhance the quality of their coopetitive collaborations.

In addition to these two strategies, other approaches such as "adaptive communication" and "relationship building" were noted as important for maintaining open channels of communication and fostering trust among competitors. Several respondents highlighted that adaptive communication allows firms to remain flexible in their interactions, ensuring that they can continue to collaborate even when competitive pressures are high. Meanwhile, strong relationships built on trust enable long-term cooperation, which is essential for mitigating the risks associated with coopetition.

This study also contributes that flexibility was one of the most frequently cited factors that help firms address SC disruptions in terms of resilience capabilities. Flexibility allows companies to adjust their operations quickly in response to challenges such as supply shortages or geopolitical crises. Respondents stressed that flexible decision-making and production processes are vital for maintaining operational continuity, particularly when external disruptions threaten business as

usual. Agility and trust were also emphasized as essential capabilities that work in tandem to support overall resilience. Agility allows firms to rapidly reconfigure their SC operations in response to market changes or crises, ensuring that collaborative efforts are not compromised. This capability supports quick decision-making and operational adjustments, helping firms stay competitive in dynamic environments. Simultaneously, trust serves as the foundation of resilience in coopetitive relationships. It fosters deeper collaboration by reducing fears of opportunistic behavior and enabling open resource and information sharing. Trust-based relationships lead to stronger, more reliable partnerships, which are critical for the long-term success of CVC-C.

This study consequently reveals that these elements collectively improve the adaptability and resilience of automotive SC enterprises, helping them to overcome obstacles and survive in a dynamic and frequently unexpected market environment. The following subsections will provide a thorough review of these strategies and capabilities. Table 36 presents the specific notices, second-order codes, and categories related to the subject "Strategies and Resilience Capabilities for CVC-C."

Table 36. Sample Codes of Strategies and Resilience Capabilities for CVC-C

#	Theme	Category	Second-Order Code	Evidentiary Quotation
1	Strategies & Resilience Capabilities for CVC-C	Adaptive Communication Strategies	Communication and contingency planning	“ There are WhatsApp groups, and on WhatsApp, there's someone on duty, because there are time differences [...]” (OEM 1)
2	Strategies & Resilience Capabilities for CVC-C	Adaptive communication strategies	Industry-specific gatherings for information sharing	"Absolutely, there should be industry-specific summits where people from various sectors come together.” (TS 8)
3	Strategies & Resilience Capabilities for CVC-C	Awareness of Cultural Diversity	Embracing Cultural Diversity	“ Everyone needs to be able to create an embracing environment for each other. I think this is the most important thing in any collaboration.” (OEM 2)
4	Strategies & Resilience Capabilities for CVC-C	Awareness of Cultural Diversity	Adapting work practices to fit cultural differences	" If a Japanese person needs to work 18 hours, they do. But they don't ask the Arab person there to come and work with them." (OEM 6)
5	Strategies & Resilience Capabilities for CVC-C	Legal and regulatory compliance management	Compliance with rules and regulations	“ [...] there needs to be a very serious awareness and serious training provided to people who will be involved in this collaboration. Because there are very serious audits in competition.” (OEM 2)
6	Strategies & Resilience Capabilities for CVC-C	Relationship-building	Interpersonal Communication and Relationship Establishment	"[...] I think the first thing you need to do is establish that personal relationship.” OEM 2
7	Strategies & Resilience Capabilities for CVC-C	Structured Information-Sharing Governance	Implementation of confidentiality agreements	“ But now there are confidentiality agreements. " (TS 2)

Table 36 (Continued). Sample Codes of Strategies and Resilience Capabilities for CVC-C

#	Theme	Category	Second-Order Code	Evidentiary Quotation
8	Strategies & Resilience Capabilities for CVC-C	Structured Information-Sharing Governance	Protecting critical information with limited sharing.	“ Certain information is shared to a certain extent.” (OEM 6)
9	Strategies & Resilience Capabilities for CVC-C	Agility	Agility as one of the strongest suits.	"Our strongest suit in that regard [...] is flexibility and agility." (TS 7)
10	Strategies & Resilience Capabilities for CVC-C	Collaboration	Situational importance of the collaboration	“ [...] in a major crisis, as happened to the French company, you have to use collaboration." (TS 4)
11	Strategies & Resilience Capabilities for CVC-C	Flexibility	Flexibility in contingency planning	"Well, here, I can say flexibility [...]” (TS 6)
12	Strategies & Resilience Capabilities for CVC-C	Trust	Trust ensuring production continuity	“ I think the most important thing here is open communication and trust." (OEM 2)

4.6.1. Adaptive Communication Strategies

Adaptive communication as a novel strategy is observed through the analysis that it is frequently utilized by the indusrty players for effective collaboration. Table 37 outlines the detailed second, and first-order codes related to adaptive communication strategies.

Table 37. Sample Codes of Adaptive Communication Strategies

Second-Order Code	First-Order Code
Utilization of various communication channels	Multi-channel communication and role clarification for effective collaboration in managing conflicts.
Collaborative problem-solving	Importance of intensive communication for finding common solutions
Using shared information platforms for mutual benefits	Companies should unite and support each other through a shared data platform, rather than compete.

The results of the analysis reveal that companies often employ a multi-channel approach to maintain consistent communication, allowing them to coordinate and resolve issues in a timely manner. In detail, various platforms, such as social media, emails, and phone calls, are utilized to facilitate this communication, especially during time-sensitive operations. Thus, these tools enable actors to stay connected, clarify roles, and take immediate action when necessary, as highlighted by OEM 1 followingly.

> *"Especially, we try to resolve them through meetings, we also have meetings through Teams or via the internet, we also do it through phone calls, there are also a lot of correspondences through emails, and in there, all relevant parties, actors are specified with their duties after the meeting, and everyone knows their role, they need to act accordingly, everyone participates in the next meeting prepared or provides feedback related to their action. But we mostly use email and online meetings."* (OEM 1)

In addition, utilization of intensive communication is particularly observed as this approach is crucial when companies collaborate on finding solutions to common problems. As explained by OEM 3, maintaining consistent, open communication helps

organizations to address challenges more effectively and to coordinate their actions efficiently.

> *"As employees, our perspective is always that there is a problem and we need to solve it. Therefore, in the company where we collaborate, there are similar employees there too. So, a common solution is found, but it requires communication. I can say that it is resolved through intense communication."* (OEM 3)

Furthermore, some interviewees point out that firms can utilize shared data platforms to unite on common ground, promoting mutual benefits. Through this process, organizations can access each other's data and expertise, which leads to a more collaborative approach to addressing industry challenges. TS 2 highlighted the importance of these platforms in creating shared opportunities for growth and innovation. Also, by expanding the accessibility of these data-sharing platforms, companies allow qualified individuals and teams to engage directly with critical information. We observed that this sharing of both operand (resources such as data) and operant (skills and expertise) sources fosters a collaborative environment that strengthens collective problem-solving capabilities.

> *"Rather than competing and trying to eliminate each other, it's beneficial to come together on common ground and support each other through a shared data platform. Because that's where the world is heading now. No one can act alone in a specific field anymore. Apart from that, especially when it comes to the automotive sector, each organization inevitably needs information and data from other organizations."* (TS 2)

These findings underscore the importance of employing various communication platforms is essential for efficiently resolving disagreements and coordinating collaborative tasks. Companies that rely on constant and vigorous communication may guarantee that challenges are solved collectively, resulting in more efficient and effective solutions.

4.6.2. Awareness of Cultural Diversity

Awareness of Cultural Diversity, which is one of the novel strategies identified by this study, emerges as a critical approach for ensuring smooth CVC-C processes among rivals from diferent cultures. This novel strategy is particularly supported by the findings of the study. Table 38 followingly details this strategy's second and first-order codes:

Table 38. Sample Codes of Awareness of Cultural Diversity

Second-Order Code	First-Order Code
Cross-cultural understanding and conflict prevention	Cultural training and awareness programs to improve understanding and reduce cultural conflicts.
Compliance and respect for cultural differences	Prioritizing respect for local culture, even if it extends the process.
Compliance and respect for cultural differences	Managing holiday differences like Christmas and Ramadan by accommodating diverse cultural practices.

One of the key challenges companies face in coopetitive engagements is navigating cultural differences between partners from different regions or countries as evidenced by the findings of this study. To address this, we observed that firms implement various cultural training and awareness programs to help understand and respect each other's customs and working habits. In line with these findings, OEM 2 emphasized the significance of such programs, noting that cultural training provided by partners helped avoid potential conflicts that could arise from cultural misunderstandings.

> *"...when we collaborated with Isuzu, the first thing done was to provide us with cultural training. Europeans were given training about Japanese culture, and we were given 2-3 days of training about Japanese culture. This was for us to understand each other better. The differences are really significant; I've been working in this field for 3 years, and before entering this field, I couldn't have predicted the differences. Sometimes, these differences can lead to a breaking point in the work. What may seem trivial to you may be significant to them, and vice versa."* (OEM 2)

In support of formal training procedures, unrequited cultural sensitivity also plays a crucial role in managing operational workflows. Respondents frequently highlighted that companies must remain flexible to accommodate the cultural practices of their partners. Thus, the ability to adapt to these cultural nuances enables the smooth continuation of business activities without causing disruptions to operations, as detailed by both OEM 6 and TS 7 followingly.

> *"Toyota has a policy of respecting cultures. For example, is it about getting the job done or disregarding the culture of that company or country? No, let's not finish the job at the expense of ignoring the culture."* (OEM 6)

> *"We are Mediterranean people, for example, let me put it this way, during Christmas holidays after December 22nd, you can't reach anyone, but we packed and sent parts on the first day of Ramadan Bayram (holiday). Ramadan Bayram, you know."* (TS 7)

4.6.3. Legal and Regulatory Compliance Management

Legal and regulatory compliance management emerges as another novel strategy throughout the analysis of the SSIs. Table 39 highlights the second, and first-order codes related to legal and regulatory compliance management.

Table 39. Sample Codes of Legal and Regulatory Compliance Management

Second-Order Code	First-Order Code
Compliance Awareness	Compliance training and rule adherence prevent negative outcomes in coopetitive relationships.
Confidentiality agreements and contracts	Significance of confidentiality agreements and contracts as the fundamental basis.

This study reveals that one of the critical aspects of maintaining successful coopetitive relationships is ensuring that all parties adhere strictly to legal and contractual frameworks. Respondents requently emphasized that compliance with these rules ensures that companies operate within defined boundaries, reducing the risk of legal infractions, thus securing a more stable coopetitive relationship. OEM 2

emphasized the importance of compliance training to help ensure that employees remain aware of and committed to adhering to the rules.

> *"...we play very compliantly with the rules, everyone is trained on this every six month. So, people are aware of how important this is, so no one has crossed the boundaries. Neither on their side nor on our side, nothing negative happened."* (OEM 2)

In addition to legal awareness training, TS 1 further underscored the significance of contractual agreements, highlighting how they provide a clear foundation for any collaborative effort by ensuring that all parties operate transparently and securely. Furthermore, we observed that these agreements establish trust between partners by ensuring that sensitive information is protected and that all parties understand the legal obligations of the relationship.

> *"The agreements made are the foundation of everything for us, confidentiality agreements, contracts..."* (TS 1)

These findings underscore that compliance with regulations and contractual agreements are essential components particularly in addressing challenges related to legal issues that are significantly hindering collaborative efforts. By upholding these standards, companies can mitigate risks, protect sensitive information, and build mutually sound, more resilient coopetitive long-term relationships.

4.6.4. Relationship Building

Relationship building that ensures successful CVC-C practices is introduced as another novel strategy by this study. Table 40 details of this strategy's second and first-order codes are as follows:

Table 40. Sample Codes of Relationship Building

Second-Order Code	First-Order Code
Face-to-face interaction	Bridging cultural differences through face-to-face and informal interactions.
Face-to-face interaction	Combining face-to-face meetings with digital platforms to improve communication and clarity.

Building strong personal relationships is acknowledged by most of the interviewees as a critical approach for managing cultural differences and fostering effective communication between companies. We observed that frequent face-to-face meetings, combined with informal interactions, are essential to establishing the trust needed for successful collaboration. Regular in-person meetings promote clearer communication and greater engagement, especially when crossing cultural gaps. OEM 2 underlined that regular face-to-face meetings are key to building personal ties as supported by OEM 1's explanations that in-person meetings provide clearer communication through body language, enhancing understanding and connections.

> *"...if you're working with different cultures, establishing a personal relationship is really important there. That's why we used to go to Japan every month. The next month, I would go for a week, then they would come for a month, then I would go for a month, then they would come for a month. So, we had face-to-face meetings 12 times a year, for a week each time. If you don't do this, and if you don't have dinner together and talk about your family in the evenings, establishing that relationship is not possible. I think that's the most important thing, establishing that close relationship."* (OEM 2)

> *"...meeting face-to-face, people's postures, behaviors, and body language can convey a lot, with body language being a more accurate term, perhaps. People can express many things through body language and can communicate what they want more clearly. Of course, we will use digital platforms, maybe we will have ten digital, online meetings, but occasionally having face-to-face meetings, especially in such competitive situations, I believe increases their effectiveness."* (OEM 1)

The study reveals that establishing strong relationships reinforces the aforementioned strategies, such as awareness of cultural diversity, adaptive communication, and legal compliance with a trust-based approach. These strategies are crucial tools for establishing more resilient, adaptable, and collaborative SCs.

4.6.5. Structured Information Sharing Governance

Based on the interviews, “structured information-sharing governance” is identified as the most prevalent strategy for enhanced and more resilient CVC-C. Table 41 provides details on the second and first-order codes for this approach.

Table 41. Sample Codes of Structured Information Sharing Governance

Second-Order Code	First-Order Code
Confidentiality and strategic information protection	Confidentiality agreements protect strategic information, limiting sharing to product-specific details.
Information control and confidentiality agreements	Exclusive core teams with confidentiality agreements protect shared information.

As identified by this study, one of the significant challenges in coopetitive relationships is the need to protect proprietary information while fostering collaboration. The SSIs executed with the industry actors pointed out that “structured information-sharing governance”, primarily through confidentiality agreements, addresses this challenge by establishing clear boundaries for what information can be shared. We observed that this allows partners to collaborate on specific projects while ensuring that valuable knowledge remains protected. OEM 3 underlined how these agreements assist to protect important data, limiting oversharing while yet allowing for required information exchange.

> *"You don't share every piece of information anyway, information that we are not obliged to share. These are somewhat determined from the beginning, as far as I understand, and there are agreements, confidentiality agreements. Confidentiality agreement is actually the most important aspect of this matter. You don't already give out very strategic information. Information specific to that product or specific to that production line can be provided."* (OEM 3)

In addition to confidentiality agreements, this study revealed that by designating specific measures with exclusive access to shared information, companies make sure that data is only accessible to people directly participating in the collaboration. This not only builds trust between partners but also addresses concerns about data security

and misuse. OEM 2 highlighted the role of core teams in controlling the flow of sensitive information, ensuring that only essential personnel have access.

> *"There is a specific core team under this alliance, for example. Only that core team can have access to that information. They have also signed special confidential agreements. They cannot share shared information with others. They cannot even share it with their manager, so ultimately, you need to establish very strong control to protect the information."* (OEM 2)

In conclusion, we observed that while strategies such as adaptive communication foster diverse communication channels, and building strong relationships encourage more intimate and direct interactions, structrured information sharing approach defines these strategies' boundaries by establishing specific frameworks.

4.6.6. Agility

The SSIs conducted with the participants revealed that "agility" is acknowledged as a key resilience capability in CVC-C practices. Table 42 presents the details of the second and first-order codes for this capability.

Table 42. Sample Codes of Agility

Second-Order Code	First-Order Code
Enhanced agility through collaboration	Enhanced agility by leveraging alternatives and facilitating quick deployment.
Situational importance of the agility	The importance of agility varies depending on the circumstances.

Agility, widely discussed by the recent literature as a resilience capability, enables companies to quickly adapt to changing conditions and challenges within the SC. Respondents highlighted that firms ensure operational continuity and minimize disruptions by leveraging alternative solutions and acting quickly. This ability to be agile is further strengthened through collaboration, as it allows companies to combine resources, identify alternative pathways, and deploy solutions more swiftly as discussed by OEM 3.

"Agility can be created with the use of alternatives. If companies act together, they can be more agile. They can activate alternatives more quickly and provide convenience to each other." (OEM 3)

In addition, we observed through the interwievs that agility is situational and must be applied according to the specific circumstances a company faces. This situational agility allows companies to tailor their responses to crises, ensuring resilience in various contexts. TS 4 supports this by emphasizing that the use of agility changes according to the nature of the disruption.

"It varies; we can't formalize this with a single parameter here. Because in this sector, each company's production lines can be in different locations, divided into different stages, and diversified, which we can also call agility or flexibility. But in a major crisis, as happened to the French company, you have to use collaboration. I believe the formula is formulated differently according to different environmental conditions." (TS 4)

4.6.7. Collaboration

The outcomes of this study reveal that "collaboration" is a vital resilience capability that enhances the resilinece of the automotive SCs. Table 43 outlines the details of the second, and first-order codes related to collaboration.

Table 43. Sample Codes of Collaboration

Second-Order Code	First-Order Code
Collaboration for enhancing success	Leveraging combined strengths for success in emerging fields through collaborative development.
Collaboration ensuring production continuity	Collaboration as crucial capability ensuring production continuity.

The study indicates that collaboration allows companies to leverage their combined strengths, which significantly increases their chances of success in both product development and production continuity. Several interviewees indicated that in emerging fields, where uncertainty is high and companies may lack full expertise, joining forces enables them to share knowledge, resources, and solutions to common

problems. In line with these findings, collaboration not only enhances the probability of success but also ensures operational resilience in the face of uncertainties as discussed by OEM 2 and OEM 1 followingly.

> *"By combining their strengths, two companies, instead of developing products separately in different fields, join forces in that area. Because this is an emerging area and no one knows what to do, they increase the chance of success ultimately."* (OEM 2)

> *"Flexibility could be one, we can say that collaboration could be one, trust could be there, mutual trust, because trust is important among manufacturers, suppliers, even though we are at the firm level, sharing information could be important, in the meantime, all of these are necessary for production continuity and to be done more healthily, I think."* (OEM 1)

These findings demonstrate that by fostering collaboration, companies can build resilience, strengthen their operations, and create a stable foundation for coopetitive practices. This strategy addresses many of the challenges discussed earlier, ensuring that companies can continue to thrive despite industry uncertainties.

4.6.8. Flexibility

The findings indicate that flexibility is the most prevalent capability used among the indusrty players in fostering both resilience and CVC-C practices. Table 44 highlights the detailed breakdown of the second and first-order codes related to flexibility.

Table 44. Sample Codes of Flexibility

Second-Order Code	First-Order Code
Flexibility in production planning and alternative manufacturing	Developing flexibility in production and exploring alternative methods to address disruptions.
Flexibility as one of the strongest suits.	Flexibility as a key capability for swift action and implementation of measures.

Flexibility enables companies to adapt quickly to disruptions, such as SC shocks, economic crises, or unforeseen global events as evidenced by the detailed analysis o the interviews. Respondents point out that this flexibility enables firms to maintain production continuity and explore alternative production methods or sourcing options, ensuring that their operations remain stable in uncertain conditions. From these participants, OEM 4 and TS 7 emphasized how flexibility has become a critical factor in addressing challenges as companies are now more capable of adjusting their production systems to remain agile and responsive.

> *"Our working system has changed significantly. For example, I believe we have made quite a progress in terms of flexibility. Because, for instance, previously, the production plan was a process where production progressed directly at a certain point without much change, but due to processes like chip crises, the COVID-19 pandemic, and war, we are conducting analyses on alternative production types that could be possible."* (OEM 4)

> *"Our strongest suit in that regard (disruptions), our strongest muscle as Beyçelik, is flexibility and agility. We can take very fast actions and implement rapid measures there."* (TS 7)

4.6.9. Trust

One of the key findings of this study is “trust” as this capability plays a vital role in enhancing the resilience. Table 45 details the related remarks, second, and first-order codes as follows.

Table 45. Sample Codes of Trust

Second-Order Code	First-Order Code
Trust ensuring production continuity	Trust as crucial capability ensuring production continuity.
Trust ensuring production continuity	Trust, backed by top management and rapid-response teams, ensures production continuity.

The analysis of the interviews revealed that in moments of crisis or uncertainty, the presence of mutual trust between manufacturers, suppliers, and other stakeholders

fosters a stable environment where information is shared freely, and actions are coordinated efficiently. We also observed that trust not only ensures that production can continue uninterrupted but also mitigates risks associated with miscommunication or delays as evidenced by both OEM 1 and OEM 2's responses.

> *"...trust could be there, mutual trust, because trust is important among manufacturers, suppliers, even though we are at the firm level, sharing information could be important, in the meantime, all of these are necessary for production continuity and to be done more healthily, I think."* (OEM 1)

> *"Therefore, in such crisis moments, it is necessary to have a complete human resource that will work on that issue 24/7 by creating task forces. Also, very good support should be obtained from the top management in terms of guidance. I think the most important thing here is open communication and trust."* (OEM 2)

4.7. Coopetitive Co-created Value

The findings indicate that CVC-C within the automotive SC is facilitated by several elements, drivers and strategies wherein competitors strategically integrate resources, exchange information, leveraging cross-cultural expertise, and actively participate in joint ventures. We observed that this dynamic and multifaceted process among these dyadic, triadic, and even multi-actor collaborations generates mutual value that surpasses what individual firms can achieve alone.

In this study, eleven coopetitive co-created values within automotive SCs were identified through SSIs. "Production efficiency" emerged as the most prominent co-created value, driven by competitors optimizing manufacturing processes, synchronizing workflows, and adopting shared production practices. These efforts improve operational efficiency and cost-effectiveness, enabling firms to remain competitive in a cost-sensitive industry. "Collaborative Resilience" emerged as another significant value co-created through coopetition. This is achieved through rivals pooling resources, coordinating contingency plans, and jointly addressing disruptions. This collaboration minimizes downtime and strengthens overall SC stability.

Additionally, "best-practice improvement" was identified through the analysis, where firms benchmark operations, exchange knowledge, and refine industry

standards to enhance quality, safety, and efficiency. “Confidentiality” and “trust building” further underpin these coopetitive practices by fostering secure information sharing and reliable partnerships, ensuring that sensitive data is protected while maintaining long-term collaborative relationships. “Collaborative Innovation” also plays a crucial role, as competitors jointly contribute to research, technological development, and product design, driving industry-wide advancements that surpass individual capabilities.

The prominent findings of this study reveals that these co-created values fortify SC resilience by promoting efficiency, collaborative problem-solving, trust, and continuous improvement. We discovered that they enable firms to respond collectively to disruptions, reduce vulnerabilities, and maintain operational continuity, ultimately fostering a more adaptable and resilient SC. Table 46, followingly provides a detailed summary of these values, and the actors’ contributions supported by participants’ responses.

Table 46. Coopetitive Co-created Values

Coopetitive Co-created Value	**Contributions of Multiple Actors**	**Evidentiary Quotation**
Best-practice Improvement	Information sharing, Investment	"[...] even though we are direct competitors, when it comes to occupational safety and health, everyone has shared information here." OEM 1
		"OEMs are collaborating on a survey [...] sharing the investment of doing this survey and then using the information internally." OEM 8
Collaborative Innovation	Information sharing, Resource sharing, Investment	"Daimler, the Traton Group, and Volvo, the three largest competitors in Europe, have come together to establish Cell Centric [...] these three major companies are investing together in this area." OEM 2
		"[...] advanced engineering is one example of collaboration and sharing of knowledge." OEM 8
		“[...] if there are 2,000 engineers working and they work for 3 years, the aim here is to save on this. They are also developing vehicles for us in the meantime." OEM 3
Collaborative Resilience	Information sharing, Resource sharing	“"During the pandemi [...] to manage the supply chain properly [...]Honda, Ford, and Renault. There's Toyota and TOGG as well. They sometimes close the production line for a day, opening the way for others by doing so.” OEM 5
		“[...] it provided us with the opportunity to continue production on the customer's lines without interruption." TS 5
		"[...] materials are distributed and shared among the firms according to production criticality through common meetings [...] preventing production shutdowns among firms in a collaborative manner [...]." OEM 4

Table 46 (Continued). Coopetitive Co-created Values

Confidentiality	Structured Information Sharing	“ [...] a competitor mentioned that they had the machine and could show it to us, but they refused to share information [...].” TS 6
		" [...] Only that core team can have access to that information [...] They cannot share shared information with others.” OEM 2
Cross-cultural Compliance	Cultural Awareness	" [...] when we collaborated with Isuzu, the first thing done was to provide us with cultural training [...] This was for us to understand each other better." OEM 2
		"So, they adapt directly to it. If a Japanese person needs to work 18 hours, they do. But they don't ask the Arab person there to come and work with them." OEM 6
Different/New Product	Know-how Sharing, Resource Sharing"	" [...] In the product development phase, they are developing some of our products, and we are developing some products on their behalf [...]." OEM 3
		"We had a joint engine project with BMW [...] we adapted BMW's 1.6 and 2.0 diesel engines for the Verso and Avensis models [...].” OEM 6
		"By collaborating with mask manufacturing companies, we obtained know-how on how the production is done [...].” OEM 1
Enhanced Collaboration	Coopetitive Attitude & Approach	" Those who collaborate [...] remain vibrant because they continuously share information. Even if they're not from this sector, they receive support from it." TS 6
Market Extension	Investment, Resource Sharing	“ [...] I also run my brand with much lower costs according to their standards. In this way, they also sell a product in this market." OEM 5
		“Toyota Proace, sold in both Europe and Turkey, is essentially Peugeot-made, with only minor cosmetic changes. They are produced in the Peugeot factory [...].” OEM 6
Production Efficiency	Investment, Resource Sharing, Information sharing, Know-how Sharing	“[...] by producing two similar vehicles in the same production facility, optimization was achieved. Price, production cost, labor, quality, and since they are similar cars, costs were minimized [...].” OEM 1
		“ [...] you saved maintenance for at least a thousand of them [...] you're increasing efficiency by focusing on a single thing." OEM 7
		“ [...]they said, let's use the same platform. If we divide the investment cost of the same line into three, the unit cost decreases, so I won't invest [...].” TS 7
		"Unlike us, they were able to produce flawless products, which we couldn't.” TS 8
		“ [...]neither Peugeot nor Toyota foresaw production volume in Europe significant enough for either to establish a factory alone, so they set it up together." OEM 6
		“ [...] they also provided us with information about reducing working hours, production, and part shortages. This was very helpful in shaping our production plan.” OEM 5
Relationship Building	Information sharing	“ [...]So, we had face-to-face meetings 12 times a year, for a week each time. If you don't do this [...] establishing that relationship is not possible.” OEM 2
		"[...] online meetings related to work began, everyone shared small snippets from their homes [...] many genuine relationships were built during that time [...].” OEM 7

Table 46 (Continued). Coopetitive Co-created Values

Trust Building	Structured Information Sharing, Information Sharing	“ [...]trust environment is established within the framework of agreements." OEM 3
		“ [...] When Ermetal asks us, ‘Hey, how do you manage warehouse logistics?’...we say, ‘Come on, buddy, let us explain it to you.’ You can benchmark there.” TS 7

4.8. Coopetitive Co-destructed Value

The findings highlight that while CVC-C within the automotive SCs offer significant potential, interactions between collaborating firms do not always lead to positive outcomes. Instead, these interactions can sometimes result in value co-destruction (VC-D). Research suggests that VC-D occurs when actors fail to integrate or apply operant and operand resources in alignment with each other's expectations (Cabiddu et al., 2019; Plé and Chumpitaz Cáceres, 2010).

Despite the aforementioned co-created values, we identified three major coopetitive co-destructed values through SSIs. These are *legal repercussions, operational inefficiency,* and *collaboration breakdown*. These outcomes are widely driven by industry challenges and the negative contributions of firms in coopetitive practices, including limited legal awareness, operational incompatibility, poor information sharing, cross-cultural conflict, and trust deficits.

Operational Inefficiency emerged as a significant co-destructed value, driven by firms' inability to align manufacturing processes, synchronize workflows, and standardize quality expectations. We observed that these inconsistencies lead to defective products, delays, and resource waste. Additionally, collaboration breakdown was identified as another critical co-destructed value, stemming from poor information sharing, cross-cultural conflicts, and trust deficits. When firms withhold essential data or fail to communicate transparently, misunderstandings disrupt coordination and hinder joint efforts. Cultural differences exacerbate these issues, straining partnerships and reducing cohesion. Furthermore, the absence of trust and ambiguous contractual terms deter firms from committing to coopetitive initiatives.

Legal Repercussions also was identified by this study as a major co-destructed value, resulting from firms’ challenges in navigating competition laws and regulations. The analysis of the interviews revealed that the fear of severe penalties or sanctions discourages open collaboration and resource-sharing efforts. Furthermore, misunderstandings about legal compliance led firms to adopt excessively cautious strategies, ultimately avoiding coopetition altogether.

This study's findings emphasize the need of addressing these issues is essential to prevent co-destruction and harness the full potential of CVC-C. By incorporating the strategies and resilience capabilities that are identified by the findings of this study, firms can strengthen their collective resilience and overcome the pitfalls of co-destruction. Table 47 provides a detailed summary of these values, and the actors' contributions supported by respondent quotations as follows:

Table 47. Coopetitive Co-destructed Values

Coopetitive Co-destructed Value	**Contributions of Multiple Actors**	**Evidentiary Quotation**
Operational Inefficiency	Operational Incompatibility, Trust Deficit	"[...] when we create a similar production line, now Coşkunöz's pricing strategy changes [...] If I try to produce this on Coşkunöz's line, or try to use the same thing, then other problems will start to arise." TS 7
		"We had to recall the BMW motor three times [...] the fuel system in BMW is different from our Toyota fuel systems." OEM 6
		" [...] it was understood that they did not comply with our regulations. As parts lost their shelf life, they had to be scrapped, leading to a crisis." OEM 7
Collaboration Breakdown	Limited Legal Awareness, Poor Infirmation Sharing, Trust Deficit, Cross-Cultural Conflict	" [...]maybe we wouldn't have talked about anything that would violate competition, etc., but just to meet these requirements, we couldn't talk at all." OEM 3
		" It was said that in order for us to work with you, your company must have a French partner. What do they call this? Is it a secret clause?" TS 2
		" [...] You can't change a German's plan. If you mess with a German's plan, they lose it." TS 7
Legal Repercussions	Limited Legal Awareness	" [...]there are very serious audits in competition [...] if they find any non-compliance during the audit, the penalties are incredibly high.

CHAPTER 5: DISCUSSION AND CONCLUSION

The aim of the study was to address the research questions by clarifying how dyadic, triadic, and broader multi-actor coopetitive interactions among OEMs and the initial two tiers of the SCs contribute to SCRes. Given the intricate networks and interdependencies within the automotive SCs, collaboration among competitors emerged as a critical factor for mitigating disruptions (Ponomarov and Holcomb, 2009). This unique interplay between collaboration and competition not only offers a fascinating area for research but also sheds light on the strategic importance and theoretical understanding of CVC-C in navigating uncertainty and complexity within supply chain dynamics.

Through qualitative analysis and insights from industry participants, this study uncovered seven critical enablers, such as strategic coopetitive mindset and market expansion, that foster CVC-C practices among SC actors. It was also essential to identify prominent barriers, including cross-cultural and legal constraints, which were among the nine challenges highlighted. Additionally, the study revealed the dual outcomes of CVC-C practices, encompassing both co-created values, such as enhanced resilience and operational efficiency, and co-destructed values, such as resource misuse and collaboration breakdowns. These findings provided a nuanced understanding of how CVC-C dynamics can simultaneously drive VC while posing risks. Consequently, the study identified five robust strategies that effectively address the aforementioned challenges, and four prominent resilience-building capabilities further strenghten overall resilience. Theoretical perspectives, including SDL, the RBV, and the DCV, provided a comprehensive framework for interpreting these findings, positioning this study as a significant contribution to both academic discourse and practical applications in SCM.

5.1. Theoretical Contributions

The focus of previous studies has been primarily on coopetition based VC (Rai, 2016), or solely VC-C within organizations (Osborne et al., 2013), or with individual customers (Prahalad and Ramaswamy, 2000; Vargo and Lusch, 2004) to generate mutual value and improve resilience (Abdalatif and Yamin, 2022; Christopher and Peck, 2004; Pettit et al., 2013). The findings of this study address these gaps empirically by incorporating coopetition and VC-C activities, thus, proposes

"Coopetitive Value Co-Creation" as a novel approach for more resilient SCs. Thus, this thesis shed new insights into the complex dynamics of CVC-C practices, especially in achieving SCRes.

First, this master thesis makes contributions to literature about the *industry-specific issues* and relevant key *drivers to CVC practices* by addressing the first research question. The study enhances the understanding of automotive industry's distinguishing characteristics and its complex dynamics by revealing *production complexity*. This complexity in production and diversity of components is driven by an expanding value chain, evolving mobility concepts, and technological advancements, similar to the findings of Alzate et al. (2022) and Kleindorfer and Saad (2005). Moreover, the demand for customized vehicles and faster shipping times, as noted by Christopher (2011), has transformed customer preferences and increased the need for precise coordination and collaboration among competitors. Additionally, the study introduces *distinctive standart* such as the reliance on just-in-time (JIT) manufacturing with stringent quality standards exacerbated by *significant investments* and mistake intolerance, as discussed by Boysen et al. (2015) and Falsafi et al. (2018), underscores the importance of strong organizational capabilities and managerial skills. These findings enhance the study by Christopher (2022) and Seidel et al. (2005), who emphasize that the industry's competitive nature drives firms to engage in coopetitive activities through *talent and knowledge acquisition* to remain resilient.

The study further identifies key drivers alongside the aforementioned *industry-specific issues* paving the way for CVC-C practices among the industry players, offering both theoretical contributions and empirical evidence that extend the existing literature. While prior research primarily focuses on the strategic motivations behind horizontal and vertical coopetitive partnerships (Crick and Crick, 2021; de Leeuw and Fransoo, 2009; Garraffo and Siregar, 2022), to co-create value or benefits (Ritala, 2012; Rusko, 2011), it has not distinguished the specific drivers that enable the simultaneous processes of collaboration and competition for VC-C. This study fills this gap by identifying significant drivers.

The *strategic coopetitive mindset*, as a novel driver introduced by this study's findings, aligns with Brandenburger and Nalebuff's (1996) "value net" theory, which emphasizes creating mutual value before dividing it. Firms engage in coopetition to reduce costs, pool technological expertise, and share investment risks. This finding supports the literature on the financial motivations behind coopetition (Ritala, 2012;

Rusko, 2011) while extending it by illustrating how strategic mindsets specifically enhance SCRes. By focusing on mutual gains, firms achieve a win-win scenario that strengthens long-term partnerships and collective resilience (Gnyawali & Park, 2011; Hosseinnezhad et al., 2023). *Production efficiency* as another key driver reinforces findings by Hoffmann et al. (2018) and Garraffo and Siregar (2022), who highlight efficiency improvements as a primary motivation for coopetition. In the automotive industry, competitors optimize manufacturing processes, share resources, and reduce errors through collaborative production models.

Additionally, *market expansion* supports existing research on coopetition's role in accessing new markets (Garraffo and Siregar, 2022; Hoffmann et al., 2018; Ritala et al., 2014). By leveraging joint branding strategies and international partnerships, firms reduce market entry barriers and diversify opportunities. This finding provides empirical evidence of how market expansion through coopetition contributes to SCRes, a dimension not extensively addressed in the literature. Finally, this thesis contributes to the literature by introducing *contractual commitments and responsibilities* as a novel motivation behind the CVC-C practives. This driver offers a unique contribution by highlighting the role of legal responsibilities in fostering coopetitive practices. While the literature discusses trust and relational governance (de Leeuw and Fransoo, 2009), this study demonstrates how adherence to contracts ensures timely delivery and quality, reinforcing trust and facilitating long-term collaboration. This perspective enhances the theoretical understanding of how regulatory and contractual compliance supports CVC-C and thereby SCRes.

Second, this thesis further provides valuable insights into the *CVC-C practices* triggered by the identified drivers within automotive SCs and their impact on SCRes. The practices identified through SSIs such as *joint ventures, information sharing, know-how sharing, and resource sharing* (Cao and Zhang, 2011; Simatupang and Sridharan, 2008), are well-aligned with recent literature on SCRes, coopetition, and SCC (Hosseinnezhad et al., 2023; Scholten and Schilder, 2015; Singh and Power, 2009). *Information and know how sharing*, as frequently observed type of CVC-C practice, fosters transparency, coordination, and real-time decision-making within SCs, enabling firms to respond rapidly and effectively to disruptions (Duong and Chong, 2020). This practice enhances visibility and flexibility, as noted by Scholten and Schilder (2015), while supporting better operational efficiency and reducing inefficiencies. This finding contributes to the literature by demonstrating how

coopetitive information sharing promotes adaptive capabilities, aligning with the DCV (Teece et al., 1997). Moreover, it reflects the principles of SDL (Vargo and Lusch, 2004), which emphasize continuous learning, knowledge integration, and collaborative innovation.

Other results of these practices, particularly in the form of *joint ventures*, facilitate the co-development of new technologies, especially in the realms of electric and autonomous vehicles, by pooling resources and sharing R&D risks, which aligns with the findings of Gnyawali and Park (2011). This collaborative innovation accelerates technological advancements and reduces costs, thereby supporting resilience through sustained innovation and operational continuity (Duong and Chong, 2020). Such practices align with the RBV (Barney, 1991), which highlights leveraging unique resources and capabilities to maintain a competitive advantage. The empirical evidence of this study further extends the theoretical framework by showcasing how joint ventures in a coopetitive setting enhance SCRes through shared technological competencies, risk mitigation, and collective adaptability.

The results acknowledge the literature by witnessing *resource sharing* as one of the foremost coopetitive interactions utilized by industry actors and further strengthens SCRes by enabling firms to pool tangible assets, optimize resource utilization, and ensure operational continuity during crises. The empirical results reinforce findings by Lotfi and Larmour (2022), Hoffmann et al. (2018), and Garraffo and Siregar (2022), as this practice facilitates the sharing of production facilities, transportation networks, and other critical resources, allowing firms to minimize errors, reduce costs, and optimize manufacturing processes. Furthermore, the results on resource sharing contribute to the literature by identifiying its role in building efficiency and strenghtening long-term partnerships, which are critical for resilient supply networks (Singh and Power, 2009).

This study also presents that the impacts of CVC-C practices introduce novel contributions to literature. Recent studies widely focused and discussed on the “value creation” as the major outcome of coopetition (Gnyawali and Park, 2011). Therefore, *improved trust-building* emerges as a significant outcome through information sharing and joint venture-based coopetition practices. While trust is widely discussed in collaboration literature (Duong and Chong, 2020; Singh and Power, 2009), its role as an outcome of coopetitive practices contributing to SCRes is less explored. This research demonstrates that these practices strengthen trust among rivals, enhancing

long-term resilience. Another significant impact of CVC-C practices contributing directly to enhanced SCRes is *improved information sharing*. This outcome reflects the ability of firms to exchange critical information more effectively, thereby enhancing it's role in recent literature that emphasizes the importance of improved information flow in resilience-building practices (Munir et al., 2022; Tukamuhabwa et al., 2015). Lastly, this study identifies *industrial sustainability* as a novel outcome of joint ventures and resource pooling. The empirical results reveal that these practices enable firms to share investments in sustainable technologies and processes, extending the literature by linking coopetitive practices to sustainability outcomes, a dimension not extensively covered in prior SCRes research.

Third, this master's thesis contributes to the literature by comprehensively examining the *challenges and barriers to CVC-C practices* in response to the third research question. Existing studies (Bengtsson and Raza-Ullah, 2016; Bouncken and Kraus, 2013), discuss the dynamics and managerial challenges of coopetition, particularly the tensions that arise from balancing collaboration and competition. However, this study extends these discussions by identifying specific challenges hindering CVC-C practices.

Despite the significant advantages of CVC-C practices, this study identifies several challenges hindering their implementation within automotive SCs through SSIs. *Information sharing issues*, as one of the prominent challenges, is widely acknowledged in literature. In line with studies by Bengtsson and Kock (2000), Crick and Crick (2020), Fawcett et al. (2015), and Gnyawali and Park (2009), reluctance to share knowledge due to fears of competitive exploitation remains a crucial obstacle. This challenge is well-grounded in the RBV, which emphasizes the importance of protecting firm-specific, valuable, and inimitable resources (Barney, 1991). Simultaneously, SDL highlights the potential for mutual value creation through collaborative operant resource exchange (Vargo and Lusch, 2017).

Another significant challenge identified in this thesis is *resource issues*, where dependencies on distant suppliers, shortages, and restrictions caused by geopolitical disruptions and governmental/supplier-led resource prioritizations introduce new insights into the fragility of resource-sharing in coopetitive arrangements. While SDL emphasizes resource integration and exchange for mutual value creation (Lusch and Vargo, 2006) and RBV highlights the strategic importance of leveraging unique resources (Barney, 1991), these challenges reveal critical vulnerabilities not fully

addressed in the literature. This thesis illustrates that CVC-C practices in automotive SCs are particularly susceptible to external disruptions, requiring firms to develop adaptive capabilities. This aligns with the DCV, which stresses the need for continuous resource reconfiguration in response to environmental changes (Teece, 2018). By highlighting the fragility and adaptability of resource-sharing mechanisms, this study provides a novel contribution to the literature, emphasizing the importance of resilience-building strategies in managing SC vulnerabilities.

While barriers such as *cross-cultural and organizational issues* (Mirzabeiki et al., 2023), *communication issues, joint decision-making issues* (Wu et al., 2019), *legal and regulatory issues, technological adaptation issues* (Gnyawali and Park, 2009), and *workforce capability and mindset issues* (Ramesh et al., 2010) have been explored in the literature, and particularly in the context of coopetition or VC, this study enhances the understanding of these barriers by defining them holistically as challenges specific to CVC-C practices. By framing these issues as interconnected challenges that hinder CVC-C, this research provides a more nuanced and integrated perspective, highlighting the added complexity these barriers introduce to implementing CVC-C effectively. This holistic perspective bridges gaps in the literature by illustrating how these challenges intersect with SDL, RBV, and DCV, providing a comprehensive understanding of the barriers to CVC-C and offering strategic insights for overcoming them.

Fourth, this thesis contributes to the recent study by offering novel strategies for overcoming the abovementioned obstacles and acknowledge relevant capabilities for achieving more resilient CVC-Cs. These strategies and resilience capabilities for CVC-C significantly advance the theoretical understanding of SDL, RBV, and the DCV by offering concrete insights into how firms can overcome the identified challenges. Whereas the recent literature widely discusses foundations and elements particularly enabling VC-C (Ritala and Hurmelinna-Laukkanen, 2009; Ritala and Tidström, 2014; Vargo and Lusch, 2016), and the antecedents/enablers of the SCres (Dubey et al., 2019; Munir et al., 2022; Shekarian and Mellat Parast, 2021), this thesis contributes to the literature by identifying holistic terms that encapsulates both processes.

We propose that the *structured information-sharing governance* strategy aligns closely with RBV by emphasizing the strategic protection and controlled exchange of valuable resources (Brandon-Jones et al., 2014), while SDL supports this by framing

information sharing as a critical service exchange that fosters mutual VC (Lusch and Vargo, 2006). Moreover, this strategy addresses DCV by demonstrating the need for dynamic adaptation of governance structures to protect resources while enhancing collaborative efficiency (Dubey et al., 2023; Teece et al., 1997). This integration highlights how firms can balance openness and confidentiality to build resilient SCs.

Similarly, *awareness of cultural diversity* is mentioned by the respondents as a novel strategy that bridges gaps in literature by underscoring how cultural alignment is essential for effective CVC-C. While SDL emphasizes the importance of reciprocal learning and shared VC (Lusch and Vargo, 2006), the RBV highlights the need to leverage human capital resources and organizational resources such as culturally competent workforces as strategic assets (Barney, 1991). Furthermore, DCV extends this perspective by illustrating how firms can dynamically reconfigure their organizational practices to accommodate cultural differences, ensuring that coopetitive initiatives remain adaptable and resilient (Helfat and Peteraf, 2009). This holistic approach addresses gaps in existing literature, offering strategic insights into managing cultural complexities within global SCs, and collectively fosters resilient CVC-C experience.

This study further offers *adaptive communication* as a novel strategy that is essential for overcoming barriers and ensuring collaboration among rivals by adopting new technologies. SDL emphasizes the role of communication and reciprocal learning in creating value (Lusch and Vargo, 2006). By utilizing multi-channel communication and fostering role clarity, firms integrate resources efficiently, aligning with SDL's emphasis on service exchange such as knowledge and connectivity (Akaka et al., 2013). From an RBV perspective, adaptive communication is an intangible resource that enhances firm capabilities (Barney, 1991). DCV further supports this by highlighting the need for dynamically adapting communication practices to manage disruptions (Alzate et al., 2022; Eisenhardt and Martin, 2000). This strategy ensures resilience by facilitating quick decision-making and collaborative problem-solving.

Additionally, *legal and regulatory compliance management* ensures that coopetitive engagements remain legally sound and clear for both sides. This novel strategy further redefines the understanding of the related theories that are discussing compliance. For instance, SDL acknowledges the role of institutional arrangements in facilitating VC-C (Vargo and Lusch, 2016). Compliance management acts as an institutional mechanism that supports trust and governance. From an RBV perspective,

compliance is a capability that safeguards firms' resources and intellectual property (Barney, 1991; Knudsen, 2007). DCV highlights the need to reconfigure compliance practices dynamically to adapt to changing regulations and market conditions (Helfat and Peteraf, 2009). This master's thesis proposes that employing this strategy helps mitigate legal risks and supports long-term resilience in CVC-C practices.

Another intriguing finding of this study is *relationship-building* that fosters trust and clenches CVC-C by addressing several challenges such as legal and regulatory disagreements, and cultural conflicts. According to SDL, VC-C thrives on collaborative engagement and reciprocal learning (Lusch and Vargo, 2006), which promotes knowledge exchange and connectedness across SC participants in the generation of better value. There, the findings of thesis propose that *relationship-building* enhances this collaboration by fostering mutual understanding through tight ties, hence establishing trust and commitment not just for value creation but also for the eventual SCRes. Similarly, RBV views relationships and trust as intangible assets that provide a competitive edge (Dyer and Singh, 1998), rather than a coopetitive strategy for resilient CVC-Cs. Furthermore, the findings support the DCV paradigm in the sense that enterprises must nurture partnerships that can adapt to changing surroundings and disturbances (Teece, 2007). Thus, this study augments the dynamic capabilites (Eisenhardt and Martin, 2000), with this approach as strong relationships help sense, seize and mitigate risks associated with coopetition and ensure the continuity of collaborative efforts.

Moreover, this study builds on the understanding of operant resources discussed in the SDL literature, such as skills, by emphasizing relationship-building, cultural diversity awareness, and adaptive communication strategies as critical for fostering mutual understanding and addressing cross-cultural complexities in coopetitive interactions (Lusch and Nambisan, 2015; Vargo and Lusch, 2004).

Fifth, complementary to the successful strategies, this master's thesis confirms *agility, collaboration, flexibility, and trust* as the foremost resilience capabilities that are congruent with recent literature as critical for navigating disruptions and enhancing CVC-C in line with the studies by Dubey et al. (2019), Munir et al. (2022), Shekarian and Parast (2021). Together, these capabilities provide a robust framework for achieving resilience in CVC-C practices, ensuring firms can adapt, collaborate, and thrive despite the challenges inherent in dynamic automotive SCs.

Sixth, this master's thesis introduces the dual consequences of CVC-C practices through the extensive analysis of SSIs, concentrating on both co-created and co-destructed values. While the literature on VC-C, particularly from the SDL perspective, extensively explores customer-centric VC, it has largely overlooked B2B contexts (Osborne et al., 2013), especially within coopetition. Traditional SDL literature emphasizes outcomes like customer satisfaction, loyalty, and service innovation (Ranjan and Read, 2016; Vargo and Lusch, 2004). In contrast, this study identifies novel co-created values specific to inter-firm contexts, such as *production efficiency, collaborative resilience*, and *best-practice improvement*. This study also elaborates the VC-C process by introducing the actors' contributions such as shared resource integration, structured information, and know-how. Therefore, we help readers comprehensively to observe the process. These findings extend SDL's principles into the B2B realm, demonstrating that VC-C in coopetition transcends customer interactions to deliver mutual benefits among firms. Alongside the specific strategies and capabilities, we introduce these co-created values to literature as the key factors positively affecting the resilience of the SCs.

Additionally, this thesis also recognizes the inherent hazards of co-destructed values. Literature often focuses on the positive outcomes of resource-sharing and collaboration (Echeverri and Skålén, 2011; Vargo and Lusch, 2008b). Yet, as pointed out by Plé and Cáceres (2010), VC-C is not inherently guaranteed, and interactional failures such as misuse of resources or communication breakdowns can lead to VC-D. We extend this literature by identifying specific negative contributions of the SC actors which result in negative consequences such as *operational inefficiency*, *legal repercussions* or *collaboration breakdown* which exacerbate the challenges of coopetition. Thus, the study addresses a significant gap in literature by identifying co-destructed values. Moreover, the detailed analysis of the qualitative content reveals that unlike the identified challenges hindering the implementation of VC-C, these co-destructed values emerge during the VC-C process, or as a consequence of it. Therefore, we propose that companies should address these negative outcomes of VC-C process alongside the identified challenges.

In conclusion, the findings of this study provide new insights into the complex nature of CVC-C practices within the automotive SC, particularly in terms of SCRes. Several major ideas have evolved from analyzing OEMs and their suppliers' viewpoints, contributing to the theoretical landscape of CVC-C practices. While

rooted in the automotive sector, these insights have broader implications for industries with similarly complex and interdependent supply chains. For instance, in the pharmaceutical industry, coopetitive strategies like joint ventures and resource-sharing during the COVID-19 pandemic showcased their potential to enhance resilience and accelerate innovation (Druedahl et al., 2021). Similarly, in the food value chain, disruptions highlighted the necessity of balancing collaboration and competition. Firms adopted coopetitive practices such as joint logistics networks, shared storage solutions, and competitive diversification of supply sources to mitigate cascading failures and maintain operational continuity during crises (Ali et al., 2022; Crick and Crick, 2020). In the electronics sector, coopetitive technology development strategies enabled firms to overcome high R&D costs and innovate collaboratively while retaining competitive differentiation through unique branding and market positioning (Gnyawali and Park, 2011).

These diverse examples underscore how CVC-C principles, informed by the theoretical frameworks of SDL, RBV, and DCV, collectively integrate collaborative and competitive strategies to enhance SCRes across industries. SDL emphasizes the importance of resource integration and stakeholder collaboration, making it critical for industries requiring multi-actor engagement and co-creation of value, such as healthcare and pharmaceutical. RBV highlights the strategic role of leveraging both tangible and intangible resources, such as production facility and trust, to maintain resilience in logistics and electronics. Meanwhile, DCV underscores the necessity of adaptability and resource reconfiguration to navigate disruptions, particularly in technological innovation. By extending the application of these frameworks beyond the automotive sector, this study positions CVC-C as a strategic approach for addressing complex interdependence and fostering resilience across diverse industries.

Overall, the findings on CVC-C practices along Automotive SCs and their implications for SCRes are presented in Figure 4.

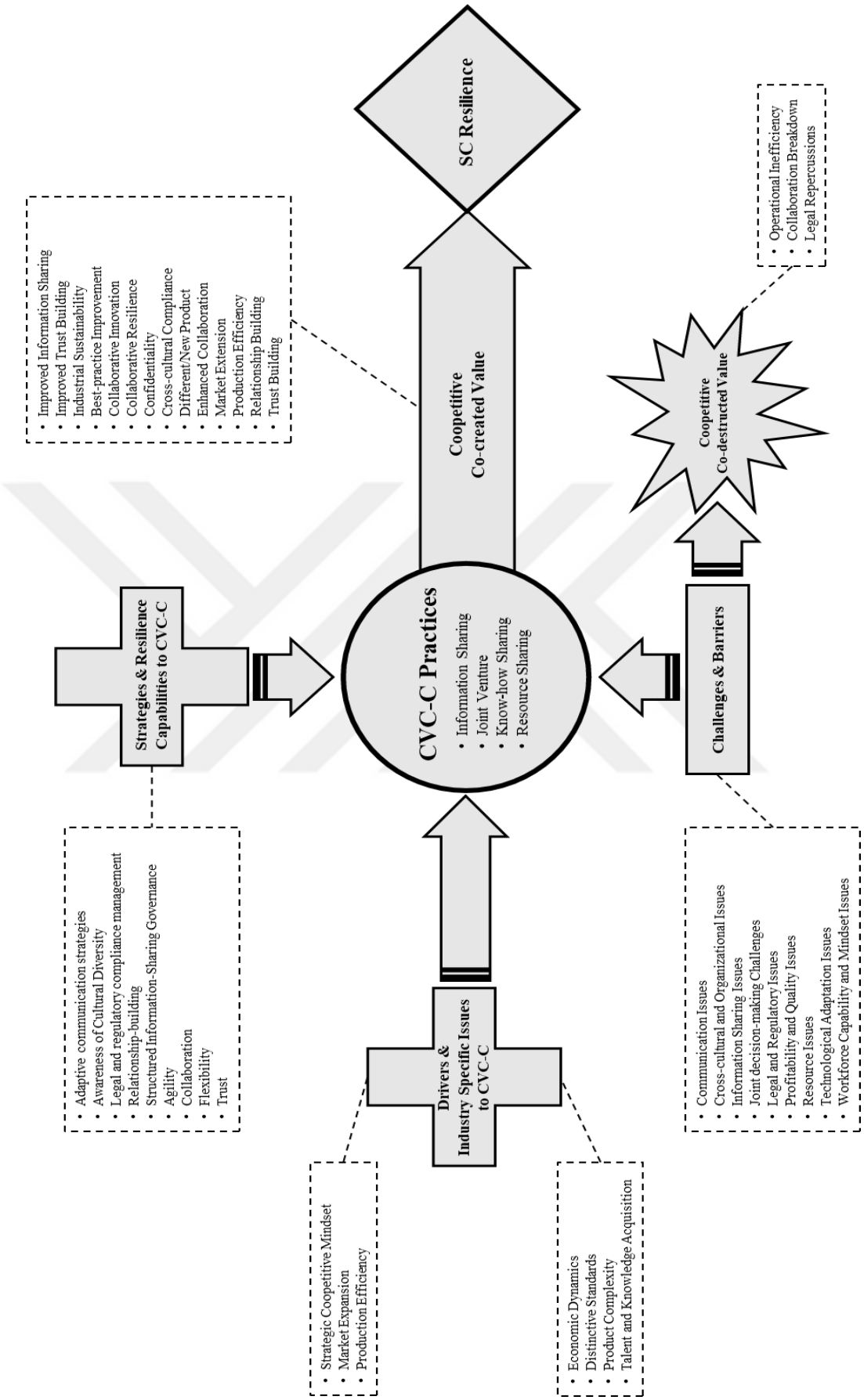

Figure 4. CVC-C practices along automotive SCs and their implications for SCRes.

5.2. Practical Implications

The practical implications of CVC-C practices within the automotive SCs are highly relevant, particularly in the context of contemporary challenges such as geopolitical tensions, technological disruptions, and global pandemics. This thesis highlights that collaboration between competitors, facilitated through both horizontal and vertical coopetition, enhances SCRes and enables firms to navigate disruptions more effectively. The findings underscore that companies engaged in strategic partnerships and mutual support during crises, such as semiconductor shortages and geopolitical sanctions, maintained operational continuity and mitigated losses better than firms relying solely on competitive strategies.

A significant practical insight derived from the study is the *strategic coopetitive mindset*, which is pivotal in forming successful coopetitive partnerships. Transparent information sharing, structured governance frameworks, and joint ventures with competitors enable firms to optimize resource use and reduce redundancies. For instance, successful collaborations in producing critical components during crises illustrate how governance frameworks can streamline production and minimize disruptions. This insight is also applicable to diverse industries such as pharmaceuticals, where similar frameworks can support joint manufacturing and supply chain visibility to mitigate risks during health crises.

Furthermore, *adaptive communication* for real-time information exchange is identified as a key enabler of resilience. Leveraging technologies such as blockchain for transparent information sharing reduces risks of opportunism and enhances collective agility. For example, in the food industry, adaptive communication strategies have proven essential in managing disruptions caused by COVID-19, enabling firms to adjust inventories and align resources across geographically dispersed networks. This thesis also emphasizes the importance of *structured information-sharing governance*, which facilitates secure and efficient communication among coopetitive partners, thereby strengthening SCRes.

Additionally, fostering *relationship-building, cultural diversity and legal awareness* capabilities address challenges such as legal and regulatory disagreements and cultural conflicts within joint ventures. By building trust through cultivated relationships and shared goals, firms can enhance their collaborative efforts and achieve greater VC-C. These practices are particularly relevant and applicable in industries like electronics, where collaboration on technological innovation requires

balancing shared investments with the protection of intellectual property. The development of resilience capabilities such as *agility, collaboration, flexibility, and trust* further support the ability of firms to respond to and recover from disruptions.

Policymakers and SC managers are encouraged to promote a coopetitive mindset as an alternative to pure competition. Implementing frameworks for coopetitive strategies and resilience-focused practices can lead to more sustainable and robust VC-C operations. Beyond the automotive industry, these insights can inform strategies in various interdependent sectors within global SCs, where coopetition facilitates the development of shared technologies to meet sustainability goals, and logistics, where joint investments in shared infrastructure can reduce costs and improve network efficiency.By integrating these insights, firms in the automotive industry can better prepare for disruptions, optimize resource allocation, and foster innovation through collaborative networks.

5.3. Limitations and Directions for Further Research

While this thesis offers valuable insights into coopetitive practices and their role in enhancing SCRes within the automotive industry, several limitations warrant consideration.

This thesis relies on qualitative content analysis based on SSIs with industry experts. While this approach provides rich, contextual insights, it may not capture the full range of coopetitive practices across different industries or regions. Expanding future research to include other sectors with varying technological capabilities and market dynamics could yield a more comprehensive understanding of CVC-C practices.

We primarily focused on short- and medium-term outcomes of CVC-C practices. A longitudinal approach could offer deeper insights into the long-term impacts of CVC-C practices on SCRes. Understanding how coopetitive strategies evolve over time and their sustained influence on resilience would be beneficial for both academics and practitioners. Additionally, the study's findings are based on qualitative data, which, while insightful, lack the empirical robustness of quantitative research methods. Future studies incorporating quantitative data, such as financial and operational performance metrics (e.g., lead times, cost efficiencies, inventory levels), could provide more concrete evidence of the effectiveness of CVC-C practices.

Another limitation is the underexplored role of digital transformation in enhancing CVC-C frameworks. Technologies such as blockchain, artificial intelligence, and big data analytics offer significant potential for optimizing resource sharing, improving transparency, and fostering trust among competitors. Further research on how these technologies can be integrated into coopetitive strategies would advance the understanding of SCRes in the digital era.

While this thesis identifies key resilience capabilities such as *agility, collaboration, flexibility, and trust,* further exploration of their interdependencies is needed. Investigating how these capabilities interact and reinforce each other in various disruption scenarios could provide a more holistic understanding of resilience-building practices.

Addressing these limitations by adopting cross-industry studies, longitudinal research, quantitative analyses, and digital technology frameworks can further enrich the theoretical and practical understanding of CVC-C and SCRes. These future research directions will contribute to developing more resilient, adaptive, and collaborative SCs in an increasingly complex global environment.

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APPENDICES

APPENDIX A: ETHICS COMMITTEE APPROVAL

SAYI: B.30.2.İEÜ.0.05.05-**020**-*320* 07.11.2023

KONU : Etik Kurul Kararı hk.

Sayın Doç. Dr. Aysu Göçer ve Mehmet Yurtsever,

"COOPETITIVE VALUE CO-CREATION ALONG SUPPLY CHAINS FOR ACHIEVING RESILIENCE IN CASES OF DISRUPTIONS" başlıklı projenizin etik uygunluğu konusundaki başvurunuz sonuçlanmıştır.

Etik Kurulumuz 06.11.2023 tarihinde sizin başvurunuzun da içinde bulunduğu bir gündemle toplanmış ve Etik Kurul üyeleri projeleri incelemiştir.

Sonuçta 06.11.2023 tarihinde **"COOPETITIVE VALUE CO-CREATION ALONG SUPPLY CHAINS FOR ACHIEVING RESILIENCE IN CASES OF DISRUPTIONS"** konulu projenizin etik açıdan uygun olduğuna oy birliğiyle karar verilmiştir.

Gereği için bilgilerinize sunarım.

Saygılarımla,

Prof. Dr. Murat Bengisu

Etik Kurul Başkan

APPENDIX B: INTERVIEW FORM

Below, the concepts intended to be examined in this master's thesis and their definitions are included, with the aim of making the interview questions more understandable. Before answering the questions, you are kindly requested to review the following concepts.

Supply Chain: A supply chain is a network of organizations, individuals, activities, information, and resources involved in the creation and distribution of goods and services from the point of origin to the end consumer. It encompasses all the processes and steps required to source, produce, transport, store, and deliver products to customers.

Supply Chain Resilience: The capacity of a business/organization to withstand and recover from disruptions such as natural disasters, crises, supply chain disruptions, economic crises, or other unforeseen events while continuing to produce, operate, and deliver products and services to customers is referred to as supply chain resilience. Supply chain resilience is critical to ensuring company continuity and reducing the impact of unplanned disruptions/crises.

Horizontal Collaboration: Horizontal collaboration in the context of supply chain management refers to a collaborative approach where organizations at the same level in the supply chain, such as manufacturers, distributors, or retailers, work together to achieve common goals and improve overall supply chain performance. This collaboration involves sharing information, resources and processes horizontally across the supply chain network rather than just relying on traditional linear, siloed relationships.

Vertical Collaboration: Vertical collaboration in the context of the supply chain refers to the cooperation and coordination among different entities or stakeholders within a supply chain, where these entities are positioned at different levels of the supply chain hierarchy. This collaboration involves entities such as suppliers, manufacturers, distributors, retailers, and sometimes even customers working together to improve the efficiency and effectiveness of the supply chain processes.

Coopetition: This term combines "cooperation" and "competition." It implies that companies in a supply chain can cooperate on certain aspects, such as sharing information, resources, or infrastructure, while still competing with each other in the market.

Coopetitive Value Co-Creation: Coopetitive Value Co-Creation in the context of Supply Chain refers to a collaborative approach in which organizations, typically within a supply chain network, both cooperate and compete with each other to create and deliver value to customers. This concept acknowledges that while businesses within a supply chain may have competing interests, they can also achieve mutual benefits by working together strategically.

APPENDIX C: QUESTIONNAIRE

Interview Questions

A. Demographics:

Name:

Age:

□ 18-24 □ 25-31 □ 32-38 □ 39-45 □ 46-55 □ 56 and over

Education level:

□ Primary school

□ Secondary school

□ High school

□ Associate degree

□ Bachelor's degree

□ Master's degree

□ Doctorate

Company/Organization Name:

Number of employees in the Company/Organization: (Will be categorized due to answer)

□ 1-9 □ 10-49 □ 50-250 □ 251 and over

Area of expertise:

Years of professional experience: (Will be categorized due to answer)

□ 0-5 □ 6-10 □ 11-15 □ 16-20 □ 21 and over

Years of experience in the automotive industry: (Will be categorized due to answer)

□ 0-5 □ 6-10 □ 11-15 □ 16-20 □ 21 and over

What firms have you previously worked for, and what roles have you held?

Which industry does the company that you work for serve? (E.g., Motor Engine Sector)

What is the industrial position of your company?

□ Domestic □ Multinational

What is the scope of operation of your company?

□ Domestic □ Multinational

During your time in the automotive industry, have you witnessed/experienced any disruptions? If yes, what are they? (E.g., Global semiconductor chip shortage, the COVID-19 pandemic, etc.)

□ Yes, ……

□ No.

B. About the Automotive Industry:

1. Can you explain about the automotive industry's supply chain?

1.1. Can you provide an overview of your company's involvement in the automotive industry and its position in the supply chain?

1.1.1. In which part of the automotive supply chain does your company operate? (E.g., Focal Company, 1st tier Supplier, etc.)

1.1.2. What is the function of the company for which you work in the automobile industry? (Automotive product manufacturer, Automotive product vendor, Automotive product/service user, OEM, and so on.)

1.1.3. Can you please explain who your customers are? (E.g., Focal Company, 1st tier Supplier, etc.)

1.1.4. Can you please explain who your suppliers are? (E.g., Part Manufacturer, Logistics Service Provider, etc.)

1.2. What are the issues that distinguish this industry from others?

1.3. What are the sector's distinctive challenges? (Think of categories such as resource, product, and service.)

1.4. Can you discuss the competitive environment of the automotive industry and its special dynamics?

1.4.1. Who are the competitors/rival companies of your company? Can you describe it in more detail without mentioning the company name? (Clients, suppliers, logistical service providers, and so on.) Can you tell me about your business involvement with them?

1.5. Which members (businesses) do you collaborate with to buy/sell/manufacture automotive products? (as a sector)

1.5.1. Do you vertically collaborate with the members along your supply chain (e.g., suppliers, customers, etc.), how?

1.5.2. Do you horizontally collaborate with your competitors/rivals in your supply chain, how?

2. What, in your opinion, are the most critical challenges among the rival companies that must be addressed in the automobile industry?

C. Coopetitive Value Co-Creation Process:

3. Considering the entire process (supply, development, production, and delivery of products to the end-user), how do the actors in the automobile industry supply chain collaborate with their competitors to create value during disruptions?

3.1. Can you describe specific examples of coopetitive initiatives during disruptions within the automotive industry's supply chains? What types of actions are implemented with which members of the supply chain?

3.1.1. How do these coopetitive initiatives contribute to the company and SCRes?

3.1.2. Which of the specific supply chain resilience capabilities (e.g. flexibility, agility, collaboration, redundancy, etc.) do you think are more important to support coopetitive value co-creation practices during supply chain disruptions? Can you explain why?

3.2. What actor adds value by participating in the process and in what way? Can you explain what exactly are these created values?

3.3. What are the motivations or objectives behind these coopetitive value co-creation practices during disruptions? Can you explain?

3.3.1. How do these practices affect the company's SCRes?

3.4. Are there any innovative coopetitive strategies that have proven particularly effective? Can you explain what these are?

3.5. How do these coopetitive practices impact the relationships between different actors within the automotive industry?

D. Challenges of Coopetitive Value Co-Creation Practices

4. What are the major obstacles faced when implementing coopetitive initiatives during disruptions? Can you explain?

4.1. What are the primary logistical or operational difficulties encountered when trying to implement coopetitive practices during disruptions? Can you explain?

4.2. Are there any legal or regulatory constraints that hinder coopetitive efforts during disruptions? If so, can you explain what they are?

4.3. How do resource constraints, such as financial limitations or shortages of key materials, affect coopetition during disruptions?

5. Are there cultural or organizational challenges in adopting coopetitive strategies? If so, can you explain what they are?

5.1. How does the corporate culture within organizations influence their willingness to engage in coopetitive practices during disruptions?

5.2. Can you explain whether there are instances where organizational cultures clash when trying to collaborate with competitors during a disruption/crisis and how these conflicts are managed?

5.3. Do different organizational structures (e.g., hierarchical vs. flat) impact the ease of adopting coopetitive strategies during disruptions? Can you explain?

6. How do information sharing and trust issues impact coopetitive value co-creation efforts?

6.1. To what extent do information-sharing challenges hinder coopetition during disruptions?

6.2. How do organizations manage the delicate balance between sharing critical information with competitors while safeguarding their own interests?

6.3. Can you share examples of situations where information sharing or trust-building had a significant impact, positive or negative, on coopetitive value co-creation outcomes?

6.4. Are there trust-building mechanisms or strategies that have proven effective in coopetitive relationships during disruptions? If so, can you explain what they are?

6.5. Are there industry-specific differences in how information sharing, and trust dynamics affect coopetitive initiatives during disruptions? If so, can you explain what they are?

7. Can you provide examples of successful strategies for overcoming these obstacles in coopetitive scenarios?

7.1. Can you share more recommendations and suggestions for addressing the obstacles discussed earlier in coopetitive scenarios?

7.2. Are there any specific cases or real-world examples of organizations that effectively navigated coopetitive challenges, and what strategies did they employ to overcome these obstacles?

7.3. In your experience, are there any common pitfalls or mistakes that companies tend to make when trying to balance cooperation and competition? How can these be avoided or mitigated for a more successful coopetitive strategy?