

**The evolution of buyer-supplier collaboration for resilient supply chains in  
South Africa's chemicals sector**

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## ABSTRACT

**Major Themes:** Amidst increasing global disruptions that threaten supply chain continuity, this study examined the evolution of buyer-supplier collaboration in enhancing supply chain resilience within South Africa's chemical sector. It identifies key themes, including the evolution of collaborative practices and processes, illustrating how they have dynamically adapted to recent global disruptions to enhance flexibility, visibility, and velocity. The study also uncovers challenges, detailing the risks and barriers hindering effective buyer-supplier collaboration, and presents solutions, outlining strategic approaches and enablers for overcoming these barriers to enhance collaboration.

**Purpose:** This study is driven by the need to address vulnerabilities exposed by recent global disruptions, which have significantly impacted supply chain continuity and competitiveness. It seeks to bridge gaps in existing literature that predominantly rely on secondary data and overlook the adaptive role of buyer-supplier collaboration in response to ongoing disruptions. Furthermore, the study examines the applicability of collaborative practices within South Africa's chemical sector and evaluates their alignment with findings from other studies to assess their broader generalisation in managing supply chain disruptions.

**Design/methodology/approach:** An exploratory qualitative approach was employed, using inductive approach to provide in-depth insights. Data was collected through semi-structured interviews with 11 key stakeholders in South Africa's chemical sector, ensuring diverse perspectives from different supply chain and sales roles. The thematic analysis was used to identify emerging patterns in buyer-supplier collaboration and resilience strategies, allowing for a rich, nuanced understanding of the evolving dynamics of buyer-supplier collaboration.

**Findings:** The findings reveal that buyer-supplier collaborative practices have evolved significantly in response to recent global disruptions, enhancing supply chain resilience by improving flexibility, visibility, and velocity. By aligning these findings with global insights, the study demonstrates the broader generalisation of these practices.

**KEYWORDS:**

Supply Chain Resilience, Supply Chain Collaboration, Buyer-Supplier Collaboration

## **PLAGIARISM DECLARATION**

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Sisi Bande

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04 March 2025

## CONTENTS

ABSTRACT.....	I
KEYWORDS .....	II
PLAGIARISM DECLARATION .....	III
CONTENTS .....	IV
LIST OF FIGURES .....	IX
LIST OF TABLES .....	IX
ABBREVIATIONS.....	IX
<b>CHAPTER 1: INTRODUCTION TO THE RESEARCH PROBLEM.....</b>	<b>1</b>
1.1 Contextual Background to the Topic.....	1
1.2 Research Problem and Statement.....	3
1.3 Research Purpose.....	4
1.4 Research Significance.....	5
1.5 Definition of Key Terms .....	6
1.5.1 Supply Chain Resilience.....	7
1.5.2 Supply Chain Collaboration.....	7
1.5.3 Buyer-Supplier collaboration .....	7
1.6 Research Scope.....	7
<b>CHAPTER 2: LITERATURE REVIEW .....</b>	<b>9</b>
2.1 Introduction.....	9
2.2. South Africa’s Chemical Sector .....	9
2.3 Theoretical Framework.....	10
2.4 Supply Chain Resilience.....	13
2.4.1 SCRes Enablers in Developed Countries .....	15
2.4.2 SCRes Enablers in Developing Countries .....	17
2.4.2 Comparative Insights on SCRes Enablers in Developed and Developing Contexts .....	19

2.5	Supply Chain Collaboration .....	20
2.5.1.1	Information-Sharing .....	25
2.5.1.2	Incentive Alignment .....	27
2.5.1.3	Collaborative Communication .....	27
2.5.1.4	Informal Financial Support.....	28
2.5.1.5	Joint Activities.....	28
2.5.2	Challenges / Risks / Barriers to Collaboration Practices in Supply Chains ...	30
2.5.3	Foundational Conditions or Enablers that Enhance Collaborative Practices.	34
2.5.4	Strategies for Overcoming Collaboration Barriers.....	35
2.6	Conceptual Framework for Collaborative Practices in Enhancing SCRes ....	39
2.7	Conclusion .....	40
	<b>CHAPTER 3: RESEARCH QUESTIONS .....</b>	<b>42</b>
3.1	Introduction .....	42
2.5.1	Research Question One (RQ1) .....	42
2.4.2	Research Question Two (RQ2) .....	43
3.2	Conclusion .....	43
	<b>CHAPTER 4: RESEARCH DESIGN AND RESEARCH METHODOLOGY .....</b>	<b>44</b>
4.1	Introduction.....	44
4.2	Research Design.....	44
4.2.1	Purpose of Research Design: Exploratory.....	44
4.2.2	Philosophy: Interpretivism.....	44
4.2.3	Approach Selected: Inductive .....	45
4.2.4	Methodology Choice: Qualitative .....	45
4.2.5	Strategy: Case Study.....	47
4.2.6	Time Horizon: Cross Sectional .....	47
4.3	Research Methodology.....	47

4.3.1 Population .....	47
4.3.2 Unit of Analysis.....	48
4.3.3 Sampling Method and Size.....	48
4.3.4 Measurement Instrument.....	49
4.3.5 Data Gathering Process .....	50
4.3.6 Analysis Approach.....	51
4.3.7 Ethical Consideration.....	53
4.3.7.1 Participants' Rights.....	53
4.3.7.2 Quality Control / Methodological Integrity .....	53
4.3.8 Limitations .....	54
4.4 Conclusion.....	55
<b>CHAPTER 5: PRESENTATION OF FINDINGS .....</b>	<b>56</b>
5.1 Introduction.....	56
5.2 Sample Description .....	56
5.3 Findings for Research Question One Themes.....	59
5.3.1 Findings for a Collaborative Practices Theme .....	60
5.3.2 Findings for a Evolution Collaborative Practices Theme.....	65
5.3.3 Findings for a Process Evolution Theme .....	71
5.3.4 Findings for a SCRes Theme .....	74
5.4 Findings for Research Question Two Themes.....	77
5.4.1 Findings for Challenges and Barriers to Buyer-Supplier Collaboration Themes.....	78
5.4.2 Findings for Solutions to Overcoming Collaboration Barriers Themes.....	82
5.4.3 Findings for Lessons Themes.....	86
5.5 Conclusion.....	89
<b>CHAPTER 6: DISCUSSION.....</b>	<b>91</b>

6.1	Introduction.....	91
6.2	Discussion to Findings for RQ1 .....	91
6.2.1	Collaborative Practices and Their Evolution .....	91
6.2.2	Process Evolution.....	98
6.2.3	SCRes .....	99
6.3	Discussion to Findings for RQ2 .....	100
6.3.1	Challenges and Barriers to Buyer-Supplier Collaboration.....	100
6.3.2	Solutions to Overcoming Collaboration Barriers .....	104
6.3.3	Lessons .....	108
6.4	Conclusion.....	111
	<b>CHAPTER 7: CONCLUSION.....</b>	<b>112</b>
7.1	Introduction.....	112
7.2	Summary of The Study.....	112
7.2.1	What was Studied and Relevance .....	112
7.2.2	Research Context and Relevance .....	114
7.2.3	Existing Knowledge and Research Gaps.....	114
7.3	Summary of The Research Questions and Methodology.....	115
7.3.1	Research Questions Addressed .....	115
7.3.2	Research Methodology.....	115
7.4	Key Findings and Their Interpretation.....	117
7.4.1	Evolution of Collaborative Practices .....	117
7.4.2	Process Evolution.....	119
7.4.3	Role of Practices in SCRes .....	119
7.4.4	Challenges and Barriers to Buyer-Supplier Collaboration.....	120
7.4.5	Solutions (Strategies and Enablers) to Collaboration and Barriers .....	120
7.4.6	Interpretation .....	121

7.5	Contribution to Scholarly Debate and Conceptual Framework .....	121
7.6	Managerial and Practical Implications .....	122
7.7	Limitations of the Study .....	123
7.8	Recommendations for Future Research .....	124
	<b>REFERENCES</b> .....	<b>125</b>
	<b>APPENDICES</b> .....	<b>141</b>
	Appendix 1: Semi- Structured Interview Guide .....	141
	Appendix 2: Consent Letter .....	143
	Appendix 3: High Level Audit Trail: Codes, Sub-Themes and Key Themes .....	144

## List of Figures

<b>Figure 1:</b> Conceptual framework for collaborative practices in enhancing SCRes	<b>39</b>
<b>Figure 2:</b> Coding process overview: Open, Axial and Selective Coding.....	<b>52</b>

## List of Tables

<b>Table 1:</b> Sample Description .....	<b>57</b>
<b>Table 2:</b> Themes, Sub-Themes and Codes Frequency.....	<b>58</b>
<b>Table 3:</b> Research Question One and Themes .....	<b>59</b>
<b>Table 4:</b> Research Question Two and Themes .....	<b>77</b>
<b>Table 5:</b> Pre and Post-Disruptions Collaborative Practices .....	<b>92</b>

## Abbreviations

SCRes	Supply Chain Resilience
SCC	Supply Chain Collaboration
GDP	Gross Domestic Product
RBV	Resource-Based View
VUCA	Volatile, Uncertain, Complex and Ambiguous
SCRM	Supply Chain Risk Management
IT	Information Technology
ERP	Enterprise Resource Planning
EDI	Electronic Data Interchange
RQ1/2	Research Question One or Two
P	Participant
FOB	Free on Board
CFR	Cost and Freight
SRM	Supplier Relationship Management
EXW	Ex Works
SLA	Service Level Agreement
JSE	Johannesburg Stock Exchange

# CHAPTER 1: INTRODUCTION TO THE RESEARCH PROBLEM

## 1.1 Contextual Background to the Topic

In today's globalised and interconnected business environment, supply chains are increasingly susceptible to various disruptions, including natural disasters, geopolitical conflicts, economic volatility, and other uncertainties (Shekarian & Mellat Parast, 2020; Yan et al., 2023; Kotzé et al., 2017). These disruptions can have far-reaching implications for organisational performance, profitability, and sustainability (Duong & Chong, 2020; Shekarian & Mellat Parast, 2020; Goel et al., 2021). Recent events such as the COVID-19 pandemic, the Russia-Ukraine conflict, and global trade shifts resulting in port congestion have further exposed the fragility and interconnectedness of supply chains and their susceptibility to external shocks (Svabova et al., 2022; Allam et al., 2022; Beškovnik et al., 2022; Kuźmicz, 2022).

The pandemic severely affected key supply chain players such as suppliers, manufacturers, and distributors (nodes), along with transportation and communication links (edges), surpassing the impacts of previous crises like 2003 SARS and 2009 H1N1 (Chowdhury et al., 2021). The disruptive impact of COVID-19 had severe consequences for the global economy, crippling multiple industries, with more than 94% of the top 1000 companies experiencing negative effects from the pandemic (El-Baz & Ruel, 2021). It led to a 29.6% average gross domestic product contraction across 64 countries, with 23.3% of the decline attributed to foreign shocks transmitted through global supply chains, emphasising the critical role of interdependence in amplifying or mitigating crises (Bonadio et al., 2021). Due to lockdown, the pandemic brought supply chains to a standstill, delaying production, and disrupting critical inputs such as semiconductors, critical for the automotive industry and imbalances in the perishable goods sector, where surging demand for some items contrasted with production cuts and spoilage losses in others (Pató et al., 2022; Ozdemir et al., 2022).

Meanwhile the Russia-Ukraine war further compounded global supply chain vulnerabilities, disrupting the export of wheat, maize, sunflower oil, and fertilizers, creating shortages, price spikes, and heightened food insecurity in regions heavily

reliant on these imports (Jagtap et al., 2022). The war intensified risks in energy supply chains, causing sharp price fluctuations and reshaping global energy trade patterns (Cui et al., 2023).

For South Africa's chemicals sector, an important contributor to the national economy, these global disruptions have intensified existing challenges, including an over-reliance on international supply chains and local infrastructure constraints, which are diminishing the country's competitiveness (Du Plessis, 2019; Misra, 2021; Mondliwa et al., 2021; Horner, 2021; Khuluvhe & Ganyaupfu, 2023). Recent disruptions have caused delays in importing raw materials, escalating input costs and weakening supplier networks, leaving the sector struggling to maintain operations and stay competitive. These challenges led to widespread job losses, with several companies laying off employees, while small enterprises faced even greater vulnerabilities, often resulting in business closures (Telukdarie et al., 2020). These compounded to the socio-economic crises in South Africa (Mbunge, 2020; Van Heerden, & Roos, 2021).

Against this backdrop, supply chain resilience (SCRes) has emerged as a critical concept in navigating these complexities and ensuring operational continuity. It emphasises the need for supply chains that can not only withstand and recover from unexpected disruptions but also evolve to meet future challenges more effectively (Jain et al., 2017; Juan et al., 2021; Yan et al., 2023). This recognition emphasises the strategic imperative of building resilient supply chains capable of sustaining competitiveness and fostering long-term sustainability in an increasingly uncertain global market (Shekarian & Mellat Parast, 2020; Juan et al., 2021; Ming et al., 2021).

Among the various enablers for enhancing SCRes, supply chain collaboration (SCC) stands out as a critical enabler for improving overall performance and adaptability (Adobor & McMullen, 2018; Han et al., 2020; Simba et al., 2017; Nickel & Schliebener, 2021; Juan et al., 2021; Oh et al., 2020; Tarigan et al., 2021; Zineb et al., 2017; El-Baz & Ruel, 2021; Kazancoglu et al., 2022; Aityassine et al., 2022). By fostering strong partnerships and aligning objectives, SCC enables organisations to gain a competitive advantage, respond effectively to market dynamics, and deliver consistent value to customers (Patel, 2023). This underlines the strategic importance

of collaboration as a cornerstone for building resilient and agile supply chains in today's volatile business landscape.

## **1.2 Research Problem and Statement**

While SCC has been extensively studied, there remains a need for an ongoing, comprehensive, and in-depth exploration of the role of collaboration network and its associated practices, particularly in the context of adapting to and managing ongoing disruptions.

Collaborative practices, including information-sharing, collaborative communication, resource-sharing, and joint knowledge creation, are consistently recognised for their role in enhancing SCRes (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson, 2021; Duong & Chong, 2020; Lotfi & Larmour, 2022). However, less-cited practices such as informal financial support, incentive alignment, joint planning and forecasting, and joint performance measurement appear to be highly context-specific, influenced by factors like industry dynamics, regional conditions, and the nature of disruptions. For instance, while decision synchronisation and incentive alignment have been emphasised in the European food processing industry (Scholten & Schilder, 2015), informal financial support plays a critical role in rural food supply chains in disaster-prone South Asia (Umar & Wilson, 2021). This variability reflect challenges in generalising collaborative practices across industries, regions, or types of disruptions. This perspective is supported by Kotzé et al. (2017), who recommended that future studies to assess the applicability of buyer-supplier collaborative practices into different industries, to evaluate whether findings and benefits of buyer-supplier collaboration observed in one industry can be generalised to another industry with comparable supply chain dynamics.

Lotfi and Larmour (2022) recommended examining how organisations have adapted vertical collaboration such as buyer-supplier relationships and its associate practices, and horizontal collaboration in the aftermath of COVID-19 to strengthen SCRes and leverage the opportunities for valuable real-life insights arising from the significant disruptions caused by the pandemic. However, recent studies on buyer-supplier collaboration rely on secondary data (Duong & Chong, 2020; Lotfi &

Larmour, 2022). While those based on empirical research in the area tend to focus on other narrow contexts of buyer-supplier collaboration, overlooking the specific role and adaptation of collaborative practices in enhancing SCRes (Villena et al., 2021; Mwesiumo et al., 2021; Nunes et al., 2022). Similarly, more recent studies conducted post-COVID-19 on buyer-supplier collaboration primarily focus on broader themes rather than specific collaborative practices (Akhavan & Philsoophian, 2023; Maleki et al., 2023).

Collectively, these studies highlight a lack of up-to-date empirical information on the role collaboration practices in other industries and their adaptation, particularly in response to recent disruptions like the COVID-19 pandemic and the Russia-Ukraine war, both of which significantly impacted supply chains to address gaps identified by Kotzé et al. (2017) and Lotfi & Larmour (2022). A concern, considering that SCRes is characterised by ongoing and dynamics efforts, rather than being a static concept (Novak et al., 2021; Patel, 2023).

Therefore, in light of recent and ongoing disruptions that have exposed critical weaknesses in supply chains, there is an urgent need to explore the evolution of buyer-supplier collaboration in response to recent disruptions. In addition, assess the applicability of buyer-supplier collaborative practices across industries to determine if benefits observed in one sector can be generalised to others with similar dynamics. Failure to address these, ongoing global disruptions could worsen supply chain vulnerabilities, increase operational costs, and threaten business continuity, particularly in South Africa's chemical sector, where SCRes is critical for the sector's competitive advantage and the country's economic stability.

### **1.3 Research Purpose**

The purpose of this study is to investigate the evolution of buyer-supplier collaboration for resilient supply chains within South Africa's chemical manufacturing sector, particularly in response to the recent disruptions. The chemical manufacturing sector in South Africa provides a valuable case study for examining SCRes, given its significant contribution to the country's economy and its role in global trade (Mugwenhi et al., 2019; Majozi & Veldhuizen, 2015). This is particularly relevant in

the context of recent challenges such as the global pandemic, port congestion, and other disruptions that have impacted the sector in recent years (Du Plessis, 2019; Misra, 2021; Mondliwa et al., 2021; Horner, 2021; Svabova et al., 2022; Allam et al., 2022; Bešković et al., 2022; Kuźmierz, 2022; Khuluvhe & Ganyaupfu, 2023).

Building on previous findings, this study aims to investigate existing buyer-supplier collaboration practices for resilient supply chain in South Africa's chemical manufacturing sector. To evaluate their alignment with findings from other industries and regions. By doing so, it seeks to provide valuable insights into their broader generalisation in managing disruptions, thereby addressing the research recommendation made by Kotzé et al. (2017).

Further to this, the study examines how buyer-supplier collaboration have evolved in response to recent disruptions to strengthen SCRes within the sector. It aims to address existing gaps in empirical research by identifying the adapted collaborative practices and processes or technologies employed to navigate recent disruptions, while also examining any new collaborative activities that may have emerged in response to recent disruptions. Thereby closing the research gap identified by Lotfi and Larmour (2022) and offer real-world insights based on recent disruptions.

In addition, the study includes the challenges encountered in managing buyer-supplier collaboration, the underlying factors driving these difficulties, and the strategies adopted to overcome them. It also share key lessons from these experiences. Ultimately, this research aims to provide a deeper understanding of the buyer-supplier collaboration and its adaptation in enhancing SCRes amidst ongoing disruptions.

#### **1.4 Research Significance**

The findings aim to contribute to both academic literature and practical applications, supporting organisations in building more resilient supply chains.

This study holds significant value for businesses, industry practitioners, and policymakers, offering insights to navigate an increasingly uncertain global

landscape. By identifying transferable practices and parallels across industries in the face of recent disruptions, it aims to provide real-world practical frameworks and innovative strategies for addressing vulnerabilities (Svabova et al., 2022; Jain et al., 2017; Yan et al., 2023; Du Plessis, 2019; Misra, 2021).

Focusing on the disruptions impacting South Africa's chemical manufacturing sector, the study is significant as it aims to empower businesses with effective buyer-supplier collaboration frameworks that enhance SCRes. It seeks to equip businesses with solutions to overcome buyer-supplier collaboration barriers for future resilience. The findings of this study will not only strengthen SCRes but also mitigate broader socio-economic consequences, such as job losses and business closures that result from supply chain disruptions (Telukdarie et al., 2020; Mbunge, 2020; Van Heerden, & Roos, 2021). By addressing systemic weaknesses and fostering a culture of collaboration and adaptability, this research contributes to building a more resilient industrial framework, reducing vulnerabilities, and promoting sustainable economic growth in South Africa.

Furthermore, this study is significant as it bridges a critical gap in recent research, which has predominantly relied on secondary data and has not adequately explored the evolving role of collaboration practices in strengthening SCRes in response to recent disruptions (Duong & Chong, 2020; Lotfi & Larmour, 2022; Villena et al., 2021; Mwesiumo et al., 2021; Nunes et al., 2022; Akhavan & Philsoophian, 2023; Maleki et al., 2023). Building on Kotzé et al.'s (2017) empirical research in South Africa, this study provides updated insights into collaborative practices and their relevance within the country's chemical manufacturing sector. By doing so, it also contributes to the broader body of research on these practices in developing countries, offering valuable insights into SCRes and collaboration dynamics.

## **1.5 Definition of Key Terms**

This section provides consolidated definitions of the key terms used in this study. The goal is to clarify their usage early in this study.

### 1.5.1 Supply Chain Resilience

**SCRes** refers to the capacity to foresee, plan for, respond to, adjust to, and recover from disruptions in a timely and cost-efficient manner, while learning from past experiences to improve future performance (Umar & Wilson, 2021; Aityassine et al., 2022; Shekarian & Mellat Parast, 2020).

### 1.5.2 Supply Chain Collaboration

**SCC** is defined as a coordinated approach where stakeholders work together, sharing resources and information to create mutual value and effectively address supply chain disruptions. This collaboration enhances flexibility, visibility, and responsiveness, improving overall preparedness, performance, and recovery during challenges (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson, 2021; Juan et al., 2021; Aityassine et al., 2022).

### 1.5.3 Buyer-Supplier collaboration

Buyer-supplier collaboration refers to a strategic partnership within the vertical supply chain ecosystem, emphasising the relationship between purchasing organisations (buyer) and their suppliers to enhance mutual value and performance (Scholten & Schilder, 2015; Kotzé et al., 2017; Sá et al., 2018).

## 1.6 Research Scope

This section gives an overview of what the report covers.

**Chapter 1:** This chapter establishes the foundation for the research by outlining its necessity, objectives, and scope. It highlights the increasing vulnerability of global supply chains to disruptions and emphasises the importance of SCRes and SCC in managing complexities, ensuring continuity, and maintaining competitiveness during unexpected disruptions. The chapter clearly defines the research problem and purpose, providing justification from both practical (business needs) and theoretical perspectives to underscore the study's relevance and contribution. Lastly, gives

consolidated definitions of the key terms used in this study.

**Chapter 2:** This chapter introduces the theoretical framework for the study, provides and overview of South Africa's chemical manufacturing sector, and offers an in-depth examination of the two key constructs such as SCRes and SCC.

**Chapter 3:** This chapter explores the two research questions, which also served as the foundation for developing the semi-structured interview guide.

**Chapter 4:** This chapter outlines the research methodology, detailing the exploratory design, interpretivist philosophy, and qualitative approach used to investigate buyer-supplier collaboration. It highlights the data collection methods, ethical considerations, and limitations, providing a framework for understanding the study's rigorous and context-specific approach.

**Chapter 5:** This chapter presents the findings organised into seven key themes identified through thematic analysis of data collected from semi-structured interviews. The themes include collaborative practices, evolution of collaborative practices, process evolution, SCRes, challenges to buyer-supplier collaboration, solutions to collaboration barriers, and lessons learnt. These findings offer valuable insights into the dynamics of collaboration and resilience in supply chains.

**Chapter 6:** This chapter presents a comprehensive discussion of the findings in relation to two key research questions. The discussion critically evaluates the findings (Chapter 5) by integrating insights from the literature review (Chapter 2) to determine the extent to which the findings align with, extend, or challenge existing theoretical perspectives on buyer-supplier collaboration and supply chain resilience.

**Chapter 7:** This chapter summarises what was studied and the study's key findings on the evolution of buyer-supplier collaboration for resilient supply chains in South Africa's chemical manufacturing sector, drawing comprehensive conclusions that directly address the study's objectives.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The previous chapter introduced the study's background, research problem, and objectives, outlining the scope of this study. Building on this foundation, this chapter reviews the literature on the two key constructs such as SCRes and SCC. It synthesises current debates and research in these fields while identifying research gaps related to SCC.

The chapter begins by providing context on South Africa's chemical sector, followed by an overview of the key theoretical framework guiding the study. It then examines SCRes and its key enablers, comparing perspectives from both developed and developing countries. Following this, the focus shifts to SCC, analysing collaborative practices and identifying existing research gaps.

The discussion also highlights challenges and barriers to collaboration, along with foundational enablers and strategies to overcome collaboration barriers. The chapter concludes by presenting an adapted conceptual framework for collaborative practices for enhancing SCRes, illustrating how effective SCC enhances SCRes during disruptions.

### **2.2. South Africa's Chemical Sector**

The South African chemical sector is the largest and most advanced in Africa, serving as a key driver of economic growth and contributing significantly to the country's industrial development and socio-economic well-being. It contributes significantly to the national GDP and manufacturing output (Mugwenhi et al., 2019; Majozi & Veldhuizen, 2015). The industry has historical roots dating back to the late 19th century, when the discovery of diamonds (1868) and gold (1886) led to increased demand for explosives and other industrial chemicals to support mining operations. The chemical sector evolved around coal gasification and synthetic fuel production, a unique characteristic that still defines the industry today (Majozi & Veldhuizen, 2015).

Majozi and Veldhuizen (2015) also highlighted that South Africa has the most diverse chemical industry in Africa, comprising 11 key sub-sectors. These include plastic products, consumer chemicals, inorganic chemicals, primary polymers and rubbers, pharmaceuticals, rubber products, bulk formulated organic chemicals, specialty chemicals, fine chemicals, and liquid fuels. The sector provides employment opportunities for approximately 171,376 individuals and several major companies operate within South Africa's chemical sector, including Sasol Limited, AECI Limited, Omnia Holding Limited, Dow, BASF SE, Clariant, Brother Enterprises, Afrox, Foskor, Renergen, and Pelchem. In recent years, new investments have been made by companies such as Anaex, Brother Enterprises, Dry Ice International, and Petregaz SA, further expanding the sector's footprint (InvestSA, 2025).

### **2.3 Theoretical Framework**

The study integrates three theoretical frameworks Resource-Based View (RBV), Dynamic Capabilities, and the Stakeholder Model to offer a comprehensive understanding of the evolution of buyer-supplier collaboration in enhancing SCRes in the South Africa's chemical manufacturing sector. These frameworks are interconnected and collectively address the complexities of buyer-supplier collaboration, where RBV explores internal resource optimisation, dynamic capabilities enable adaptability to disruptions, and the stakeholder model ensures alignment with external actors, creating a comprehensive strategy for the evolution of buyer-supplier collaboration in volatile environments. These were selected due to their widespread use among scholars in the field of SCRes and SCC (Co & Barro, 2009; Ponomarov, 2012; Brandon-Jones et al., 2014; Chen et al., 2017; Shahbaz et al., 2018; Aslam et al., 2020; El-Baz & Ruel, 2021; de Arroyabe et al., 2023).

The RBV emphasises that a firm's competitive advantage stems from its unique tangible and intangible resources and capabilities, which must be valuable, rare, inimitable, and non-substitutable (Barney, 1991; Barney, 1991, as cited in El-Baz & Ruel, 2021). Recognised as one of the most influential theories in strategic management, and has been widely adopted across various disciplines (Freeman et al., 2021).

In the context of SCRes, RBV demonstrated how strategically leveraging or bundling critical resources helps organisations strengthen capabilities such as risks management and responsiveness to achieve a competitive edge (Brandon-Jones et al., 2014; El-Baz & Ruel, 2021). However, while RBV has made significant contributions, it has been widely criticised for its static nature, which overlooks how firms adapt and manage resources in dynamic and uncertain environments (Ponomarov, 2012; El-Baz & Ruel, 2021). Critics argue that its inward-focused perspective is restrictive, as it fails to account for the complex external challenges organisations frequently encounter and how their actions influence resource effectiveness over time (Kozlenkova et al., 2014; Kojana, 2020). This limitation stems from RBV's assumption of a relatively stable environment, which contrasts with the reality of modern global supply chains and interconnected business landscapes that are increasingly vulnerable to disruptions such as natural disasters (e.g., earthquakes, hurricanes, and pandemics), geopolitical conflicts, economic volatility, and other uncertainties (Kotzé et al., 2017; Shekarian & Mellat Parast, 2020; Yan et al., 2023).

In contrast, the dynamic capabilities framework, introduced by Teece et al. (1997) addresses this limitation, by emphasising a firm's ability to sense, seize, and reconfigure resources and capabilities to navigate rapidly changing environments. Dynamic capabilities play a critical role in enabling supply chains to function effectively amidst volatile and rapidly shifting conditions (Aslam et al., 2020). Therefore, an integrated approach combining RBV's resource efficiency with dynamic capabilities' adaptability offer a more balanced resilience strategy (El-Baz & Ruel, 2021; Barney et al., 2021). These dynamic capabilities are particularly critical in volatile, uncertain, complex, and ambiguous (VUCA) environments, where organisations must detect early signals, capitalise on emerging opportunities, and adapt their operations to address and mitigate disruptive challenges (Schoemaker et al., 2018). The synergy between RBV and dynamic capabilities has been widely recognised in resilience research, with scholars demonstrating how their integration strengthens adaptability and SCRes (Ponomarov, 2012; El-Baz & Ruel, 2021). For instance, El-Baz and Ruel (2021) illustrated how organisations can reconfigure, integrate, and adapt their risk management capabilities to navigate uncertainties and disruptions such as those caused by the COVID-19 pandemic. This highlights that

this hybrid approach provides a dual perspective, where RBV identifies and optimises internal resources, while dynamic capabilities ensure continuous adaptation to evolving challenges. However, to fully realise resilience, collaboration must extend beyond internal adaptations to include alignment with external stakeholders, which is where the stakeholder model plays a critical role.

The stakeholder model, introduced by Freeman (1984), expands RBV and dynamic capabilities by emphasising the roles, interests, and influence of all supply chain actors, including suppliers, customers, employees, shareholders, and investors (Mahajan et al., 2023). Stakeholder theory defines stakeholders as individuals or groups who either influence an organisation's ability to achieve its objectives or are affected by its success in meeting those objectives (Ahmed et al., 2020). This theory is widely recognised across disciplines, providing a framework for understanding stakeholder relationships, their interests, and their impact on organisational goals and responsibilities for shared purpose (Chen et al., 2017; Shahbaz et al., 2018).

In the context of SCC, this theory has been used to examine the roles of both primary stakeholders, such as buyers and suppliers, and secondary stakeholders, including government and organisations with shared interests, in achieving shared resilience goals (Chen et al., 2017; de Arroyabe et al., 2023). For instance, research by Scholten and Schilder (2015), Kotzé et al. (2017), and Umah and Wilson (2021) highlighted that organisations leveraging collaboration among stakeholders whether buyers, suppliers, government, or competitors enhanced their resilience and maintained operations despite disruptions.

Therefore, this study integrates stakeholder theory with RBV and dynamic capabilities to highlight the interplay between buyer-supplier partnership and their alignment with internal resource utilisation (RBV) and dynamic adaptation (Dynamic Capabilities) in nurturing SCRes. By combining all these three frameworks, the study offers a holistic illustration on how buyers and supplier within South Africa's chemical sector have sensed, seized and transformed their internal resources and capabilities such as collaborative practices, processes and many others, to ensure sustained collaboration and SCRes against recent unpredictable dynamic disruptions.

## 2.4 Supply Chain Resilience

SCRes has gained significant attention in the context of global disruptions, such as the COVID-19 pandemic, natural disasters, and geopolitical conflicts and their potential effects on business competitiveness and sustainability (Simba et al., 2017; Han et al., 2020).

The concept of SCRes has been defined in various ways across the literature, with subtle yet important differences in emphasis that reflect diverse perspectives on its key attributes and priorities. Umar and Wilson (2021) defined SCRes as the capacity of a supply chain to sustain the necessary levels of preparedness, response, and recovery to effectively manage various disruptions. This capability allows supply chains to recover to their original state or achieve an improved state following a disruption. Aityassine et al. (2022) further defined it as the adaptive capability of a supply chain to prepare for and respond to disruptions, enabling timely and cost-effective recovery and progression to a post-disruption operational state ideally, an improved state compared to before the disruption. According to Shekarian and Mellat Parast (2020), the concept of SCRes in existing literature emphasises the ability to recover and adapt, while comparatively less attention is given to the capacity to anticipate disruptions and learn from past experiences.

Several studies have identified key enablers of SCRes, including supply chain agility, supply chain flexibility, supply chain redundancy, supply chain robustness, supply chain risk management, and SCC, which effectively mitigate various types of disruptions (Jain et al., 2017; Simba et al., 2017; Shekarian & Mellat Parast, 2020; El-Baz & Ruel, 2021; Aityassine et al., 2022; Kazancoglu et al., 2022; Ming et al., 2021; Juan et al., 2021; Dickens et al., 2023).

**Supply chain agility** is defined as the capability to rapidly respond to unforeseen shifts, while enabling a company to adapt its operations, processes, and strategies to remain efficient and competitive in a constantly evolving business environment (Aityassine et al., 2022). Similarly, it is a firm's ability to adapt efficiently to uncertainty and market volatility, enabling businesses to swiftly navigate industry fluctuations and manage both expected and unexpected disruptions in the supply

network (Shekarian & Mellat Parast, 2020). At a broader level, agility reflects a company's ability to adjust its global supply networks in response to shifting conditions and the speed at which these adjustments are executed (Kazancoglu et al., 2022). Building on this, supply chain agility is a network's ability to swiftly adjust and respond to shifting market conditions through seamless synchronisation across stakeholders, enabled by real-time visibility for responsive and informed decision-making (Juan et al., 2021). Together, these perspectives emphasise that supply chain agility is not just about speed but also about coordinated adaptability and visibility.

Agility is built on key three factors such as flexibility, which allows firms to adapt processes to changing requirements; velocity, referring to the speed of execution and response; and visibility, ensuring real-time access to information for synchronised decision-making (Juan et al., 2021). However, some studies distinguish supply chain agility and supply chain flexibility as separate constructs that enhance SCRes independently (Shekarian & Mellat Parast, 2020; Aityassine et al., 2022). This distinction is confusing, as it contradicts definitions of agility that emphasise flexibility in a form of "company's ability to adapt or adjust to disruption". It also conflicts with Juan et al. (2021), who asserted that agility is inherently built on flexibility, visibility, and velocity implying that the presence of flexibility should inherently signify agility. Therefore, this study will treat flexibility as a key factor of agility to align with its definition and Juan et al. (2021). Agility supports firms in responding profitably to unpredictable market changes (Kazancoglu et al., 2022) and ensures swift satisfaction of customer needs through rapid adaptation (Aityassine et al., 2022). This comprehensive capability allows firms to navigate uncertainty and volatility effectively, thereby improving overall supply chain performance and resilience (Juan et al., 2021).

Similarly, **Supply Chain Risk Management (SCRM)** plays a crucial role in strengthening resilience. SCRM involves recognising and addressing potential risks within the supply chain through coordinated strategies among partners (Munir et al., 2020). This process includes applying approaches to manage both routine and unexpected challenges, relying on continuous evaluation of threats to minimise vulnerabilities and ensure operational continuity (Simba et al., 2017). Key steps in

SCRM encompass risk identification, impact assessment, implementation of risk mitigation strategies, and ongoing monitoring and tracking of these measures (Zineb et al., 2017; Simba et al., 2017; El-Baz & Ruel, 2021). When effectively applied across all supply chain stages, SCRM enhances organisational performance and SCRes, ultimately sustaining a competitive advantage (Waqas et al., 2023).

#### 2.4.1 SCRes Enablers in Developed Countries

A review of SCRes literature across developed countries identifies several consistent enablers, including SCC, supply chain agility (flexibility, velocity, and visibility), and SCRM practices.

SCC is widely recognised as a key driver of SCRes across various industries and regions. For instance, in the **United Kingdom** manufacturing sector, Brandon-Jones et al. (2014) emphasised that SCC, supported by information sharing and connectivity, enhance supply chain visibility, enabling proactive risk identification and seamless data exchange among partners to mitigate supply chain disruptions. Similarly, Scholten and Schilder (2015) highlighted the mediating role of SCC in enhancing SCRes. Their study on the **Netherlands'** food processing sector demonstrated that SCC through collaborative activities foster trust and coordination, enabling more agile responses to disruptions.

Expanding on these findings, Oh et al. (2020) examined **Korean** SMEs across various industries and found that SCC, supported by strong supply chain integration, positively impacts contingency management, ultimately enhancing operational performance and SCRes during the COVID-19 era. Further reinforcing this perspective, Nickel and Schliebener (2021) examined the **German and Scandinavian** automotive industries, emphasising SCC's role in enhancing SCRes through integration of collaborative strategies particularly inter-organisational planning and information sharing. Meanwhile, Juan et al. (2021) examined **Taiwan's** high-tech and traditional manufacturing industries, proposing a SCRes framework that highlighted how supply SCC promotes supply chain agility (flexibility, velocity, and visibility) and supply chain robustness, which in turn boosts performance under disruption and ultimately enhances SCRes. This suggests that SCC is a critical driver

of SCRes, acting as the glue that connects even other SCRes enablers such as supply chain agility and robustness.

Differences emerge in how collaboration functions in terms of practices and supporting factors across industries and geographies. Some studies emphasise broader collaborative activities (Scholten & Schilder, 2015), while others focus on narrowed activities such as information sharing, connectivity, and planning (Brandon-Jones et al., 2014; Nickel & Schliebener, 2021). Furthermore, others emphasise integrated processes along SCC to enhance SCRes (Oh et al., 2020). Despite these variations, cross-contextual evidence consistently identified SCC as a key universal enabler of SCRes and a catalyst for other SCRes enablers across developed countries (Scholten & Schilder, 2015; Oh et al., 2020; Juan et al., 2021).

EI-Baz and Ruel (2021) demonstrated SCRM's mediating role in enhancing SCRes and robustness in **French** supply chains, emphasising that effective SCRM relies on adopting SCRM practices, supported by SCC with supply chain partners. Similarly, Nickel and Schliebener (2021) emphasised the importance of a strong SCRM culture in **German and Scandinavian** supply chains, as actively fostering awareness, preparedness, and risk-conscious decision-making enhances SCRes. The collective evidence strongly reinforces that a structured approach to SCRM is critical for enhancing SCRes across different regions, with SCC playing a key supporting role. While Nickel and Schliebener (2021) do not explicitly emphasise collaboration, fostering awareness, preparedness, and risk-conscious decision-making within supply chain networks inherently requires some degree of collaboration to ensure alignment among stakeholders.

Nickel and Schliebener (2021) identified **supply chain agility** as another critical SCRes enabler facilitated by flexibility, visibility and velocity that strengthen the **German and Scandinavian** automotive industries during COVID-19 era. This aligns with findings from **Taiwan**, where supply chain agility is driven by flexibility, a key component supported by visibility and velocity. While visibility and velocity do not directly impact supply chain performance under disruption, they enhance it through supply chain flexibility (Juan et al., 2021). These findings further reinforce supply

chain agility as a crucial enabler of resilience across diverse regional contexts in developed countries.

Building on these perspectives, Shekarian and Mellat Parast (2020) conducted a literature-based study in the United States, analysing key supply chain enablers such as flexibility, agility, SCC, and redundancy. Their findings identified flexibility (43%), SCC (27%), and agility (19%) as the most influential enablers of SCRes, while redundancy (11%) had the least impact. When integrating flexibility into agility, this aligns with studies that identify supply chain agility and SCC as key enablers of SCRes (Nickel & Schliebener, 2021; Juan et al., 2021; Brandon-Jones et al., 2014; Scholten & Schilder, 2015; Oh et al., 2020).

#### **2.4.2 SCRes Enablers in Developing Countries**

A review of the literature on SCRes across developing countries reveals the interplay of SCC and agility in SCRes as dominant enablers, while also highlighting regional variations of certain SCRes enablers such as SCRM, digital technologies, social networks, and intellectual capital, each adapted to unique regional challenges.

**SCC** is consistently identified as a critical enabler of SCRes across several regions in developing countries. Kotzé et al. (2017) highlighted that in the **South African** petrochemical industry, buyer-supplier collaboration enhances antecedents of SCRes such as visibility, velocity, and flexibility, which collectively enhance SCRes. Similarly, Tarigan et al. (2021) highlighted the critical role of strong supply chain partnerships in the **Indonesian** manufacturing sector, which not only enhance agility and SCRes but also mediate the relationship between internal integration and sustainable competitive advantage. These findings suggest that SCC is a universal enabler of resilience in developing countries.

Tarigan et al. (2021) examined the **Indonesian** manufacturing sector and highlighted the critical role of **supply chain agility** in strengthening SCRes. This aligns with Kazancoglu et al. (2022), whose research on Turkey's food, automotive, textile, and energy industries during COVID-19 demonstrated that **supply chain agility** influenced by flexibility enhance responsiveness, playing a critical role for sustaining

global supply chains during crises. They reinforced the idea that while flexibility alone contributes to responsiveness, an agile supply chain helps translate flexibility into faster and more efficient responses to disruptions. Expanding on this, in **Malaysia**, Akhtar et al. (2022) elaborated how real-time information, facilitated by an industrial digital ecosystem, enhances operational agility in the service sector by enabling swift decision-making, ultimately strengthening SCRes. Meanwhile, Mubarik et al. (2021b) reaffirmed a framework in **Malaysia**, demonstrating that supply chain visibility, a key component of agility, mediates the relationship between supply chain mapping and SCRes. Highlighting that supply chain mapping enhances visibility, which in turn strengthens SCRes. These findings reinforce that supply chain agility is a critical enabler of resilience, shaped by flexibility and visibility across different regional contexts. However, these factors of resilience such as flexibility and visibility how they influence agility may be regional specific.

Building on this, in the **Moroccan** manufacturing sector, Zineb et al. (2017) examined supply chain flexibility, SCC, and supply chain redundancy in enhancing SCRes. Their findings revealed that redundancy has limited to no impact on SCRes and remains a costly strategy for businesses, while SCC had the greatest impact on SCRes, followed by supply chain flexibility. On the contrary, Aityassine et al. (2022) found in **Jordan** that supply chain flexibility had a limited impact on supply chain performance, with its effects primarily observed through SCC and supply chain agility. This finding highlights conflicting perspectives on supply chain flexibility as a stand-alone construct. However, it aligns with the broader view that supply chain agility and SCC are the key drivers of SCRes (Kotzé et al., 2017; Tarigan et al., 2021; Mubarik et al., 2021b; Kazancoglu et al., 2022; Akhtar et al., 2022). Collectively, these findings underscore the multifaceted nature of SCRes, where supply chain agility, SCC, and technology interact in varying degrees across different contexts. Aligning with a study in China by Ming et al. (2021) which highlighted the transformative role of digital technologies in enhancing SCRes in manufacturing sector.

SCRM was also identified across different regions. In **South Africa**, Simba et al. (2017) identified SCRM as an important enabler of SCRes, by minimising disruptions and ensure continuity, particularly within the grocery manufacturing sector. This

aligns with the findings of Mustafa et al. (2018), whose study highlighted the importance of proactive SCRM practices in the **Malaysian** manufacturing industry. This study emphasised the need for timely risk responses, effective communication, and strong supplier collaboration as essential strategies to mitigate supply chain disruptions and maintain operational continuity. This suggests that collaboration serves as a foundational layer that reinforces SCRM. Expanding on this perspective, a study on **Malaysian** fresh fruit and vegetable agribusiness entrepreneurs demonstrated that SCRM moderates the impact of supply chain risks on overall supply chain performance (Waqas et al., 2023). Their findings introduce a performance-driven lens, suggesting that SCRM not only mitigates disruptions but also enhances competitiveness in volatile environments.

In **Ghana**, Asamoah et al. (2020) highlighted the role of social networks in resource-limited environments, showing that SCRes mediates their impact on customer-oriented performance, leveraging relationships to improve outcomes. In **Pakistan**, Mubarik et al. (2021a) confirmed the critical role of intellectual capital in ensuring SCRes within the processed food sector. These findings emphasise the influence of region-specific factors in shaping resilience strategies.

#### **2.4.2 Comparative Insights on SCRes Enablers in Developed and Developing Contexts**

Across developed countries, SCRes is consistently underpinned by SCC, supply chain agility (flexibility, velocity, and visibility), and SCRM (Scholten & Schilder, 2015; Nickel & Schliebener, 2021; Juan et al., 2021; Oh et al., 2020; Shekarian & Mellat Parast, 2020; El-Baz & Ruel, 2021). Conversely, in developing countries, dominant enablers such as SCC, supply chain agility, and SCRM have been consistently observed across various regions (Kotzé et al., 2017; Simba et al., 2017; Tarigan et al., 2021; Mubarik et al., 2021b; Kazancoglu et al., 2022; Akhtar et al., 2022; Waqas et al., 2023). Highlighting these mechanisms as universal enablers of SCRes in both developing and developed contexts.

However, enablers such as digital transformation, social networks, and intellectual capital were predominantly observed in developing countries, with each being

adapted to address unique regional challenges (Asamoah et al., 2020; Ming et al., 2021; Mubarik et al., 2021a). These enablers not only mitigate supply chain disruptions but also enhance performance and sustainability in resource-constrained environments (Tarigan et al., 2021; Kazancoglu et al., 2022; Ming et al., 2021; Asamoah et al., 2020; Mubarik et al., 2021a). Furthermore, supply chain redundancy had a measurable impact in developed countries, though it was less influential than other SCRes enablers (Shekarian & Mellat Parast, 2020). In developing countries, however, it had limited to no impact and was perceived as a costly and impractical strategy for businesses (Zineb et al., 2017). These suggest that certain SCRes enablers should be tailored to the economic and operational realities of different regions, as a one-size-fits-all approach is ineffective. This perspective aligns with Poo et al. (2024), emphasising tailored strategies for varying resilience levels between developing and developed countries.

Contextualising these findings, while other SCRes enablers such as SCRM, supply chain agility and robustness, contribute to SCRes; in both contexts SCC stands out for its role in influencing SCRM to enhance SCRes (Mustaffa et al., 2018; El-Baz & Ruel, 2021; Nickel & Schliebener, 2021). Similarly, Juan et al. (2021) emphasised SCC being significant influence to supply chain agility and robustness. Ultimately, making SCC a key enabler of SCRes and a catalyst for integrating other resilience enablers, making it fundamental for driving inter-organisational efforts to manage disruptions and achieve shared goals.

## **2.5 Supply Chain Collaboration**

SCC is a key mechanism for organisations seeking to improve their performance and resilience within supply chains (Adobor & McMullen, 2018; Han et al., 2020). This collaborative approach involves various stakeholders working together to achieve mutual benefits and create value across the supply chain network (Aityassine et al., 2022). It fosters inter-organisational teamwork and resource sharing to collectively address disruptions and challenges (Juan et al., 2021). The importance of collaboration within supply chains lies in its ability to enhance flexibility, visibility, and velocity thus enabling better preparedness, response, performance, and recovery during disruptions (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson,

2021; Juan et al., 2021). According to Kumar et al. (2017), organisations collaborate with their supply chain partners to manage internal and external pressures such as disruptions, globalisation, and competition. These pressures drive the need for strategic alignment and operational efficiency, compelling firms to extend their planning beyond their boundaries. Ultimately, organisations that accept collaboration with suppliers are able to create a competitive edge, deliver value to customers, and adapt to market changes (Patel, 2023).

Within SCC, two key dimensions are often explored such as vertical and horizontal (Umar & Wilson, 2021; Lotfi & Larmour, 2022; Mustapha et al., 2022). Vertical collaboration involves organisations at different levels of the supply chain, such as customers or buyers and suppliers. Horizontal collaboration, on the other hand, involves organisations at the same tier of the supply chain, including competitors and entities such as governments, research centres and many more, to enhance supply chain resilience (Umar & Wilson, 2021; Mustapha et al., 2022; Lotfi & Larmour, 2022; Sá et al., 2018). Building on these foundations, the buyer-supplier collaboration level represents a specific form of partnership within the vertical supply chain ecosystem (Scholten & Schilder, 2015) that focuses on the relationship between purchasing organisations (buyers) and their suppliers (Kotzé et al., 2017; Sá et al., 2018). A cooperative partnership between buyers and suppliers is the key element of SCC for effectively handling disruption risks (Shekarian & Mellat Parast, 2020).

Azadegan and Dooley (2021) introduced a three-tier collaboration network for complex adaptive systems. At the micro-level, buyers and suppliers work directly to prevent and recover from supply risks. Organisations, including opponents, collaborate with entities like government agencies or trade associations to manage long-term supply risks at the macro level. These two levels correspond to vertical and horizontal networks. The Meso-level arises when multiple micro and macro-level supply networks join forces to address immediate to intermediate-term supply risks, allowing for more flexible and spontaneous collaborations than the other two levels.

Various studies have explored and emphasised collaborative practices within collaboration networks that enhance SCRes. These include information sharing, collaborative communication, informal financial support, and joint activities such as

joint knowledge creation, joint incentive-alignment, resource-sharing, decision synchronisation, joint planning and forecasting, and joint performance measurement (Scholten & Schilder, 2015; Kotzé et al., 2017; Duong & Chong, 2020; Umar & Wilson, 2021; Mustapha et al., 2022; Lotfi & Larmour, 2022). Such practices improve velocity, flexibility, and visibility, ultimately contributing to greater SCRes (Kotzé et al., 2017; Juan et al., 2021). These practices are discussed in greater detail below.

### 2.5.1 Buyer-Supplier Collaboration across Different Studies and Gaps

A synthesis of the reviewed studies on buyer-supplier collaboration reveals several key collaborative practices that enhance SCRes. These practices include **information-sharing, collaborative communication, decision synchronisation, resource-sharing, and joint knowledge creation** which consistently emerge as primary collaborative practices that enhance resilience. However, practices like **incentive alignment, joint planning and forecasting, informal financial support, and joint performance measurement** are observed less frequently.

In the European food processing industry, Scholten and Schilder (2015) examined collaborative practices through primary data from buyer-supplier relationships. This study highlighted key practices such as **information-sharing, collaborative communication, joint knowledge creation**, and joint relationship efforts such as **resource-sharing, decision synchronisation, and incentive alignment**. Notably, decision synchronisation through joint problem-solving and resource-sharing emerged as critical elements of joint activities practices.

Similarly, Kotzé et al. (2017) investigated buyer-supplier collaboration in the South African petrochemical industry using semi-structured interviews with key industry stakeholders. The study revealed **information-sharing, collaborative communication, joint knowledge creation**, and collective efforts such as **decision synchronisation, and resource-sharing** as collaborative practices enable SCRes by improving antecedent supply chain such as flexibility, velocity, and visibility.

Duong and Chong (2020) reinforced these perspectives through a systematic literature review of supply chain collaboration during disruptions across various

industries. The review identified **information-sharing**, **incentive alignment**, and joint activities practices such as **decision synchronisation**, and **joint planning and forecasting** as key collaborative practices that enhance resilience by improving visibility and coordination.

Umar and Wilson (2021) investigated collaboration in disaster-prone rural food supply chains in South Asia using multiple case studies. This study identified **effective communication**, **information-sharing**, and expanded the list with **informal financial support** as key practices that enhance SCRes by improving velocity, flexibility, and visibility during natural disasters, where mutual dependence and trust are essential.

Similarly, Lotfi and Larmour (2022), in a systematic literature review of vertical and horizontal collaboration networks, identified a comprehensive set of practices, including **information-sharing**, **incentive alignment**, and joint activities such as **decision synchronisation**, **collaborative communication**, **joint knowledge creation**, **resource-sharing**, **joint planning and forecasting**, and **joint performance measurement**. Highlighted that these practices are critical in enhancing SCRes by promoting greater integration and coordination.

Finally, Mustapha et al. (2022) examined global supply chain recovery during the COVID-19 pandemic through a systematic review. This study reinforced the importance of collaborative **resource-sharing** specifically of labour, material, and information resources as critical for resilience and recovery. Demonstrated that these collaborative efforts significantly improve supply chain performance during disruptions.

While practices like **information-sharing**, **resource-sharing**, **collaborative communication**, **decision synchronisation**, and **joint knowledge creation** are consistently identified across studies (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson, 2021; Duong & Chong, 2020; Lotfi & Larmour, 2022). The frequency and relevance of practices such as informal financial support, incentive alignment, joint risk planning and forecasting, and joint performance measurement less cited, may be highly context-specific, influenced by industry dynamics, regional conditions,

and the nature of disruptions. For example, decision synchronisation and incentive alignment were emphasised in the European food processing industry (Scholten & Schilder, 2015), while informal financial support was highlighted as critical in rural food supply chains in disaster-prone South Asia (Umar & Wilson, 2021), reflecting distinct regional and situational needs.

Moreover, the reviewed empirical studies primarily focus on specific industries or regions, such as food processing in Europe (a developed region), petrochemicals in South Africa (a developing region), and rural food supply chains in South Asia (developing regions) (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson, 2021). While these studies offer valuable insights, additional research is necessary to validate these findings and confirm applicability in other industries. These insights highlight the challenge of generalising collaborative practices in other industries, regions, or base on types of disruptions. This perspective is supported by Kotzé et al. (2017), who recommended that future studies to assess the applicability of buyer-supplier collaborative practices into different industries, to evaluate whether findings and benefits of buyer-supplier collaboration observed in one industry can be generalised to another industry with comparable supply chain dynamics.

Lotfi and Larmour (2022), who explored systematic literature review recommended examining how organisations have adapted vertical collaboration, such as buyer-supplier relationships and its associated practices, and horizontal collaboration in the aftermath of COVID-19 to strengthen SCRes and leverage the opportunities for valuable real-life insights arising from the significant disruptions caused by the pandemic. A perspective further highlighted by the emergence of informal financial support in disaster-prone South Asia (Umar & Wilson, 2021). This evolution possibly highlights how different disruptions can prompt the adoption of new collaborative practices or strategies, suggesting the importance of continuously updating frameworks based on real-world events.

However, recent studies on buyer-supplier collaboration that cover collaborative practices often rely on secondary data (Duong & Chong, 2020; Lotfi & Larmour, 2022). Those based on empirical research on buyer-supplier collaboration tend to focus on narrow contexts, overlooking the specific role and adaptation of

collaborative practices in enhancing SCRes in other industries (Villena et al., 2021; Mwesiumo et al., 2021; Nunes et al., 2022). For instance, Villena et al. (2021) examined the potential negative effects of excessive collaboration, highlighting strategies to manage complexities and mitigate risks to improve performance. Similarly, Mwesiumo et al. (2021) emphasised the importance of strategic buyer-supplier relationships, joint risk management, and addressing multi-tier supply chain risks to enhance resilience. Nunes et al. (2022) focused on identifying and overcoming collaborative challenges within supply chain networks to strengthen resilience and sustainability.

Studies conducted more recent (post-COVID-19) on buyer-supplier collaboration primarily focus on broader themes rather than specific collaborative practices (Akhavan & Philsoophian, 2023; Maleki et al., 2023). For instance, Akhavan and Philsoophian (2023) examined the role of blockchain technology and SCRes in enhancing collaboration and performance. Similarly, Maleki et al. (2023) explored buyer-supplier relationships through the lenses of sustainability and resilience, presenting an integrated framework based on a systematic literature review of 187 articles to synthesise factors influencing buyer-supplier relationships.

Collectively, these studies highlight the scarcity of recent empirical data on the role of collaboration practices across various industries and their adaptations, particularly in response to significant disruptions such as the COVID-19 pandemic and the Russia-Ukraine war. These events have profoundly impacted supply chains, highlighting gaps previously identified by Kotzé et al. (2017) and Lotfi & Larmour (2022). This emphasises the need for further research to investigate contemporary collaborative practices in greater detail expanding from existing literature, ensuring they remain relevant to current challenges and disruptions.

#### **2.5.1.1 Information-Sharing**

Information plays a critical role in SCC, as most decisions and their outcomes rely on the quality and availability of information. Scholten and Schilder (2015) defined information sharing as the degree to which a firm shares a range of relevant, accurate, complete, and confidential ideas, plans, and procedures with its supply

chain partners in a timely manner. Similarly, Kotzé et al. (2017) described it as the extent to which one party within the supply chain shares essential and proprietary information with another. Mustapha et al. (2022) further highlighted the importance of the timely exchange of relevant, accurate, and complete information for enhancing visibility, improving decision-making, and enabling immediate corrective actions to prevent disruptions. By ensuring the seamless flow of timely, relevant, and accurate information, firms can create an integrated supply chain network where visibility, collaboration, and agility are enhanced, leading to superior performance outcomes even when small medium manufacturing enterprises face constraints such as limited technological and financial resources (Baah et al., 2021).

Effective information sharing involves various aspects such as sharing point-of-sale data like purchase orders, inventory levels, demand forecasts, shipping details, anticipated disruptions, market trends, maintenance plans, and lead times (Scholten & Schilder, 2015; Lotfi & Larmour, 2022). However, achieving this level of data exchange requires a fundamental shift from conventional business practices toward greater transparency in sharing inventory levels, demand projections, planning processes, and financial data, fostering stronger cooperation among supply chain partners (Kotzé et al., 2017).

This includes sharing a vision in buyer-supplier supply chain relationships, which is crucial for fostering alignment, goal congruence, and a unified strategic direction. A shared vision provides clear goals and strategies, guiding firms in identifying and capitalising on opportunities while aligning priorities and values. When partners articulate their goals transparently, they create a structured framework that enhances collaboration and decision-making. By establishing clear objectives, firms can develop strategic roadmaps that ensure all stakeholders understand the necessary steps to achieve success, ultimately strengthening relationships and maximising collective value (Verghese et al., 2022).

These practices not only enhance visibility but also improve flexibility and velocity within the supply chain (Scholten & Schilder, 2015). Additionally, information sharing fosters better-coordinated processes, supply chain planning, and decision-making, ultimately improving agility, response times, and cost efficiency (Juan et al., 2021;

Islam, 2023; Nsowah et al., 2024). Furthermore, it allows supply chain partners to proactively identify potential disruptions, optimise decision-making processes, and respond swiftly to market changes, ultimately fostering resilience and competitive advantage (Mustapha et al., 2022; Vosooghizaji et al., 2020).

The role of information sharing in SCC has become increasingly critical due to the growing complexities and interconnected nature of modern supply chains. Firms that adopted real-time data-sharing mechanisms via block chains and cloud-based platforms were better able to anticipate and mitigate supply chain shocks (Islam, 2023; Akhavan & Philsoophian, 2023). However, the effectiveness of information sharing is contingent on trust, as partners may withhold critical data due to competitive concerns (Vosooghizaji et al., 2020; Akhavan & Philsoophian, 2023). To maximise these benefits, organisations must carefully manage the type of information shared, the frequency and direction of communication, the level of detail provided, and the timeliness and mode of information sharing (Scholten & Schilder, 2015; Kotzé et al., 2017). This highlights the necessity of structured governance frameworks that balance transparency and the protection of proprietary information, ensuring both accountability and competitive advantage.

#### **2.5.1.2 Incentive Alignment**

Incentive alignment refers to the willingness of supply chain partners to share costs, benefits, and distribute risks in ways that foster collaboration and support mutual goals. For instance, buyers and suppliers may distribute cost burdens and risks equitably to address challenges such as product shortages or rising raw material costs caused by supply constraints. This balanced approach strengthens mutual trust, enhances resilience, and ensures continuity across the supply chain (Scholten & Schilder, 2015; Duong & Chong, 2020).

#### **2.5.1.3 Collaborative Communication**

Collaborative communication is the exchange of information between supply chain partners, defined by the frequency, flow, methods, and strategies used to influence outcomes (Scholten & Schilder, 2015). Acts as a bridge that helps supply chain

members recognise the value of sharing information and resources swiftly to adapt to disruptions (Zaman et al., 2024). Advance warnings of supply issues help partners coordinate transitions and manage logistics efficiently (Kotzé et al., 2017).

Investing in robust communication infrastructure and telecommunications, such as mobile phones and media platforms enhances accessibility and supply chain responsiveness, enabling partners to adapt quickly to unexpected challenges (Umar & Wilson, 2021). By leveraging technologies like mobile computing, social media platforms, cellular networks, and internet tools, collaborative communication empowers partners to engage in response networks, facilitating seamless information-sharing and cooperation across organisational boundaries (Shittu et al., 2018).

#### **2.5.1.4 Informal Financial Support**

Informal financial support refers to non-institutional financial partnerships within supply chains, where partners directly invest in each other to address immediate financial needs and vulnerabilities. This support includes providing loans, raw materials, equipment, or labour financing, along with flexible repayment options tailored to the financial circumstances of each partner. These arrangements enable partners to recover from disruptions and maintain continuity, benefiting all parties involved (Umar & Wilson, 2021).

#### **2.5.1.5 Joint Activities**

In SCC, joint activities refer to coordinated efforts between partners, such as buyers and suppliers, aimed at enhancing performance and achieving mutually beneficial long-term improvements (Duong & Chong, 2020; Lotfi & Larmour, 2022; Zaman et al., 2024). The term 'joint activities' has been used interchangeably with 'joint relationship efforts' and 'collective efforts' in prior studies, encompassing practices such as decision synchronisation, incentive alignment, and resource sharing, while excluding joint knowledge creation from the scope (Kotzé et al., 2017; Scholten & Schilder, 2015). More recent studies, however, have redefined the scope by excluding incentive alignment but including joint knowledge creation, decision

synchronisation, joint planning and forecasting, resource-sharing, and joint performance measurement (Duong & Chong, 2020; Lotfi & Larmour, 2022). Additionally, Lotfi and Larmour (2022) introduced collaborative communication within the scope of joint activities.

To maintain consistency with the latest research, this study aligns with the more recent scope by including joint knowledge creation while excluding incentive alignment as a stand-alone practice. However, collaborative communication will also be excluded to ensure alignment with majority of the previous studies (Kotzé et al., 2017; Scholten & Schilder, 2015; Umar & Wilson, 2021). Accordingly, the joint activities considered in this study encompass practices such as decision synchronisation, resource sharing, joint planning and forecasting, joint knowledge creation, and joint performance measurement.

**Joint Forecasting and Demand Planning** is jointly coordinated planning, prediction, and restocking within a supply chain is the most effective approach for simultaneously handling both routine operational risks and unexpected disruptions (Shekarian & Mellat Parast, 2020).

**Resource-sharing** is a strategic approach that focuses on harnessing and enhancing capabilities, resources, and assets, while fostering growth through strong collaboration with supply chain partners (Scholten & Schilder, 2015; Zaman et al., 2024). In both vertical and horizontal collaboration, this approach involves the joint use of labour, materials, and information resources to drive efficiency and innovation (Mustapha et al., 2022). In a buyer-supplier collaboration, this includes sharing transportation or personnel, assisting partner organisations in finding solutions through site visits, or adapting processes across both organisations to enable a swift response to disruptions (Scholten & Schilder, 2015). Lotfi and Larmour (2022) emphasised the role of resource-sharing for horizontal network collaboration in particular, as sharing of transportation and distribution, where partners improve operations by sharing trucks, consolidating freight loads, and optimising warehousing. This collaborative practice further extends to leveraging specialised labour skills, IT capabilities, and plant equipment within buyer-supplier partnership (Mustapha et al., 2022; Lotfi & Larmour, 2022), ultimately enhancing the resilience

and overall efficiency of the supply chain (Lotfi & Larmour, 2022).

**Decision synchronisation** refers to collaborative decision-making within a supply chain, where partners work together to align and optimise their activities and decisions across various functional areas to achieve common goals and mutual benefits (Scholten & Schilder, 2015; Lotfi & Larmour, 2022; Duong & Chong, 2020). This process involves jointly seeking solutions to challenges, leveraging shared expertise and resources to enhance overall supply chain performance (Kotzé et al., 2017). It emphasises how effectively partners align and integrate decisions, particularly in problem-solving, to drive shared objectives and strengthen supply chain resilience and efficiency (Zaman et al., 2024).

**Joint knowledge creation** strengthens SCRes through joint learning reviewing disruptions together, learning from past experiences, and identifying ways to improve future responses; joint product development; and a deep awareness of each other's needs. Long-term relationships foster this understanding, enabling partners to anticipate disruptions and respond quickly (Scholten & Schilder, 2015; Kotzé et al., 2017).

## **2.5.2 Challenges / Risks / Barriers to Collaboration Practices in Supply Chains**

The reviewed literature highlights that collaboration in supply chains, while critical for resilience, faces substantial challenges and barriers across multiple dimensions. These include information-related risks, trust deficits, communication barriers, resources limitations, lack of preparedness, over reliance on a single supplier and excessive collaboration, misaligned inter-organisational issues, cultural issues, lack of incentive alignment, and economic challenges.

Information is a crucial foundation for decision-making, as nearly all choices and their outcomes depend on the quality and availability of information (Zissis, 2023). However, gaps or deficient in information sharing can create obstacles and potential risks in buyer-supplier partnerships (Kotzé et al., 2017; Nunes et al., 2022). Reluctance to share information, information flow disruptions, and poor information

quality are key barriers to SCC among partners (Mahmud et al., 2021). Inaccurate data sharing can impact choices within the supply process and lead to delays in updates from partners until more precise details are available (Panahifar et al., 2018). Furthermore, information asymmetry due to disparities in access to critical information between supply chains partners often lead to coordination failures as parties may withhold private information, such as cost structures or demand data, for competitive advantage, resulting in inefficiencies and mistrust. This includes sharing of incomplete or fragmented or partial and delayed information affect collaboration (Vosooghidizaji et al., 2020; Zissis, 2023). The dissemination of inaccurate or manipulated information, especially during disruptions, undermines trust and disrupts coordination (Zissis, 2023). In some industries, regulatory frameworks present additional barriers to collaboration. For instance, in the South African petrochemical industry, strict regulations limit the sharing of certain information between buyers and suppliers (Kotzé et al., 2017). Such constraints hinder the development of transparent relationships and prevent partners from leveraging shared knowledge to achieve mutual benefits. However, unauthorised sharing of sensitive information within networks damages trust and reduces willingness to collaborate, further complicating inter-organisational relationships (Ried et al., 2021).

Trust is a critical enabler of effective collaboration (Panahifar et al., 2018), yet it remains a fragile component in many supply chains. Lack of trust is one of the most significant inter-organisational barriers to effective collaboration, leading to reduced information sharing, misalignment in objectives, and reluctance to invest in joint initiatives (Mahmud et al., 2021; Nunes et al., 2022). Distrust can also prolong negotiations and reduce the effectiveness of collective problem-solving efforts during disruptions (Kumar et al., 2017).

Inadequate or lack of communication, ineffective communication systems, and weak system connectivity hinder SCC among partners (Kotzé et al., 2017; Mahmud et al., 2021; Nunes et al., 2022; Anderson et al., 2023).

Resource limitations including technology barriers between collaborative partners is another factor that hinder collaboration in supply chain. Collaborative resource-sharing remains underutilised due to challenges in prioritisation and the need for

mutual agreement on resource allocation (Mahmud et al., 2021; Mustapha et al., 2022). While digitalisation offers potential benefits, limited access to digital technologies and compatibility issues between partners hinder seamless collaboration and information flow (Zissis, 2023). Furthermore, organisations engaged in collaboration efforts sometimes operate under strict budget constraints leading to resource limitations, insufficient personnel and a lack of expertise, which further hinder collaborative initiatives. Even when expertise is available, collaboration may not be prioritised (Anderson et al., 2023).

A lack of experience and knowledge presents another barrier to collaboration, particularly when disruptions occur in unfamiliar regions (Duong & Chong, 2020). During crises, inadequate preparation and reactive measures expose vulnerabilities in collaboration. The absence of robust risk management and recovery mechanisms between partners hampers supply chains' ability to adapt swiftly (Mustapha et al., 2022). Similarly, a lack of adaptability weakens buyer-supplier relationships. When organisations struggle to adjust, they risk inefficiencies in maintaining timely deliveries. Consistent delays erode trust and reliability, ultimately jeopardising collaboration (Mahmud et al., 2021).

While a weak sense of mutual dependence between buyers and suppliers further undermines collaboration (Scholten & Schilder, 2015), an overreliance on a single partner or collaborative group can lead to inefficiencies and risks of systemic failure or product shortages during disruptions (Nunes et al., 2022). Similarly, while buyer-supplier collaboration is widely recognised for enhancing SCRes (Scholten & Schilder, 2015; Kotzé et al., 2017), excessive collaboration can create unnecessary complexity, hampering decision-making and responsiveness (Nunes et al., 2022). Over time, strong partnerships may also foster homogeneity in thinking, limiting innovation and adaptability, while complacency and weakened accountability can arise from a lack of due diligence. Additionally, relational inertia may make partners reluctant to switch, even when it would be beneficial, further limiting flexibility and resilience (Villena et al., 2021). This underscores the importance of strategic collaboration models that balance cooperation with adaptability and accountability to sustain long-term resilience.

Supply chains comprise multiple decision-makers with distinct objectives, preferences, and information. Each entity acts based on its available data, prioritising individual gains. In competitive environments, conflicting interests often hinder information sharing (Zissis, 2023). This is intensified by a decentralised supply chains with diverse stakeholder priorities and no single entity oversees decision-making (Vosooghizaji et al., 2020). Similarly, diverging objectives, short-term relationships, and a lack of alignment within buyer-supplier collaborations create further barriers to effective cooperation (Duong & Chong, 2020; Mahmud et al., 2021; Nunes et al., 2022). Building on this, lack of clarity on partners' roles, expectations, and capabilities in the collaboration is another key challenge (Anderson et al., 2023).

Differences in organisational culture among supply chain partners present another significant challenge (Kotzé et al., 2017). Similarly, variations in values, policies, mind-sets, and management structures can obstruct the development of cohesive strategies (Anderson et al., 2023). Organisations with a strong collaborative culture are more inclined to actively engage with partners, fostering resilient buyer-supplier relationships. Conversely, cultural differences can create friction, leading to collaboration failures or ineffective response strategies (Duong & Chong, 2020). Moreover, both physical and cognitive distances between partners can further hinder effective cooperation (Anderson et al., 2023).

Another significant barrier is the reluctance to share both risks and benefits among supply chain partners (Kotzé et al., 2017). Additionally, the prioritisation of short-term financial gains often undermines long-term commitments such as collaborative partnerships. As such, balancing immediate gains with long-term benefits remains a critical concern (Kotzé et al., 2017). This highlights lack of incentive alignment issues between partners.

Market dynamics encompass customer expectations and demand fluctuations. Significant uncertainty in supply and demand weakens cooperative efforts (Duong & Chong, 2020). Rigid pricing policies can create uncertainty in order placement, making it difficult for buyers to plan effectively. Misinformation or demand fluctuations across the supply chain can lead to inefficiencies, commonly known as the bullwhip effect. Pricing constraints due to bullwhip consequence further contribute to this

phenomenon by disrupting supply chain stability affecting collaboration (Mahmud et al., 2021).

### **2.5.3 Foundational Conditions or Enablers that Enhance Collaborative Practices**

Effective collaboration among partners is grounded in foundational enablers such as trust; commitment and alignment of interests, reciprocity, and respect; relationship management, personal interactions and mutual dependence.

Trust is critical for successful partnerships, ensuring confidence in each party's commitment and capability. Disruptions can create doubt, weakening collaboration and leading to perceptions of unreliability. A strong trust foundation enhances effective collaboration and overall supply chain efficiency in both business and humanitarian contexts (Duong & Chong, 2020). Trust helps to lower the costs of transactions, allows exclusive access to resources, encourages shared risk-taking and sharing, and minimises disputes. Reciprocity and respect promote cooperation, while companionship deepens connections, improves dialogue, and builds loyalty, honesty, and dedication in the relationship (Villena et al., 2021). These qualities form the bedrock of strong partnerships, ensuring that shared objectives drive collective success (Nwankwo et al., 2024; Duong & Chong, 2020). Establishing and sustaining trust is crucial, as it forms the foundation for both vertical and horizontal collaborations; without it, effective cooperation between partners cannot be achieved (Umar & Wilson, 2021). Building on this, a strong reputation in supply chains enhances a firm's credibility, which in turn fosters trust between partners. As a key component of trust, credibility reflects a business's fairness and integrity, ultimately reinforcing its reputation and strengthening long-term partnerships (Ruel et al., 2018).

Commitment and aligned or shared goals between supply chain partners enhance transparency, reduce inefficiencies, and create more resilient and reliable relationships (Zhang et al., 2021). Similarly, shared values play a crucial role in shaping behaviours and attitudes between partners, building trust and commitment within the supply chain. When partners align on values, they integrate more

effectively, strengthening collaboration and long-term cooperation (Ruel et al., 2018). In the context of risk management, trust, transparency, and shared objectives foster a collaborative ethos that enables seamless integration, effective risk mitigation, and joint success (Marinelli & Salopek, 2020).

Relationship management is another enabler that strengthens collaboration through communication, motivation, and training. During disruptions, raising awareness and securing stakeholder commitment is crucial. Effective partnerships enhance resource sharing, knowledge, and efficiency, relying on trust, communication, and training (Duong & Chong, 2020). Personal interactions further enhance collaboration by driving mutual understanding and enabling the pursuit of win-win solutions. For instance, Toyota and Honda have established norms of reciprocity, solidarity, and trust with key suppliers, creating a supply network that enhances responsiveness, product quality, and on-time delivery (Villena et al., 2021). Mutual dependence within a supply chain interconnects the success of organisations, encouraging open information sharing, collaborative problem-solving, joint product development, and aligned future planning. Moreover, this interdependence builds dedicated investments, further reinforcing long-term stability and strengthening mutual reliance (Scholten & Schilder, 2015). In contrast, while mutual dependence enhances a network's ability to respond and recover more effectively during disruptions, it can also restrict flexibility in changing partners when the relationship is no longer beneficial (Umar & Wilson, 2021).

These enablers or influential factors are essential for building collaboration and overcoming collaboration barriers (Scholten & Schilder, 2015; Umar & Wilson, 2021; Villena et al., 2021; Lotfi & Larmour, 2022; Nwankwo et al., 2024; Duong & Chong, 2020; Zhang et al., 2021).

#### **2.5.4 Strategies for Overcoming Collaboration Barriers**

Strategies to mitigate collaboration barriers within buyer-supplier collaboration include contractual explicitness, which ensures clarity by defining roles, responsibilities, and outcomes, along with contingency plans to address emerging issues and maintain objectivity. Additionally, challenging goals promote innovation

and continuous improvement by disrupting complacency and encouraging dynamic collaboration. At the same time, an expectation of continuity builds a shared long-term vision, driving stability, investment, and exploration of new technologies while countering knowledge redundancy and relational inertia (Villena et al., 2021).

Contracts are crucial for collaboration, providing clear rules, structure, objectives, and risk mitigation, especially during growth, conflict, or partnership dissolution. Well-documented agreements outlining terms and objectives are key to successful partnerships (Lotfi & Larmour, 2022). However, contractual flexibility is fundamental to collaboration, requiring a balanced approach between adaptability and contractual rigidity to enhance cooperation and efficiency (Marinelli & Salopek, 2020). Flexibility between partners plays a crucial role in collaboration, reflecting a partner's willingness to adapt and evolve to support cooperative efforts (Duong & Chong, 2020). These perspectives underscore the critical role of flexibility and clear adaptive contractual agreements in strengthening collaboration.

Social bonding in supply chain relationships is another key strategy to effective collaboration overcoming barriers, it relies on trust rather than formal legal agreements or market power. Building trust through consistent and transparent communication is essential for fostering strong relationships. This includes demonstrating commitment to fulfilling relationship-specific obligations and reciprocal actions, where positive gestures are met with mutual support, to further deepen connections. Additionally, shared experiences and effective collaboration during disruptions contribute to relational satisfaction and mutual understanding (Durach et al., 2020).

Building on this, bridging and bonding strategies play distinct yet complementary roles in buyer-supplier collaboration. Bonding strengthens tight social connections, ensuring mutual commitment and alignment, while bridging, facilitated by central organisations, enhances information flow and coordination across diverse stakeholders (Lotfi & Larmour, 2022). These perspectives emphasise the significance of trust and relationship building in fostering effective collaboration.

While contractual explicitly and flexibility, trust and relationship building remain

fundamental (Villena et al., 2021; Marinelli & Salopek, 2020; Durach et al., 2020), the emergence of advanced technology is revolutionising collaboration by enhancing trust, flexibility, and transparency. Innovative technologies such as blockchain, artificial intelligence, and cloud platforms offer greater transparency, responsiveness, and traceability, in supply chains (Babich & Hilary, 2020; Cisneros-Cabrera et al., 2021; Nickel & Schliebener, 2021; Akter et al., 2022). Blockchain, in particular, eliminates the need for intermediaries, reducing costs and fostering trust among partners. It enables secure, decentralised, and tamper-proof information sharing, ensuring real-time, synchronised, and accurate data access across the supply chain through consensus mechanisms, thereby increasing supply chain visibility, flexibility, and velocity (Babich & Hilary, 2020; Islam, 2023; Akhavan & Philsoophian, 2023).

Building on this, Akter et al. (2022) emphasised the growing adoption of big data analytics, enabling businesses to extract valuable insights from vast datasets, enhance decision-making, and improve operational efficiency. This includes predictive analytics, which forecasts trends and customer behavior; real-time analytics, enabling immediate decision-making based on live data; and descriptive and prescriptive analytics, which analyse past trends and recommend future actions. Furthermore, Zissis (2023) advocates for cloud platforms and incentive-compatible mechanisms designed by neutral entities to achieve optimal coordination and transparency in decentralised supply chains. However, while these advances enhance agility, they also introduce concerns regarding cybersecurity risks, high implementation and integration costs, data ownership complexities, and accessibility challenges (Cole et al., 2019; Li & Xu, 2021; Akter et al., 2022). This raises critical questions about whether advanced digital transformation delivers equitable benefits across all supply chain partners and whether all firms can afford its adoption at scale. The uneven distribution of technological capabilities risks widening resilience gaps, as resource-constrained firms may struggle to integrate advanced digital solutions into their operations.

However, before the widespread adoption of blockchain and AI, established technologies such as Enterprise Resource Planning (ERP) systems and Electronic Data Interchange (EDI) already played a pivotal role in strengthening SCRes. These systems were deeply embedded in automotive and manufacturing supply chains long

before the COVID-19 crisis, enabling real-time tracking of inventory, demand forecasting, and supplier coordination (Nickel & Schliebener, 2021). Additionally, tracking tools for just-in-time (JIT) deliveries, business intelligence models, and statistical analytics were leveraged to improve decision-making and visibility. During the pandemic, Microsoft Teams and similar digital communication platforms became critical for ensuring seamless collaboration despite contact restrictions (Nickel & Schliebener, 2021). This contrast highlights that emerging technologies offer opportunities but cannot replace existing systems; instead, they should complement and strengthen established digital infrastructures to enhance SCRes.

Lastly, a study by Nunes et al. (2022) proposes a strategic, data-driven process to address challenges such as deficient collaboration, excessive complexity, and inefficient communication. The process focuses on three key dimensions such as network access, which ensures sufficient connections while preventing silos and bottlenecks; trust, which enhances cooperation and effective decision-making; and communication, which resolves inefficiencies and bottlenecks by analysing interaction patterns. By applying social network analysis metrics and aligning strategies with ISO 31000:2018 risk management standards, this approach enhances resilience and sustainability in collaborative networks. Essentially, the study advocates for a structured, risk-informed collaboration model based on sufficient connectivity, trust and communication among supply chain partners to improve mentioned challenges.

Together, these strategies provide robust solutions for enabling collaborative practices, overcoming collaboration barriers and enhance resilient supply chain networks.

## 2.6 Conceptual Framework for Collaborative Practices in Enhancing SCRes

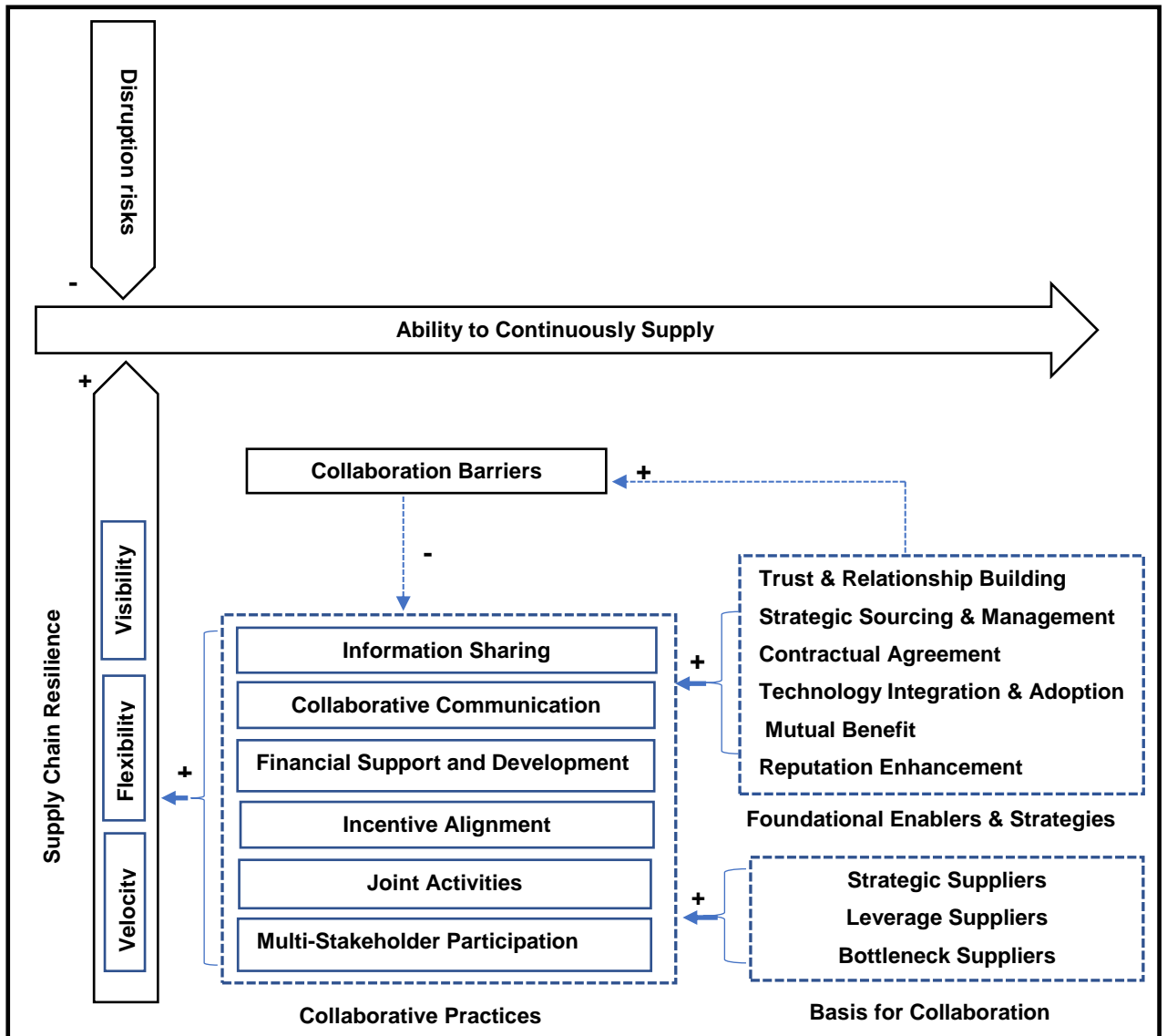


Figure 1: Conceptual framework for collaborative practices in enhancing SCRes

Source: Author, adapted from (Kotzé et al., 2017).

Kotzé et al.'s (2017) framework for collaborative practices illustrated the relationship between SCRes and SCC in the context of disruption risk. It highlighted the role of collaborative activities such as information sharing, collaborative communication, joint knowledge creation, and collective efforts (decision synchronisation and resource-sharing) driven by mutual benefit as an enabler, constrained by legislation as a barrier to information-sharing, and with strategic, leverage, and bottleneck

suppliers serving as the basis for collaboration. The framework illustrated that these collaborative activities enhance SCRes by improving velocity, flexibility, and visibility.

Figure 1, is an adapted framework of Kotzé et al. (2017), it presents the interconnected factors that influence SCRes and highlights how collaborative practices and enabling conditions strengthen a supply chain's ability to withstand and recover from disruptions. It positions SCRes as the ultimate goal of supply chain management, which is affected by both barriers to collaboration practices and external disruption risks. The framework highlights the foundational enablers and strategies for collaboration which include trust and relationship building, mutual benefit, strategic sourcing and management, reputation enhancement, contractual agreement and technology integration and adoption which enable collaborative practices and overcome barriers. When these foundational enablers and strategies are effectively implemented and barriers are overcome, they create a favourable environment for collaborative practices (collaborative practices outlined above in the framework). These practices are critical in driving key supply chain capabilities, including velocity, flexibility, and visibility. These capabilities, in turn, allow supply chains to respond effectively to disruptions and maintain SCRes in dynamic and uncertain environments. Overall, by proactively addressing barriers and being prepared for disruptions, supply chain partners can build adaptive, resilient systems that ensure continuous supply and operational stability, even during unforeseen disruptions.

## **2.7 Conclusion**

In summary, this section emphasises the critical importance of SCRes and SCC. SCC has proven to be a fundamental enabler for enhancing SCRes in dynamic markets. SCC practices, including information sharing, joint activities, resource-sharing, decision synchronisation, and collaborative communication, enhance supply chain visibility, flexibility, and velocity, thereby strengthening SCRes. The absence of foundational conditions, such as mutual trust, shared objectives, and others, can undermine collaborative efforts. Recent studies have highlighted the need for empirical data on the evolution of vertical collaboration in response to recent

disruption including COVID-19 and the applicability of buyer-supplier collaborative practices across industries.

## CHAPTER 3: RESEARCH QUESTIONS

### 3.1 Introduction

This section highlights two key research questions that shaped the investigation of buyer-supplier collaboration, focusing on understanding the collaboration practices in the South Africa's manufacturing sector and how they have evolved over time, identifying the challenges and barriers that hinder, as well as the strategies that enable, collaboration within the buyer-supplier network to enhance SCRes. These research questions informed the creation of an interview question guide, which was used to collect data from industry stakeholders. The semi-structured interview guide, detailed in Appendix 1, ensured a structured approach to gathering insights, enabling a comprehensive understanding of the study. Detailed information on research questions are reflected below.

**2.5.1 Research Question One (RQ1):** How have buyer-supplier collaboration in the South Africa's chemical manufacturing sector evolved in recent years in response to recent disruptions, to strengthen SCRes?

RQ1 aimed to explore the existing collaborative practices within buyer-supplier relationships and their role in building SCRes in South Africa's chemical manufacturing sector. This sought to address the context-specific variability of these practices and evaluate whether findings in this sector align with those observed in other studies with comparable supply chain dynamics. This research question further examine how buyer-supplier collaboration practices in South Africa's chemical manufacturing sector have evolved in response to recent disruptions, in strengthening SCRes. The focus includes understanding how these practices have been adapted and uncover any newly emerging practices that organisations have adopted, alongside the specific adaptations processes were necessary for organisations to integrate these collaboration practices into existing workflows.

**2.4.2 Research Question Two (RQ2):** What are the key challenges or barriers organisations face in fostering collaboration within the buyer-supplier network in South Africa’s chemical manufacturing sector, and how have these challenges been addressed to enhance SCRes?

RQ2 aimed to examine challenges and barriers that organisations face in implementing, adapting, and maintaining these collaborations practices, while also highlighting the solutions to collaboration barriers. Additionally, research question 2 aimed to draw lessons from adapting these collaboration practices in response to disruptions. Overall, these research questions sought to provide insights of the buyer-supplier collaborative practices in the in South Africa’s chemical manufacturing sector, to inform the broader applicability of these collaborative practices, thereby addressing the recommendation of Kotzé et al. (2017). By examining the evolution of collaborative practices this aims to close the research gap identified by Lotfi and Larmour (2022) and offer real-world insights based on recent disruptions.

### **3.2 Conclusion**

This section presented two research questions that served as the foundation for investigating the evolution of buyer-supplier collaboration practices in the South African chemical manufacturing sector. Together, these questions offered valuable insights into the analysis of collaboration practices and their contribution to enhancing supply SCRes. A structured interview guide, developed based on these questions, facilitated the effective collection of data to achieve the study's objectives.

## **CHAPTER 4: RESEARCH DESIGN AND RESEARCH METHODOLOGY**

### **4.1 Introduction**

This chapter provides a comprehensive overview of the research design and methodology employed in this study, focusing on the evolution of buyer-supplier collaboration practices within the South African chemical manufacturing sector. The research was guided by an exploratory design, an interpretivist philosophy, and an inductive approach, all chosen to address the relatively unexplored nature of the topic. A qualitative methodology was adopted to allow for an in-depth understanding of evolution collaboration practices and processes, challenges, and lessons learnt in response to recent disruptions. This chapter also outlines the data collection strategies, sampling methods, ethical considerations, and limitations encountered during the study, ensuring transparency and rigor in the research process.

### **4.2 Research Design**

#### **4.2.1 Purpose of Research Design: Exploratory**

Saunders and Lewis (2018) described an exploratory study as research aimed at discovering new ideas, raising new questions, and shedding light on the topic in a different way. This approach aligned with the research problem and purpose, which sought to gain new insights and illuminate the evolution of buyer-supplier collaboration in recent years. Creswell and Creswell (2017) explained that exploratory design is appropriate when the objective is to gather insights into a relatively unexplored area. Therefore, considering the novelty of investigating the evolution of buyer-supplier collaboration within the South African chemical manufacturing sector; a relatively new subject area, an exploratory design allowed for a more flexible and open-ended investigation. This approach also aligned with the research questions, which are open-ended and focused on exploring the “how” and “what” aspects (Olawale et al., 2023).

#### **4.2.2 Philosophy: Interpretivism**

The philosophy of this research was interpretivism. According to Dean (2018), interpretivism focuses on understanding social reality from the perspective of participants and acknowledges that individuals may interpret situations differently. This approach adopted a 'relativist' ontological perspective, suggesting that reality is comprehensible only through socially constructed meanings and that no single, shared reality exists (Ryan, 2018). This illustrated the concept of multiple realities emerging from individual perceptions. In the context of buyer-supplier collaboration, this philosophy proved suitable, as it enabled a comprehensive exploration and understanding of the meanings, perceptions, and experiences of buyers and suppliers. This approach offered rich insights into the evolving collaboration in response to recent disruptions. It also aligned with the problem and purpose of the study, as interpreting the meanings and experiences of organisations provided a deeper understanding of best practices, challenges, and opportunities within the chemical manufacturing industry in South Africa.

#### **4.2.3 Approach Selected: Inductive**

The chosen approach was inductive. Liu (2016) explained that the inductive approach enables research findings to emerge from the data by identifying frequent and significant themes without being limited by any specific qualitative research tradition. This approach offered more theoretical flexibility compared to other qualitative methods and retained valuable elements from all theory-specific approaches. Saunders and Lewis (2018) described the inductive approach as one that involves constructing theories by analysing existing data. The reasoning involved moving from specific observations (evaluating the evolution of collaboration in the chemical manufacturing sector) to broader generalisations and theories (Saunders & Lewis, 2018). Given the exploratory nature of the research questions and the intention to generate new insights while building on existing knowledge, an inductive approach aligned with the aim of allowing themes and patterns to develop organically from the data.

#### **4.2.4 Methodology Choice: Qualitative**

The chosen research methodology was qualitative, aligning with the perspective of

Levitt et al. (2018), who highlighted its ability to analyse data using natural language, such as words. This approach was adopted for its flexibility, allowing for an open-ended exploration of specific contexts and historical developments (Pilcher & Cortazzi, 2024). It aligned with the research objective and open-ended research questions by leveraging natural language analysis to examine data, facilitating a deeper understanding of the evolution of buyer-supplier collaboration and uncovering rich, contextually grounded insights.

In contrast, quantitative methods represent data numerically, collecting it through statistical analysis, experiments, or mathematical modelling (Pilcher & Cortazzi, 2024). Its positivist research paradigm, emphasises objective measurement and quantifiable data, making it less effective in capturing subjective experiences and deeper social meanings, which require an interpretive approach (Rahman, 2017). While, qualitative data sets are usually derived from a limited number of sources (e.g., participants) compared to quantitative research but offer in-depth, comprehensive, and context-specific insights from each source (Levitt et al., 2018). By focusing on subjective meanings and social interactions, a qualitative method allowed for a nuanced interpretation of participant experiences, capturing diverse perspectives that quantitative approaches may overlook (Rahman, 2017).

Building on this, Rahman (2017) further emphasised that the flexible structure of qualitative research allows for continuous refinements and revisions, making it particularly effective in exploring complex social phenomena. This flexibility made the qualitative method well-suited for exploring the evolving of buyer-supplier collaboration in response to recent disruptions through non-standardised data analysis, enabling agility in the research process. Azungah (2018) reinforced this perspective by arguing that social realities are inherently fluid and open-ended, any method attempting to quantify or restrict these complexities would be inadequate. Therefore, a qualitative methodology was adopted as the most suitable approach for the nature of this study. It allowed participants to articulate their experiences, challenges, and adaptive strategies in their own words. By analysing real-world experiences rather than imposing predefined variables, this approach uncovered diverse perspectives and deeper insights on the evolution of buyer-supplier collaboration.

#### **4.2.5 Strategy: Case Study**

A case study is a research strategy which involves studying a particular subject in its real-world setting by gathering evidence from different sources to gain a comprehensive understanding of the topic (Saunders & Lewis, 2018; Priya, 2021). It was important to recognise that a case study was not a data collection method but rather a research strategy for examining a social unit. This approach provides researchers with the flexibility to employ any data collection method that is suitable for their objectives, as long as the method is both feasible and ethical (Priya, 2021). Therefore, the case study was chosen to focus on a single organisation with multiple subsidiaries within the chemical manufacturing sector in South Africa (the “subject”), while “various sources” refer to the diverse data insights obtained through interviews with buyers and suppliers. These insights enabled a comprehensive examination of collaboration within this specific context, ensuring alignment with the study’s objectives.

#### **4.2.6 Time Horizon: Cross Sectional**

Saunders and Lewis (2018) recommended that when researchers are time-constrained, a cross-sectional time horizon is more suitable. They highlighted that a cross-sectional study served as a snapshot of a particular research setting at a specific moment, making it a practical choice for time-constrained research projects. Given the time frame for completing this study, focusing on a specific point in time (recent years in response to recent disruptions) made a cross-sectional time horizon the most appropriate choice.

### **4.3 Research Methodology**

#### **4.3.1 Population**

According to Saunders and Lewis (2018), the population does not have to consist solely of people or the workforce; it could also include entities such as organisational units, locations, and more. Therefore, the targeted population of this study consisted of a single large organisation with different subsidiaries operating in various

industries within the South African chemical manufacturing sector. Given the specificity of the sector and the focus on buyer-supplier collaboration, the study included relevant subsidiaries actively engaged in the supply chain within this sector. This choice aligned with the research problem and purpose, ensuring that the study captured insights directly relevant to the context of interest organisations within the South African chemical manufacturing sector that had been significantly exposed to supply chain disruptions and had developed resilience, as explained by Du Plessis (2019) and Misra (2021).

#### **4.3.2 Unit of Analysis**

Kumar (2018) emphasised the critical importance of selecting the appropriate unit of analysis in research. He noted that while business research offers a wide range of options, social research typically focuses on individuals, groups, and organisational artifacts. According to Kumar, the choice of a unit of analysis is influenced by the research problem and is crucial in defining the scope of study, thereby ensuring appropriate data collection methods. Kumar emphasised that the unit of analysis identifies the subjects or objects being studied, addressing the fundamental questions of "who" and "what" and serving as the basis for data analysis. Therefore, the unit of analysis in this study was an organisation of buyers and suppliers within the South African chemical manufacturing sector, engaged in SCC practices. This choice was based on the nature of the research problem, which revolved around the organisation's collaborative practices and the resilience of the supply chain in this sector. It also aligned with the research questions, allowing for a detailed examination of the evolution of buyer-supplier collaboration practices as the primary focus of analysis, which was crucial to achieving the research objective.

#### **4.3.3 Sampling Method and Size**

In this research, a purposive sampling method was used. Specifically, the unit of sampling targeted key supply chain personnel (Procurement Managers, Supply Chain Managers, and Product Managers), Sales and Business Unit Managers in the South African chemical manufacturing sector who have experience in buyer-supplier collaboration. Participant selection was based on their direct engagement with

suppliers, those were Procurement, Supply Chain and Product Managers, who function as buyers. Additionally, Sales and Business Unit Managers represented suppliers, given their role in managing relationships with customers (buyers). Kumar (2018) described the unit of sampling as a sample used for data collection. According to Saunders and Lewis (2018), the purposive sampling method enables researchers to choose the most suitable participants based on their expertise and capacity to respond to the study's inquiries. By purposively targeting key supply chain personnel and other relevant managers within the buyer-supplier network who were highly knowledgeable and experienced in the topic of focus, the study gained valuable insights and rich data, as suggested by Carter (2020), aligning with the research purpose.

Alam (2021) suggested that for many qualitative studies, an ideal sample size typically ranged from 15 to 20 participants when dealing with a homogeneous group. Alam further referenced Sandelowski (1995), who suggested that a sample size of approximately 10 participants might suffice for qualitative studies involving a homogeneous population. Several studies on collaborative practices for enhancing SCRes have employed sample sizes ranging from 11 participants from a single organisation to 16 participants from different organisations (Scholten & Schilder, 2015; Kotzé et al., 2017). In this study, 11 participants were interviewed from a single organisation with multiple subsidiaries, consistent with the approach used in Kotzé et al. (2017). Notably, no new themes emerged during the 11<sup>th</sup> interview, this indicated that data saturation had been reached. Moser and Korstjens (2018) emphasised data saturation is achieved when no additional analytical insights emerge, indicating that the study has provided comprehensive understanding of the phenomenon under investigation. Therefore, the sampling approach was well-suited for the exploratory nature of the research, ensuring that the selected sample and size provided in-depth and relevant information related to the research questions and objectives.

#### **4.3.4 Measurement Instrument**

The measurement instrument involved a semi-structured interviews and document analysis. Semi-structured interviews were used as a primary data collection using

predetermined questions. These interviews were conducted primarily via virtual platforms, such as Microsoft Teams, with some conducted in person, aligning with the recommendations of Saunders and Lewis (2018) and Moser and Korstjens (2018). Carter (2020) supported the use of open-ended questions to provide flexibility and allow for probing during the conversation, enabling an in-depth exploration of participants' experiences and perceptions. This approach was duly implemented in the study. The semi-structured interviews was chosen to capture the exact and rich insights necessary for understanding the complexities of collaboration practices. The choice aligned with the interpretivist philosophy, aiming to uncover meanings and experiences, as described by Dean (2018). Please refer to Appendix 1 for a semi-structured interview guide.

#### **4.3.5 Data Gathering Process**

Primary data was collected through semi-structured interviews with 11 buyers and suppliers, focusing on key managers involved in supply chain operations and sales within selected subsidiaries. Additionally, relevant documents, such as procurement policies, risk management processes, and partnership agreements, were analysed to validate some of the findings from the interviews, aligning with the approach by Scholten and Schilder (2015). In qualitative research, it is common to combine multiple data collection method within a single study. Data collection in this type of research is typically unstructured and flexible, allowing researchers to make decisions on the spot while engaged in fieldwork (Moser & Korstjens, 2018). Having experience working in one of the big chemical manufacturing companies in South Africa, was valuable for gathering data through direct experiences, as advocated by Carter (2020). This enabled a comprehensive understanding of the context, a thorough interpretation of the situation, and deep insights into specific instances of the phenomenon.

Before the interviews, thorough preparation and organisation were undertaken to minimise unexpected challenges, as encouraged by Carter (2020). Following the guidance of Moser and Korstjens (2018), an interview guide was carefully developed in advance and refined as needed throughout the process. Adjustments were made based on ongoing analysis and emerging insights to ensure that the questions

produced comprehensive and relevant responses. All recording and text transcription devices were checked to ensure they were operational, with backups readily available. The interviews were conducted over a duration of 45 minutes on average. However, two participants, who were interviewed face-to-face and were uncomfortable with being recorded, required an extended duration of approximately 80 to 90 minutes to allow sufficient time for comprehensive note-taking. To ensure accuracy and reliability, these notes were subsequently reviewed and verified by the participants.

In line with Moser and Korstjens' (2018) emphasis on the importance of the initial moments of an interview, efforts were made to set a positive tone by making participants comfortable before asking them to share their experiences. Open-ended questions relevant to the topic were used to encourage participants to express themselves openly. This approach aligned with an exploratory design, allowing for flexibility in exploring new ideas and gaining a comprehensive understanding of the evolution of buyer-supplier collaboration practices.

#### **4.3.6 Analysis Approach**

In conducting this study, a thematic data analysis approach was adopted. Thematic analysis was used as a method for identifying and analysing patterns of meaning in the dataset, highlighting important themes that described the phenomenon under study and emphasising the most salient constellations of meanings (Joffe, 2011). Joffe noted that thematic analysis is particularly effective at clarifying and detailing how a specific group understands and interprets the phenomenon being studied. This aligned with the study's aim to understand how organisations in the South African chemical manufacturing sector have adapted their buyer-supplier collaboration in response to recent disruptions.

The process began with an initial phase of data familiarisation, which allowed for immersion into the qualitative data to comprehend the content and context (Braun & Clarke, 2006; Saunders & Lewis, 2018). This phase established a solid foundation for subsequent analytical steps by fostering an in-depth understanding of the

evolution of buyer-supplier collaboration within the chemical manufacturing sector post-recent disruptions.

Williams and Moser (2019) further clarified that coding is essential in the interconnected process of data organisation, categorisation, and theory development, as it allows the researcher to effectively advance the research process. Figure 2, illustrates this process. In this study coding was used to identify key concepts, which were then grouped into sub-themes (categories) and key themes related to buyer-supplier collaboration. A total of 268 codes were generated, which were consolidated into 39 sub-themes, ultimately forming seven key themes. These themes were derived through a systematic manual selection process, where codes, sub-themes, and themes were identified for each participant transcript before being combined and analysed to capture the overall findings. This systematic process aligned with the research purpose, enabling meaningful insights and conclusions during the interpretation phase. Ultimately, this contributed to a comprehensive understanding of the evolution collaborative practices, process adaptations, challenges, lessons learnt, and solutions for overcoming collaboration barriers associated with buyer-supplier collaboration in the chemical manufacturing sector in response to recent disruptions.

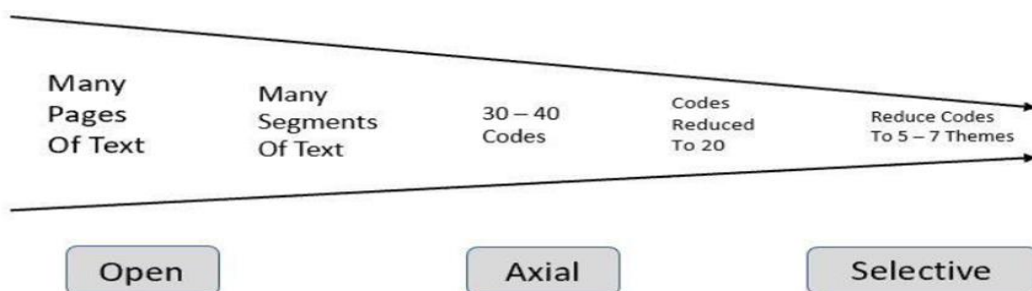


Figure 2: Coding process overview: Open, Axial and Selective Coding

Source: Williams and Moser (2019)

### **4.3.7 Ethical Consideration**

Ethical considerations were fundamental in the research as they ensured the protection of participants' rights and the methodological integrity (quality control) of the research process (Fleming & Zegwaard, 2018; Levitt et al., 2018; Nii Laryeafio & Ogbewe, 2023). Ethical considerations were critical in distinguishing between acceptable and unacceptable behaviour, thereby promoting trust and credibility in the research findings (Ubi et al., 2020).

#### **4.3.7.1 Participants' Rights**

As a researcher, participants' rights were protected by implementing confidentiality measures and storing data in password-protected digital files to prevent unauthorised access and potential misuse of sensitive information (Ubi et al., 2020). Anonymity, privacy, and confidentiality were maintained by using pseudonyms and codes and removing any self-identifying information from the data to protect participants or the organisation from potential harm (Fleming & Zegwaard, 2018; Nii Laryeafio & Ogbewe, 2023). Participation in the research was entirely voluntary, and participants were fully informed about the nature of the study and what it entailed, as emphasised by Laryeafio and Ogbewe's (2023) study. Fleming and Zegwaard (2018) highlighted that "informed consent" is a foundation of ethical research, comprising two critical components: 'informed' and 'consent', both of which were given thorough attention. Accordingly, this study was guided by participants signing an "informed consent" form. Please refer to Appendix 2 for a sample consent letter provided to participants.

#### **4.3.7.2 Quality Control / Methodological Integrity**

To ensure data quality and methodological integrity, a detailed audit trail was maintained. According to Lester et al. (2020), maintaining an audit trail is essential in qualitative research to ensure the trustworthiness and transparency of the data analysis process, ultimately enhancing the credibility and dependability of the findings. The audit trail documented the data analysis, coding process, theme interpretations, and any refinements made throughout the research, as

recommended by Lester et al. (2020). Please refer to Appendix 3 for a high level audit trail outlining the codes, sub-themes, and key themes. While a detailed audit trail is also maintained under raw data folder. All interviews, except two, were recorded and transcribed within 24 hours to ensure accuracy while the discussion remained fresh, aligning with Scholten and Schilder's (2015) 24-hour rule. An iterative process was used to compare verbatim transcripts with recordings to verify accuracy. Additionally, data triangulation was conducted by incorporating document analysis (as outlined in Section 4.3.5) to verify and enhance the reliability of the interview insights (Scholten & Schilder, 2015; Daniel, 2019). To maintain neutrality and minimise bias, transcripts were participant-verified for accuracy and alignment with their intended meaning and experiences, following Daniel's (2019) recommendations.

#### **4.3.8 Limitations**

The potential limitation of this study was its exclusive focus on companies within a single large organisation, including its subsidiaries. While this approach allowed for in-depth insights, it may have limited diversity of perspectives, as participants were likely influenced by a shared organisational culture and internal practices. This homogeneity may have contributed to faster saturation, potentially restricting the breadth of insights that could have been obtained from a more varied sample across multiple independent organisations. Furthermore, the cross-sectional time horizon constrained the ability to understand long-term trends in collaboration practices, which might have been better addressed through a longitudinal time horizon (Saunders & Lewis, 2018). Another limitation of this study was the timing of the interviews, which took place during December and early January. During this period, many participants were either winding down for the year-end or focusing on the transition into the new-year, which may have affected their level of engagement or the richness of the data collected. Lastly, although this study provides valuable insights, the framework may evolve further with ongoing disruptions.

#### **4.4 Conclusion**

In conclusion, the research design and methodology adopted in this study provided a solid insights for exploring the complexities of buyer-supplier collaboration practices in the South African chemical manufacturing sector. The combination of an exploratory design, interpretivist philosophy, and qualitative methods enabled the collection and analysis of rich, detailed data that revealed valuable insights into the evolving dynamics of these practices. Ethical considerations, including participant confidentiality and informed consent, ensured the integrity and trustworthiness of the research. While limitations such as timing and cross-sectional constraints were acknowledged, the methodological choices made were well-aligned with the study's objectives, contributing to a deeper understanding of the challenges, adaptations, and best practices in the context of SCRes.

## **CHAPTER 5: PRESENTATION OF FINDINGS**

### **5.1 Introduction**

This chapter presents the key findings from the data analysis of interview responses. It begins with a sample description to provide context for the results and to demonstrate the sample's alignment with the study's selection criteria (see Table 1 for an overview). It then provides an overview of table 2, which displays the frequency of codes, as well as the sub-themes and key themes identified through thematic analysis.

Tables 3 and 4 offer a recap of the research questions and their corresponding themes, ensuring alignment with the research questions outlined in Chapter 3. Finally, the chapter presents detailed findings for each theme, organised according to the relevant sub-themes for a clear and structured presentation.

### **5.2 Sample Description**

The sample comprises 11 participants from a single large organisation with different subsidiaries operating within the South African chemical manufacturing sector in various industries. Of the participants, three are female and eight are male. The participants represent various management levels, including five Middle Managers, four Junior Managers, and two Senior Managers. Their professional experience spans from 4 to 30 years, with an average of approximately 13.6 years. The most experienced participant has 30 years of experience, while the least experienced has four years. The supply chain managers represented the buyer perspective, while the sales and business unit managers provided insights from the supplier perspective, ensuring a comprehensive understanding of buyer-supplier collaboration within the context of this single large organisation. Please refer to Table 1 for a detailed sample description and nuances of the sample characteristics.

**Table 1: Sample Description**

Participants (P)	Gender	Level	Experience (years)	Sub-Sectors	Industry
P1	Female	Middle Manager	18	Specialty Chemicals	Various
P2	Female	Middle Manager	17	Agricultural Chemicals	Agriculture
P3	Male	Senior Manager	8	Basic Chemicals	Water
P4	Male	Junior Manager	15	Specialty Chemicals	Lubricant and Rail
P5	Male	Middle Manager	8	Specialty Chemicals	Consumer and Personal Care
P6	Male	Junior Manager	4	Basic Chemicals	Various
P7	Female	Junior Manager	5	Specialty Chemicals	Coating and Construction
P8	Male	Middle Manager	15	Specialty Chemicals	Mining and Explosive
P9	Male	Middle Manager	21	Specialty Chemicals	Coating
P10	Male	Junior Manager	5	Basic Chemicals	Various
P11	Male	Senior Manager	30	Specialty Chemicals	Mining

*Source: Author's own*

**Table 2: Themes, Sub-Themes and Codes Frequency**

Key Themes	Sub-Themes	Frequency	Total
<b>RQ1: Collaborative Practices</b>	Information Sharing	7	48
	Collaborative Communication and Coordination	18	
	Decision Synchronisation	8	
	Joint Forecasting and Demand Planning	2	
	Joint Knowledge Creation	1	
	Incentive Alignment	10	
<b>RQ1: Evolution Collaborative Practices</b>	Financial Supports and Development	2	53
	Joint Forecasting and Demand Planning	4	
	Collaborative Communication and Coordination	19	
	Information Sharing	6	
	Decision Synchronisation	10	
	Incentive alignment	6	
	Joint Knowledge Creation	2	
	Multistakeholder Participation	4	
<b>RQ1: Process Evolution</b>	Financial Supports and Development	1	22
	Joint Logistics and Consolidation (Resource-Sharing)	1	
	Technological Integration for Supply Chain Visibility	8	
	Technological Integration for Communication	6	
<b>RQ1: Supply Chain Resilience</b>	Procedural Optimisation and Adaptation	3	12
	Cultural and Organisational Strategic Shift	5	
	Supply Chain Velocity and Flexibility	2	
	Supply chain Flexibility, Visibility and Velocity	6	
<b>RQ2: Challenges to Buyer-Supplier Collaboration</b>	Supply Chain Velocity	2	33
	Supply chain Flexibility and Visibility	2	
	Trust and relationship challenges	7	
	Misalignment and Cultural Dynamics	5	
	Regulation Challenges	1	
	Misalignment Issues	6	
	Economic Conditions Challenges	5	
	Communication Challenges	3	
Vendor Management and Resource Challenges	5		
<b>RQ2: Solutions to Collaboration Barriers</b>	Information-Sharing Challenges	1	66
	Trust and Relationship Building	49	
	Building Reputation	2	
	Contractual Agreement	7	
	Strategic Sourcing and Supplier Management	7	
<b>RQ2: Lessons</b>	Technology Adoption	1	34
	Various Lessons	13	
	Improvements on Buyer-Supplier Collaboration	21	

*Source: Author's own, inspired by Williams and Moser (2019) coding process overview*

**Table 2** presents an overview of the 39 sub-themes derived from 268 codes, which were consolidated into seven key themes to address research questions one and two. A high level breakdown of the data, including the specific codes, can be found in Appendix 3 for reference.

### 5.3 Findings for Research Question One Themes

**Table 3: Research Question One and Themes**

<p><b>Research Question One (RQ1):</b> How have buyer-supplier collaboration in the South Africa’s chemical manufacturing sector evolved in recent years in response to recent disruptions, to strengthen SCRes?</p>	
Purpose	Themes
<p>RQ1 aimed to explore the existing collaborative practices within buyer-supplier relationships and their role in building SCRes in South Africa’s chemical manufacturing sector. This research question further examine how specific buyer-supplier collaboration practices in South Africa’s chemical manufacturing sector have evolved in response to recent disruptions, in strengthening SCRes. The focus includes understanding how these practices have been adapted and uncover any newly emerging practices that organisations have adopted, alongside the specific adaptations processes were necessary for organisations to integrate these collaboration practices into existing workflows.</p>	<ol style="list-style-type: none"> <li>1. Collaborative Practices</li> <li>2. Evolution Collaborative Practices</li> <li>3. Process Evolution</li> <li>4. Supply Chain Resilience</li> </ol>

*Source: Author’s own*

**Table 3** provides an overview of RQ1, highlighting its purpose and the key themes that emerged from the interviews. The identified themes such as collaborative practices, the evolution of collaborative practices, process evolution, and supply chain resilience will play a critical role in addressing RQ1. Below are the findings of these themes.

### 5.3.1 Findings for a Collaborative Practices Theme

The data collected from participants revealed several key aspects of collaborative practices in the context of information-sharing, collaborative communication, decision synchronisation, incentive alignment, joint forecasting and demand Planning, financial support and development, and joint knowledge creation. Participants highlighted these practices as critical for fostering collaboration between suppliers and buyers, optimising operations, and addressing supply chain challenges. They identified them as key collaborative practices currently utilised within South Africa's manufacturing sector.

**Information-Sharing:** Information sharing was consistently identified by participants as a crucial collaborative practice, essential for strengthening buyer-supplier collaboration. One participant highlighted this importance by stating:

*"The majority of our critical raw materials are imported, requiring us to remain highly proactive due to the long lead times involved. Therefore, information-sharing is essential practice for us; this includes sharing of purchase orders, industry trends, and demand planning information to our suppliers." (P8).*

Participants highlighted the importance of sharing cost drivers, forecasts, and market insights as a key collaborative practice. They explained that such information, especially in global partnerships, helps stakeholders understand external factors affecting supply chains, including raw material price fluctuations, economic pressures, and demand requirements, enabling more effective planning and decision-making (P1 & P7, & P10).

In addition, participants highlighted that sharing detailed contracts and strategic business plans proved critical, as these documents clearly outlined the roles, responsibilities, expectations, and shared vision for partners, fostering strategic alignment, minimising misunderstandings and increasing operational synergy (P4, P10 & P11).

**Collaborative Communication and Coordination:** Collaborative communication emerged as another critical practice in enabling successful buyer-supplier partnership. All participants consistently emphasised the importance of clear, continuous, and timely communication to align expectations, address issues proactively, and enhance overall supply chain efficiency. Effective communication practices included regularly review the shipping status, stock availability, review forecasts, monitor market trends, and adapt strategies accordingly, to enhance transparency and logistical clarity. One participant highlighted:

*“Continuous updates and coordination with planners and buyers are key for us to enable us to respond quickly to seasonal changes and unexpected demand shifts.”* (P5).

Another participant reinforced this point, stating:

*“Constant communication is also a cornerstone of our approach, ensuring that suppliers are promptly informed of any changes in demand, whether increases or decreases, to maintain alignment.”* (P8).

Participants shared specific examples of how lapses in communication with their suppliers led to significant challenges. For instance, one participant recounted how a delay in communication and follow-up resulted in a product stock out, requiring costly airfreighting of goods to retain a key customer (P3).

Regular supplier meetings, biweekly updates, and forecast reviews were identified as essential for maintaining collaborative communication and alignment. Participants emphasised that stock availability updates and general engagement sessions

enabled both buyers and suppliers to anticipate potential issues and implement corrective actions proactively. As one participant noted:

*“Frequent communication has been critical in supporting other collaborative practices, as it enables us to adapt quickly and maintain alignment with suppliers. Without consistent communication, even the best practices lose their effectiveness.”* (P7).

**Decision Synchronisation:** Six participants identified decision synchronisation as a critical collaborative practice that enables stakeholders to align strategies, optimise costs, and address supply chain challenges effectively. They emphasised the value of joint problem-solving, collaborative decision-making, and technical support in streamlining operations and enhancing SCRes. A key example of the value of decision synchronisation was shared by one participant:

*“More recently, with the Durban port congestion, many container vessels were stuck at sea, putting us at risk of manufacturing timely for a customer demand. Working with our supplier and our shipping department, we loaded the vessels to discharge at Coega port and road haul the product to Durban. This avoided many weeks delay, caused by the congestion, where some vessels even opting to bypass Durban port altogether”.* (P1).

Another participant emphasised the importance of joint risk assessments in collaborative problem-solving:

*“We conduct risk assessments with suppliers to identify single points of failure and implement contingency protocols for potential supply chain disruptions.”* (P10).

While, another participant highlighted the financial benefits of decision synchronisation, particularly in aligning strategies with suppliers to optimise cost structures. As the participant shared an example:

*“Collaborative problem-solving with my supplier around competitor pricing has been essential in aligning our strategies and optimising cost structures. By jointly*

*evaluating shipping terms, such as FOB and CFR, and comparing freight costs handled by either party, we identified the most cost-effective options.” (P7).*

Furthermore, one participant emphasised the role of collaborative problem-solving, supported by technical assistance and technology like Microsoft Teams, in facilitating nationwide coordination (P5).

**Joint Forecasting and Demand Planning:** Five participants identified joint forecasting and demand planning as an important collaborative practice, enabling alignment between buyer-supplier collaboration in supply chain operations. Participants emphasised the importance of shared forecasting efforts and coordinated planning with suppliers to ensure timely replenishment and improve production planning. These practices strengthen operational collaboration by providing suppliers with the visibility they need to align their production schedules with buyer demand, minimising the risks of overstocking or stock outs. One participant explained:

*“Our collaborative practices involve joint forecasting and demand planning with suppliers, more so over longer intervals. This sometimes includes that when larger quantities are involved, our suppliers negotiate having firm orders as a show of our commitment.” (P7).*

Another participant highlighted the importance of consistent communication in ensuring the effectiveness of joint demand planning, stating:

*“Suppliers have visibility of our stock levels through joint demand planning and forecasting to improve their production planning. This helps ensure timely replenishment before stock runs low. However, if communication between partners is reduced or inconsistent, it can hinder the effectiveness of this practice.” (P3).*

**Incentive Alignment:** Incentive alignment emerged as another important collaborative practice, identified by five participants, as it strengthens partnerships by ensuring shared benefits and equitably distributing costs and risks. Participants emphasised practices such as joint cost-sharing initiative, risk distribution, shared

accountability and ownership, consignment stock arrangements, and strategic pricing strategies to address economic pressures and operational challenges. One participant shared:

*“We worked collaboratively to find cost-sharing solutions for the rising costs, see from our end if we can pass that onto our customers.” (P3).*

Another participant described how cost and risk distribution fostered trust and efficiency, stating:

*“We share costs and risks, which has strengthened partnerships. For instance, a supplier suggested setting up consignment stock for our key product, so we’d always have a three-month supply on hand to avoid shortages, only invoicing us upon usage. This has helped with working capital to meet our internal set goals.” (P2).*

Furthermore, another example highlighted the importance of joint strategising around pricing to tackle competitive pressures, with one participant stating:

*“Economic conditions forced us to jointly strategise around competitive pricing. Collaboration involved increasing volume at a discounted price to retain market share. For example, one of our suppliers had to re-develop cost-effective products tailored to the South African market.” (P6).*

Consignment stock was a recurring theme in incentive alignment practice. Participants noted how this approach reduced working capital burdens, minimised exposure to price volatility, and provided peace of mind during disruptions. By invoicing stock only upon utilisation, buyers avoided the risks of holding excessive inventory, while suppliers maintained steady operations (P8 & P9).

**Financial Support and Development:** Two participants identified financial support and development as essential collaborative practices, particularly for fostering resilience and enhancing supplier capabilities. Participants highlighted that this practice focus on providing informal financial assistance and strategic investments to ensure the sustainability of supply chain partnerships, especially during

challenging economic conditions. One participant illustrated the critical importance of financial support during crises, stating:

*“For example, during the pandemic, one of our critical product blenders was on the verge of shutting down due to financial strain. We stepped in with financial assistance to ensure their operations could continue uninterrupted.”* (P2).

Additionally, participants highlighted investments in supplier capability enhancement as a key aspect of financial collaboration. One participant shared:

*“Another notable practice involves investing in our suppliers’ operations to enhance their capabilities. For instance, we’ve collaborated with local suppliers and financially supported them to improve their systems and ensure sustainable supply during challenging times.”* (P3).

**Joint Knowledge Creation:** One participant emphasised joint knowledge creation, citing shared risk assessment as a key practice implemented within the organisation's buyer-supplier collaboration (P2).

### 5.3.2 Findings for a Evolution Collaborative Practices Theme

Participants identified a number collaborative practices that have evolved in response to recent disruptions, they emphasised how these practices have shifted from traditional, siloed methods to more integrated, flexible, and proactive approaches, fostering stronger relationships and improved SCRes. Key categories of evolution include joint forecasting and demand planning, collaborative communication and coordination, decision synchronisation, enhanced information sharing, incentive alignment, joint knowledge-creation, financial supports and development, multi-stakeholder engagement, and resource-sharing.

**Joint Forecasting and Demand Planning:** Three participants described significant advancements in forecasting and demand planning, evolving from basic forecast sharing to more collaborative, integrated, and forward-thinking methods. One participant explained:

*"In the last four years, various disruptions have caused delays in supply chains. This has led our organisation to work closer with buyers to understand their business environment and factors affecting demand, jointly forecasting to build additional stock cover weeks on-site. This evolved from a previous approach where sharing forecasts was mainly the buyer's responsibility." (P1).*

This sentiment was echoed by another participant, who stated:

*"We have shifted from a siloed approach to joint forecasting and demand planning, integrating suppliers into our processes." (P8).*

One of the participants emphasised the significance of securing upfront orders rather than relying exclusively on forecasts, as this approach enables both parties to mitigate the risk of excess stock. This is particularly critical when a supplier caters predominantly to one or two buyers and is required to maintain substantial stock levels (P1).

Additionally, participants highlighted a shift away from spot buying towards ensuring that suppliers are provided with a minimum of three to six months' visibility through forecasting and demand planning (P2).

**Collaborative Communication and Coordination:** Ten participants highlighted the importance of communication as a cornerstone of collaboration, evolving significantly in frequency, openness, and structured planning coordination. Frequent communication, often on a weekly, biweekly or even daily basis during disruptions, has replaced the more traditional and infrequent engagement methods. One participant remarked:

*"Previously, we would simply share purchase orders, forecasts, and demand plans with our suppliers and move on. Now, we prioritise frequent communication, openly discuss challenges ... This two-way exchange helps us identify risks, develop joint solutions, and address problems collaboratively." (P7).*

Participants emphasised that during disruptions, robust discussions and frequent agreed-upon meetings between suppliers and buyers were necessary to address and align things. Daily communication with suppliers of critical products allowed organisations to monitor production, allocation and delivery. One participants described this adjustment, noting:

*“While the daily communication is not part of the SRM process but during disruptions, these are things that we had to be flexible about to ensure business continuity.” (P3).*

Another participant explained that, following the COVID-19 pandemic, there has been a noticeable increase in the frequency of communication and follow ups, supported by the adoption of technology platforms to enhance coordination. This change has minimised the need for travel, streamlining communication by enabling individuals to collaborate effectively from their own locations (P5).

One participant elaborated, emphasising that buyer-supplier engagement has extended beyond direct suppliers to include their suppliers' suppliers, ensuring alignment across all interconnected parties within the value chain. The participant explained this approach by highlighting their involvement with a supplier's supplier in the rail network system to enhance operational capabilities. Although such collaboration technically fall outside their direct responsibility, the participant noted that issues experienced by their suppliers ultimately impact the broader value chain, making it necessary for them to address them proactively (P3).

**Information Sharing:** Five participants highlighted an increasing emphasis on real-time sharing of critical and relevant information. This shift goes beyond solely exchanging forecasts and purchase orders to providing key data essential for strategic decision-making and alignment. For example, three participants explain this shift:

*“One notable development has been the structured sharing of business continuity plans between partners.” (P3).*

*“Previously, we were hesitant to be fully transparent with suppliers due to concerns that sharing our plans might lead to them exploiting the information by increasing prices. However, when the global pandemic hit us, our mind-set changed. We engaged with local suppliers, openly shared our growth plans, and provided assurance about long-term demand. Suppliers felt confident to invest in creating additional capacity.” (P4).*

*“Previously, we would simply share purchase orders, forecasts, and demand plans with our suppliers and move on. Now, we share information like budgets and continuity plans with our suppliers.” (P7).*

**Decision Synchronisation:** Insights from eight participants on decision synchronisation, highlighted the progression towards greater interdependence and alignment between supply chain partners to manage disruptions, risks, and operational challenges effectively. Participants highlighted that decision synchronisation has evolved to include proactive collaboration in areas such as risk assessment, scenario planning, problem-solving, and jointly developing solutions to address challenges. One participant added:

*“...We’ve identified potential weaknesses and risks, reflected on lessons learnt from past disruptions, and developed strategies to prevent similar issues in the future.” (P3).*

Another participant demonstrated this progression by explaining how, during periods of disruption, they collaboratively adapted their approach to manage raw material cost volatility. This adjustment ensured the supplier could account for price increases in a timely manner. While their contracts were initially based on quarterly pricing, they transitioned to a monthly pricing model to more effectively address these fluctuations (P9). Another participant highlighted collaborative problem-solving in response to shipping route diversification:

*“The most significant shift has been the diversification of shipping routes, a decision made in collaboration with our suppliers. For instance, during geopolitical tensions,*

*we moved from the Red Sea route to the Cape of Good Hope. We now rely on multiple shipping lines and input terms to secure better control.” (P10).*

In addition, one participant, illustrated the depth of this practice:

*“With Company X, our partnerships are deeply interconnected, meaning that what affects one party inherently impacts the other. This interdependence fosters a collaborative approach to finding solutions, allowing disruptions to be managed more effectively.” (P11).*

**Incentive Alignment:** Incentive alignment, identified by five participants, has emerged as an essential element in fostering collaboration and ensuring continuity during disruptions. Practices such as cost absorption, risk-sharing, and adaptive supply agreements with flexibility clauses have evolved to address challenges posed by market volatility, shipping delays, and unpredictable customer demands or global disruptions.

One participant highlighted the growing practice of cost absorption as a critical factor in fostering deeper and more effective collaboration. As a supplier, they have demonstrated a willingness to absorb certain costs during disruptions, such as those incurred through expedited shipping, including airfreighting products at short notice, to ensure the buyer's needs are met (P5).

Participants also emphasised the introduction of flexible clauses in contract terms as a significant development, aimed at redistributing risks more equitably particular for unseen challenges. For instance, one participant shared:

*“During a global disruption, we found ourselves locked into an inflexible agreement with a key chemical supplier. The contract required us to purchase fixed volumes. As the pandemic strained our customers’ budgets, with soaring product costs, many stopped buying the product, leaving us with unsellable excess stock and significant losses. This experience highlighted the critical need for flexibility clauses that account for unforeseen circumstances, enabling us to adapt to disruptions and safeguard our business going forward.” (P7).*

**Joint Knowledge Creation:** Joint knowledge creation, identified by only two participants, has emerged as one of evolving collaborative practices, enabling organisations to navigate disruptions and build resilience through shared insights and co-development efforts. This approach emphasises risk assessment and co-developing strategies that foster alignment across partners. One participant emphasised the value of joint risk assessment to improve future decision:

*"To address this for the future, we introduced joint risk assessments while increasing timely communication and sharing of information." (P2).*

Furthermore, co-product development has emerged as a practical example of joint knowledge creation. One participant shared:

*"We work closely with Company X to coordinate efforts, allowing us to organise and prepare collectively for current and future needs, including product development. This collaborative approach nurtures a shared mind-set, culture, and alignment that permeates both organisations." (P11).*

**Joint Logistics and Consolidation Strategies (Resource-Sharing):** Only one participant identified joint logistics and shipment consolidation as a key collaborative practice:

*"The establishment of a consolidation hub in Antwerp, Belgium, has been a key collaborative effort in optimising our supply chain. With a three-week free storage period, we can consolidate shipments from across Europe including Germany, France, and Italy before dispatching them to South Africa. This approach has significantly reduced costs, improved logistical efficiency, and enhanced inventory control by fully optimising container space." (P10).*

**Multi-Stakeholder Participation:** Four participants revealed that collaborative practices has seen a significant shift towards broader and more inclusive stakeholder participation within the buyer-supplier collaboration. Participants emphasised that this shift marks a shift beyond procurement-level interactions of supplier-buyer

interactions towards multi-stakeholder collaborative participation to cover even strategic things.

*“Senior members of suppliers and buyers now engage more extensively with each other, aligning on growth targets and addressing supply chain issues collectively. This marks a shift from traditional methods where only one representative from each organisation communicated...” (P6).*

Another participants added:

*“We’ve also expanded communication to include multiple stakeholders, ensuring faster decision-making and problem-solving.” (P7).*

**Financial Supports and Development:** One participant has observed that collaborative practices has extended to financial supports and development practices, reflecting a deeper commitment to fostering mutual growth and sustainability. One significant development includes co-investments in tools and equipment, which has enabled suppliers to enhance their operational capabilities and ensure consistent supply despite challenging circumstances.

*“We have worked closely with suppliers to co-invest in necessary tools and equipment to ensure consistent supply. This collaboration goes beyond traditional buyer-supplier relationships, strengthening trust and aligning goals for shared success.” (P3).*

### **5.3.3 Findings for a Process Evolution Theme**

Insights from participants highlighted several process enhancements implemented to improve the effectiveness of buyer-supplier collaboration practices. These included technology integration to enhance supply chain visibility and communication, procedural optimisation and adaptation, and cultural and strategic organisational shifts.

**Technological Integration for Supply Chain Visibility:** Insights from eight participants highlighted the evolution of processes in supply chain management has been significantly driven by the adoption of advanced technologies, particularly ERP system like SAP, and real-time tracking solutions. These innovations have revolutionised forecasting, demand planning, and overall operational efficiency. Participants consistently emphasised the implementation of SAP system as a transformative shift from periodic updates to real-time data access, enabling dynamic decision-making and accurate information sharing across the supply chain. As one participant emphasised:

*“We’ve implemented an ERP system, SAP, leveraged real-time monitoring for accurate forecasting and demand planning. This shifted from monthly updates on forecast and demand planning to real-time visibility which has improved accuracy and information sharing.” (P2).*

In addition to ERP system, digital tools such as sensors have enhanced transparency in logistics operations. These tools provide real-time updates on shipment status, ensuring proactive management and smoother workflows. Another participant stated:

*“We’ve also implemented sensors within our logistics operations to gather real-time updates on shipment status, ensuring transparency and proactive management.” (P8).*

**Technological Integration for Communication:** All participants highlighted that the evolution of communication processes within organisations has been marked by the widespread adoption of digital tools, including Microsoft Teams, WhatsApp, and other virtual platforms, to enhance collaboration and streamline decision-making. Participants emphasised that these tools have played a crucial role in facilitating seamless, real-time interactions across geographically dispersed teams. For instance, virtual platforms have enabled virtual meetings that connect stakeholders from technical, operational, and sales functions globally, fostering diverse input and innovative ideas. A participant highlighted:

*“With virtual meetings, it’s now possible to bring the relevant individuals into discussions, including those from technical, operational, and other supporting departments. This inclusive approach allows us to address issues collectively, resulting in quicker decision-making and better solutions.” (P5).*

Additionally, WhatsApp has emerged as a key tool for quick and efficient communication, supporting instant messaging, group chats, and voice calls, which ensure faster responses and broaden participation in decision-making processes. One participant noted:

*“WhatsApp allows for almost immediate responses but also make international calling more accessible for all and besides being used for instant messaging and calls, we have also seen WhatsApp chat groups started, which allows key role players (situation specific) to all be on one message group and have access to the same information and the same time.” (P1).*

**Procedural Optimisation and Adaptation:** Three participants emphasised that the evolution of internal processes through procedural optimisation and adaptation has been key to strengthening buyer-supplier collaboration and building a resilient supply chain. They highlighted how adopting structured procedures, such as Supplier Relationship Management (SRM) along vendor management processes, has transformed collaborative practices.

*“We adapted our processes to implement more effective procedures, starting with the establishment of an internal supply chain work stream team across the organisational subsidiaries to share lessons from disruptions and come up with solutions to strengthen resilience. This resulted in the introduction of a Supplier Relationship Management (SRM) procedure to guide supply chain professionals in maintaining strong relationships with suppliers.” (P2).*

*“A structured Supplier Relationship Management (SRM) procedure has been key. This involves regular, structured communication with suppliers, quarterly performance reviews, and joint problem-solving sessions.” (P3).*

*“This formalised approach involves regular, structured meetings with suppliers to discuss business conditions, risks, and opportunities.” (P4).*

**Cultural and Organisational Strategic Shifts:** Four participants emphasised that the adoption of collaborative practices has driven significant cultural and organisational strategic shifts. One participant highlighted:

*“This initiative required a cultural shift toward mutual reliance and true partnership with suppliers, supported by meaningful discussions to secure their buy-in.” (P2).*

Building on this, other participants added:

*“We have invested in mind-set shifts and training for our supply chain team, emphasising the importance of managing supplier partnerships effectively.” (P8).*

*We’ve adopted a cultural shift to align purpose and outputs with our internal staff and suppliers.” (P10).*

Expanding on the category another participant noted the importance of organisational strategic shift:

*“Concepts like nearshoring and offshoring have become critical. Previously, we relied heavily on offshore suppliers, which exposed us to risks like shipment delays and container shortages. Now, we’ve invested in local manufacturing partnering with local suppliers to reduce these risks.” (P3).*

#### **5.3.4 Findings for a SCRes Theme**

Participants highlighted that buyer-supplier collaborative practices play a crucial role in enhancing supply chain flexibility, visibility, and velocity, ultimately strengthening supply chain resilience. **Supply Chain Flexibility, Visibility, and Velocity:** Seven participants have emphasised the role of collaborative practices in enhancing supply chain flexibility, visibility, and velocity. Timely information sharing and trust-building efforts have played a critical role in enhancing supply chain flexibility, visibility, and velocity, ensuring more agile and resilient operations. As one participant noted:

*“The most significant benefit is a resilient supply chain characterised by the timely sharing of information and materials flow in the right quantity and quality.” (P3).*

Another participant added:

*“Establishing reliability and mutual support between the supplier and buyer strengthens the relationship. When buyers see that you are willing to go the extra mile for them, it creates stronger bonds and reinforces their confidence in your partnership...” (P5).*

Participants further noted that effective communication, joint forecasting, and problem-solving play a crucial role in enhancing flexibility, visibility, and velocity. These practices allow organisations to plan more effectively, ensuring continuity and improving service delivery. For instance:

*“Effective communication and joint forecasting have improved visibility and speed in operations... Joint problem-solving and risk mitigation have made suppliers more flexible by offering alternative shipping points.” (P7).*

Another participant highlighted how fluid communication and a collaborative culture enable quick and effective responses to challenges:

*“This fluid communication and collaborative culture enable quick and effective responses to challenges, further strengthening the bond between the organisations and ensuring long-term success.” (P11).*

One participant expanded on the key outcomes:

*“The key outcomes of these collaboration practices include enhanced visibility across the supply chain, enabling quick adaptation to changing circumstances. Improved forecasting accuracy and closer collaboration have significantly strengthened our ability to respond to disruptions effectively, ensuring operational continuity and buyer satisfaction. Additionally, these practices have strengthened partnerships, reduced*

*risk exposure, and positioned the supply chain to be more agile and resilient in the face of future challenges.” (P9).*

Another participant noted the operational improvements resulting from these practices:

*“These collaborative practices have significantly improved efficiency, resulting in faster turnaround times within the supply chain. We now have enhanced visibility into information and status updates, enabling us to adapt swiftly to changes.” (P8).*

**Supply Chain Velocity:** One participant highlighted the role of decision making and better solution development results in supply chain velocity thereby enhancing supply chain resilience:

*“This inclusive approach allows us to address issues collectively, resulting in quicker decision-making and better solutions. By reducing the time it takes to resolve problems, we’ve been able to avoid potential disruptions and enhance overall efficiency in the supply chain.” (P5).*

**Supply Chain Velocity and Flexibility:** Two participants emphasised the role of data-driven decision-making and enhanced communication through digital tools contribute to quick responses and adaptability. That this improvement has been driven by the adoption of more flexible and frequent communication strategies. Digital tools such as WhatsApp, Teams, and video calls have replaced traditional reliance on emails, enabling quicker responses and fostering greater adaptability, even when working with overseas suppliers. A highlight from one participant:

*“Communication has become much more frequent, sometimes daily during disruptions. Previously, we relied mainly on emails, but now we use WhatsApp, video calls, and Teams. These tools enable faster responses and greater flexibility, even with overseas suppliers.” (P2).*

**Supply Chain Flexibility and Visibility:** While one participant emphasised the role of proactive decision-making in enhancing supply chain flexibility and visibility by anticipating potential challenges through data and predictive analytics

*“One key benefit is our ability to anticipate potential disruptions and mitigate risks before they escalate. Rather than reacting out of fear, our decision-making is now driven by data and predictive analytics, allowing for more strategic and informed choices.” (P10).*

#### 5.4 Findings for Research Question Two Themes

**Table 4: Research Question Two and Themes**

<p><b>Research Question Two (RQ2):</b> What are the key challenges or barriers organisations face in fostering collaboration within the buyer-supplier network in South Africa’s chemical manufacturing sector, and how have these challenges been addressed to enhance supply chain resilience?</p>	
Background	Themes
<p>RQ2 aimed to examine challenges and barriers that organisations face in implementing, adapting, and maintaining these collaborations practices, while also highlighting the strategies or enablers to collaboration barriers. Additionally, research question 2 aimed to draw lessons from adapting these collaboration practices in response to disruptions.</p>	<ol style="list-style-type: none"> <li>1. Challenges/ Barriers</li> <li>2. Solution to Collaboration barriers</li> <li>3. Key Lessons</li> </ol>

*Source: Author’s own*

**Table 4** provides an overview of RQ2, highlighting its purpose and the key themes that emerged from the interviews. The identified themes such as challenges to buyer-

supplier collaboration, solutions to collaboration barriers, and key lessons will play a critical role in addressing RQ2. Below are the findings of these themes.

#### **5.4.1 Findings for Challenges and Barriers to Buyer-Supplier Collaboration Themes**

Participants identified several challenges hindering buyer-supplier collaboration, including trust and relationship constraints, misalignment, cultural differences, economic pressures, vendor management issues, resource limitations, communication barriers, regulatory constraints, and information-sharing difficulties.

**Trust and Relationship Challenges:** Insight from six participants revealed that building trust and strong relationships remain significant challenge in buyer-supplier collaboration, particularly in contexts involving diverse geographies and economic perceptions. One participant remarked:

*"We have faced trust issues as buyers, particularly due to the perception of being an African country, where some international suppliers are hesitant to offer favourable payment terms, viewing us as less stable." (P1).*

Another participant highlighted how global disruptions, such as Covid-19, aggravated relational issues. During the pandemic, some international suppliers quickly imposed unfavourable payment terms, which strained buyer-supplier collaboration and exacerbated existing challenges (P7).

Another participant noted the mutual scepticism that often characterises these relationships:

*"Trust has been a significant challenge. Initially, there was scepticism from both sides, from the supplier's point of view they think we are out there to exploit them; on the other hand, we also think they are here to maximise their profits and margins of our business." (P3).*

Meanwhile, another participant highlighted the challenges posed by rigid contractual agreements:

*“These global negotiations typically lock in pricing and service terms for a full quarter, limiting our ability to adjust to market fluctuations. As a result, when unforeseen changes occur within that period, we find ourselves in a reactive position, unable to renegotiate terms or adapt input conditions.” (P10).*

**Misalignment Issues:** Six participants noted that misalignment between buyers and suppliers often arises from differing objectives, strategies, and levels of buy-in. One participant observed:

*“The organisation has faced several challenges in establishing and maintaining collaboration practices with suppliers and buyers, including misalignment of objectives and strategies...” (P9).*

Another participant added:

*“Global trade, especially where reliant on imports, often presents challenges such as misaligned objectives, which can hinder effective collaboration.” (P6).*

Another participant reflected on a specific challenge, stating:

*“One example involves lack of alignment where a long-term supplier of ours eventually entered our market as a competitor. This strained our relationship, leading us to terminate the partnership.” (P11).*

Meanwhile, two participants noted that initial resistance to collaborative practices, such as establishing regular meetings and securing stakeholder buy-in, posed significant hurdles. However, these challenges were overcome by consistently demonstrating the tangible value of collaboration (P5 & P10).

**Misalignment and Cultural Dynamics:** Four participants observed that cultural or mind-set differences and power dynamics often create barriers in buyer-supplier collaboration, particularly in a globalised trade environment. One participant shared:

*“Additionally, misalignment of goals, often influenced by power dynamics and cultural differences, has posed challenges as we source from countries with diverse cultural*

*norms.” (P1).*

Another participant recounted a specific challenge, stating:

*“One of our overseas suppliers, who is one of the only four producers of this specialised product in the world, initially quoted us using CFR terms, meaning they managed freight and shipping. Without warning, they switched to EXW terms, requiring us to handle collection, stacking, and the dangerous goods declaration ourselves. They explained that our low volumes didn’t justify the effort on their end. Despite our appeals for assistance, they refused to help...” (P2).*

Different mind-sets and regional communication styles can pose challenges if not properly understood. For instance, as one participant observed, suppliers from regions such as India, Europe, and China often adopt distinctly different approaches to communication and relationship management (P7).

**Economic Conditions:** Five additional participants highlighted that economic challenges, such as rising costs, intense competition, and shipping delays due to reliant to import, have created significant barriers to effective buyer-supplier collaboration. Participants emphasised that these challenges often strain relationships, as suppliers grapple with increasing operational expenses and are compelled to pass these costs onto buyers. As one participant emphasised:

*“Economic conditions from rising energy costs and struggles to source cheaper input materials have strained suppliers’ operations, and they had to pass that onto us as buyers.” (P3).*

Global sourcing and its associated shipping delays further exacerbate these difficulties. These participants observed:

*“Shipping delays and in particular, the Durban port congestion has been problematic for our supply chain due to reliant on import.” (P1).*

*“Shipping delays and transshipment challenges caused by global sourcing issues have had a significant impact on collaboration.” (P8).*

Adding to these challenges, intense competition further complicates buyer-supplier dynamics. As one participant shared:

*"Economic conditions, such as reliance on global sourcing and intense competition, are significant external factors impacting collaboration..." (P9).*

**Vendor Management and Resource Challenges:** Two participants highlighted and agreed on the challenges of managing a large number of buyers or suppliers while operating with limited manpower, which restricts their ability to build meaningful collaborations. They also elaborated that a critical issue was the need to prioritise key suppliers, which, while necessary, often leads to the neglect of smaller vendors. As one participant explained:

*"A major challenge is the sheer number of vendors; over 400. It's difficult to dedicate enough attention to all of them. We've prioritised key suppliers and materials, focusing our efforts where they matter most. However, this means some smaller vendors receive less attention, which can pose risks when their materials become critical unexpectedly." (P4)*

Another participant elaborated on the impact of resource constraints and heavy workloads:

*"One challenge is the unavailability of key individuals due to high workloads. Managing multiple buyers or working with buyers in resource-constrained environments makes it difficult to strengthen relationships. As a result, resources are allocated to focus solely on key buyers or suppliers, which inevitably limits the ability to engage with and maintain relationships with others." (P6)*

**Communication Challenges:** Three participants highlighted that challenges such as delayed communication, lack of follow-ups, and communication breakdowns have significantly impacted collaborative efforts. For instance, one participant observed:

*"Delayed communication and internal failure to execute responsibilities effectively further exacerbated the situation. On the supplier side, the necessary alignment also fell short, with a lack of follow-ups." (P3).*

Another participant explained this with a specific example:

*"For example, a shipment was mistakenly routed via transshipment and such information was not communicated down to us, causing significant delays."* (P10).

Additionally, another participant remarked:

*"A breakdown in communication led to missed information and lost business opportunities."* (P6).

**Regulatory Challenges:** One participant highlighted regulatory challenges as a barrier to buyer-supplier collaboration, particularly due to the lack of REACH certification for certain products. The participant explained:

*"Regulations have significantly impacted collaboration. Our organisation is focused on export growth, but this requires certifications like REACH for European markets. While we have successfully certified some products, the high costs associated with certification have limited progress on others. This has constrained potential growth and affected collaboration with chosen distributors (buyers) to market our products."* (P1).

**Information Sharing Challenges:** Only one participant highlighted the challenge of timely information sharing, which has adversely affected collaboration with suppliers and buyers. They noted:

*"The organisation has faced several challenges in establishing and maintaining collaboration practices with suppliers and buyers, including a lack of timely information sharing."* (P9).

#### **5.4.2 Findings for Solutions to Overcoming Collaboration Barriers Themes**

Participants identified several key enablers or efforts for overcoming buyer-supplier collaboration barriers. These include trust and relationship building, strategic sourcing and supplier management, contractual agreements, reputation enhancement, and technology adoption.

**Trust and Relationship Building:** Participants consistently highlighted trust and relationship building as a critical solution to collaboration barriers. This revolves around fostering open communication, cultivating strong partnerships with mutual benefits, ensuring transparency through open-book approach, and demonstrating reliability. It also involves understanding partners' needs, showing genuine care for their business and challenges, and aligning on shared goals, values and objectives. Additionally, it emphasises practicing reciprocity, honesty, and mutual respect, engaging in bonding sessions, embracing flexibility, demonstrating a willingness to compromise, dedicating sufficient time to the relationship, supplier visits, and prioritising long-term partnerships over short-term gains. The following insights were shared by some participants:

*“We promote reciprocity through two-way information sharing on market conditions, strengthening these relationships. We uphold our commitments, honour our promises, and prioritise honesty and transparency in all interactions with our partners.” (P1).*

*“We’ve fostered trust through open communication, regular interactions, and feedback sessions.” (P2).*

*“We have realised how essential to dedicate more time to nurturing these partnerships to maintain supplier loyalty and enhance supply chain resilience. The level of openness goes beyond just sharing forecasts; it involves having meaningful conversations that show genuine care for the supplier and their business. It’s about demonstrating mutual respect and interest in their challenges and opportunities.” (P4).*

*“Our approach emphasises loyalty and collaboration, especially during challenging times, where we prioritise maintaining strong partnerships over short-term gains. By demonstrating flexibility and a willingness to compromise, we foster a sense of true partnership. This collaborative mind set reassures suppliers that we are working with them, not against them, ensuring alignment in goals and mutual success.” (P7).*

*To build trust and mutual understanding, we invest significant time in integrating with our partners. This involves fostering alignment in operations, values, and objectives. It also requires consistent efforts to understand our partners' needs and ensure they understand ours. (P11).*

Strategic interventions, including integrating suppliers into organisational strategies, collaborating on technical and marketing initiatives, sharing strategic growth plans, and involving senior members in supply chain interactions, were identified as effective in overcoming buyer-supplier collaboration barriers. Here are some key insights from the participants:

*"We share strategic growth plans with suppliers, fostering a sense of partnership and collaboration. Senior members are involved in supplier relationships, moving beyond procurement-level interactions." (P2).*

*"However, adopting an open-book approach and sharing our strategies/plans and ambitions helped build trust over time." (P3).*

*"We invite suppliers to visit and experience how we promote their brands locally. We also involve them in technical discussions with customers, treating them as partners rather than just suppliers." (P7).*

Participants also emphasised the effectiveness of bonding sessions. As one participant explained:

*"We organise bonding sessions with our key buyers and suppliers, providing an opportunity to connect in a more informal, social setting. These interactions help us build personal relationships, enabling a deeper understanding of individual perspectives and improving our ability to collaborate effectively with people from diverse viewpoints." (P1).*

**Strategic Sourcing and Supplier Management:** Strategic Sourcing and Supplier Management emerged as a critical solution to collaboration barriers. Three of the participants highlighted that the organisation has adopted strategies such as partnering with new and local suppliers, consolidating demand across subsidiaries, and leveraging group strategic sourcing to increase purchasing power and foster

stronger supplier relationships. One participant noted:

*“We have launched initiatives to support local suppliers to reduce reliance on a single source more so abroad suppliers.” (P2).*

One participant described how they utilise the group strategic sourcing team to enhance procurement efficiency and supplier collaboration:

*“As part of a larger organisation, we now leverage a global strategic sourcing team to also strengthen our purchasing power and foster deeper supplier relationships. This team engages directly with suppliers as well over and above purchasing managers, including face-to-face interactions, to build trust and rapport.” (P8).*

Another participant echoed the sentiment and remarked:

*“We’ve consolidated purchasing across the group, increasing leverage with suppliers in terms of purchasing power and better payment terms.” (P9).*

**Contractual Agreements:** Six participants highlighted the critical role of moving away from spot-based procurement towards a well-structured contractual agreements in overcoming collaboration barriers. These agreements, including long-term supply contracts, service level agreements (SLAs) with built-in flexibility, and exclusivity clauses, help establish clear expectations while fostering trust and reliability. As one participant shared:

*“With a key buyer, we have entered into a five-year supply agreement. This agreement clearly sets out our requirements and expectations upfront while still allowing some flexibility.” (P1).*

Another participant emphasised the value of SLAs in overcoming collaboration barriers:

*“Flexible service level agreements combined with regular reviews of quality, supply, and service performance have been instrumental in setting clear expectations and fostering mutual trust with partners.” (P5).*

A further perspective highlighted how long-term contracts strengthen partnerships:

*“We build trust and mutual understanding with suppliers through long-term contracts that include clear and transparent terms, such as exclusivity agreements. These contracts provide a foundation of reliability and shared commitment.” (P7).*

Additionally, another participant highlighted the shift away from spot-based procurement towards structured agreements:

*“We have established contractual agreements and service level agreements with clearly defined expectations from the outset. This shift away from spot-based procurement has significantly improved supplier relationships.” (P10).*

**Building Reputation:** One participant highlighted that a strong reputation is crucial for overcoming trust collaboration barriers. Being JSE-listed and demonstrating a consistent track record of high performance were noted as key factors in fostering trust and credibility with partners:

*“Being a JSE-listed company has also helped to some extent, as it signals stability and credibility, providing partners with a degree of confidence in our business. Over time, as we have built a track record of strong performance and upheld our promises, many suppliers have developed trust and faith in our organisation, strengthening our partnerships.” (P1).*

**Technology Adoption:** One participant emphasised the role of technology in overcoming collaboration barriers:

*“Adopting technology has increased the frequency of communication and significantly reduced information gaps, ensuring that all stakeholders have access to the same information and remain aligned. This has ultimately strengthened collaboration and trust (P9).*

### 5.4.3 Findings for Lessons Themes

Participants have highlighted that the challenges and disruptions faced in buyer-

supplier collaboration and supply chain management have revealed several critical lessons that highlight the importance of resilience, collaboration, flexibility, and continuous improvement.

One significant insight is the dynamic nature of resilience. As one participant noted:

*“The key lesson is that resilience is not static; it demands ongoing improvements and the readiness to pivot when necessary. While increasing inventory has proven effective in building resilience, it is not sustainable for many organisations due to working capital constraints. As a result, the focus will likely shift towards reducing stock levels and returning to a more “Just-in-Time” approach, supported by increased localisation of production to enhance agility and reduce dependency on global supply chains. So collaborative practices will remain the key for enabling supply chain resilience against future disruptions.” (P1).*

Another key takeaway emphasised the importance of effective collaboration, clear and constant communication, and proactive planning as fundamental to managing disruptions. As participants shared:

*“Supply chain parties are deeply interconnected. Effective collaboration, open communication, and the exchange of ideas are essential for addressing disruptions and driving growth and resilience.” (P2).*

*“The biggest lesson is the importance of communication and proactive planning. Excellence requires high intention, sincere effort, and intelligent execution.” (P10).*

*“The key lesson is to remain proactive and maintain constant communication. Accurate and timely information is essential for anticipating and addressing challenges. These collaboration are important, needs nurturing and constant evaluating if the practices are working for both partners.” (P8).*

Additionally, balancing loyalty with flexibility in supplier partnerships was emphasised as important to ensure organisations can adapt to changing market conditions without compromising resilience. The participant expanded:

*“One key lesson we’ve learnt or I have learnt per say from adapting collaboration*

*practices in response to disruptions is the importance of balancing loyalty with flexibility. While exclusive contracts with suppliers foster trust and commitment, they can become a challenge when market conditions change. Remaining loyal to a supplier who is no longer contributing to business profitability can strain resources and limit adaptability.” (P7).*

When participants were asked about potential improvements in buyer-supplier collaboration, their responses highlighted key strategies for fostering stronger partnerships and enhancing supply chain resilience. Participants highlighted the need for strategic partnerships supported by adequate resources and advanced technologies. As one participant noted:

*“More strategic partnerships and enhanced use of technology for supply chain visibility and market analytics are essential. Additionally, greater focus and resource allocation for collaboration are needed to ensure its effectiveness. Without sufficient resources, such measures may fail to drive meaningful collaboration.” (P1).*

Local collaboration emerged as critical for strengthening buyer-supplier relationships, particularly when building connections with nearby partners. As one participant remarked:

*“While partnering with international companies can be ideal for accessing products not available locally, we must prioritise exploring local manufacturers where possible. Building relationships with nearby partners is often easier and can foster stronger collaboration.” (P2).*

Early supplier involvement in planning processes, coupled with multi-stakeholder participation, is emphasised as a key strategy to strengthen partnerships and ensure continuity. As expressed:

*“Early buyer-supplier involvement in planning and design processes is critical. This reduces wastage, improves cost efficiency, and strengthens partnerships.” (P3).*

*“Partnerships must be built on a foundation of trust across multiple levels to prevent disruptions when key individuals leave.” (P11).*

Potential of resource-sharing initiatives to improve collaboration and resilience was also highlighted. As one participant explained:

*"Greater flexibility and enhancements in resource sharing, such as joint warehousing, could significantly improve resilience and cost efficiency. These are changes I would like to see." (P6).*

Lastly, another participant highlighted the importance of aligned technology integration in enhancing buyer-supplier collaboration:

*"The adoption of aligned advanced digital tools on both sides would streamline collaboration and further strengthen supply chain resilience." (P10).*

## **5.5 Conclusion**

The findings revealed that buyer-supplier collaboration in South Africa's chemical manufacturing sector has undergone significant evolution, particularly in response to recent disruptions. The findings highlighted key collaborative practices that have adapted and evolved, including collaborative communication and coordination, information sharing, incentive alignment, financial support and development, multi-stakeholder participation, and joint activities such as joint forecasting and demand planning, decision synchronisation, joint knowledge creation, and resource sharing. Additionally, process evolution including technology integration for supply chain visibility and communication, procedural optimisation and adaptation, and cultural and organisational strategic shift have played a critical role in aligning these practices for greater effectiveness.

Building on this, the findings further demonstrate that collaborative practices play a critical role in enhancing supply chain flexibility, velocity, and visibility, key enablers of SCRes. However, several challenges or barriers including trust issues, misalignment, cultural dynamics, communication barriers, and economic pressures continue to hinder collaboration. To address these obstacles, organisations have adopted key strategies and enablers (solutions) such as trust and relationship building, reputation enhancements, technology adoption, strategic sourcing supplier management, and contractual agreements. The key lessons from these findings

highlight that resilience is a dynamic and ongoing process, requiring continuous adaptation, proactive planning, strategic organisational positioning, and multi-stakeholder participation to effectively navigate future supply chain disruptions.

## **CHAPTER 6: DISCUSSION**

### **6.1 Introduction**

This chapter presents a comprehensive discussion of the findings in relation to two key research questions. The discussion critically evaluates the findings (Chapter 5) by integrating insights from the literature review (Chapter 2) to determine the extent to which the findings align with, extend, or challenge existing theoretical perspectives on buyer-supplier collaboration and SCRes. The discussion is structured around the key themes that emerged from the findings, with strong references to relevant literature to support and contextualise the interpretation.

### **6.2 Discussion to Findings for RQ1**

How have buyer-supplier collaboration in the South Africa's chemical manufacturing sector evolved in recent years in response to recent disruptions, to strengthen SCRes?

#### **6.2.1 Collaborative Practices and Their Evolution**

The findings from chapter 5 indicate a significant evolution in buyer-supplier collaboration practices within South Africa's chemical manufacturing sector, particularly in response to recent disruptions such as the COVID-19 pandemic, geopolitical tensions, and economic pressures. Key collaborative practices including information sharing, collaborative communication and coordination, financial support and development, multi-stakeholder participation, incentive alignment, and joint activities such as decision synchronisation, joint forecasting and demand planning, resource-sharing, and joint knowledge creation have evolved from traditional, siloed approaches to more integrated, flexible, and proactive methods. These advancements have strengthened relationships and enhanced SCRes. Additionally, the emergence of multi-stakeholder participation within the buyer-supplier collaboration beyond the procurement level marks a notable shift in buyer-supplier collaborative practices. Table 5 provides a detailed summary of these findings. These findings align with and extend the theoretical frameworks and empirical studies discussed in chapter 2.

**Table 4: Pre and Post-Disruptions Collaborative Practices**

Collaboration Practice	Pre-Disruption Practices	Post-Disruption Evolution
<b>Information Sharing</b>	Limited to purchase orders, forecasts, and demand plans. Hesitation in sharing strategic growth plans due to trust issues. Lack of real-time visibility.	Real-time sharing of information. Increased transparency in pricing, forecasts, demand fluctuations and key data (business continuity plans and key supply chain data). Broader information-sharing across multiple supply chain stakeholders.
<b>Communication &amp; Coordination</b>	Transactional, scheduled updates with limited flexibility. Buyer-supplier engagement restricted to direct interactions.	Continuous, real-time communication (weekly, biweekly, or daily during disruptions). Increased use of digital tools (Teams, WhatsApp) for instant coordination. Inclusion of suppliers' suppliers in discussions for broader alignment.
<b>Decision Synchronisation</b>	Reactive decision-making. Risk assessments not conducted jointly. Buyers and Suppliers made key decisions independently.	Joint risk assessments and scenario planning. Collaborative problem-solving on sourcing and logistics. More flexible financial negotiations for contract clauses, e.g., monthly instead of quarterly pricing adjustments.
<b>Joint Forecasting &amp; Demand Planning</b>	Buyers solely responsible for forecasting. Static demand plans with little supplier input. Minimal adjustments for unexpected fluctuations.	Suppliers actively involved in demand planning. Stock reserves built for critical products. Suppliers given visibility into stock levels to optimise production planning.
<b>Incentive Alignment</b>	Cost-sharing limited; One partner bore most costs and other risks. Inflexible contracts. Minimal strategic pricing collaborations.	Cost-sharing mechanisms introduced to distribute financial burdens. Flexible contract terms allowing for volatility in supply chain conditions. Re-enforced consignment stock to improve working capital management.
<b>Financial Support &amp; Supplier Development</b>	Suppliers expected to manage financial struggles independently. No co-investments in supplier capabilities.	Direct financial support to critical suppliers during crises. Co-investments in technology and operational capabilities. Strategic sourcing initiatives to ensure supply continuity. Greater emphasis on local supplier partnerships to reduce global dependence.
<b>Joint Knowledge Creation</b>	Limited collaboration in innovation or product co-development. Minimal joint risk assessments.	Joint risk assessments and scenario planning. Co-product development efforts. Industry-wide knowledge-sharing initiatives.
<b>Resource-Sharing (Omitted from Study)</b>	No previous buyer involvement on import transportation and no joint logistics initiatives.	Consolidation hubs established shipping coordination. Greater emphasis on local supplier partnerships to reduce global dependence.
<b>Multi-Stakeholder Participation</b>	Single representative from each organisation maintaining engagement or relationship	Increased stakeholder involvement.

Source: Author's own

**Information Sharing:** The findings of this study indicate that information sharing remains a cornerstone of buyer-supplier collaboration in South Africa's chemical manufacturing sector but has evolved in response to uncertain and dynamic conditions. These findings indicate that proactive information-sharing on purchase orders, contracts, industry trends, demand planning, and strategic business plans is increasingly critical. (P3, P4, P7, P8, P10, and P11). This aligns with Scholten and Schilder (2015), Kotzé et al. (2017), and Lotfi and Larmour (2022) who noted information-sharing of purchase orders, inventory levels, demand forecasts, shipping details, anticipated disruptions, market trends, maintenance plans, financial data and lead times as a critical enabler of SCRes, improving visibility and decision-making.

Furthermore, the findings, influenced by recent disruptions, highlight an increasing need for more comprehensive data sharing, including business continuity and strategic business plans. This reflects a shift from guarded information sharing to a more open and transparent exchange of key strategic data. This transition enables better strategic decision-making and alignment, builds a shared vision, and improve operational synergy, ensuring resilience and adaptability in supply chain partnerships (P3, P4, and P7). This resonates with Verghese et al. (2022) findings, who noted that sharing a vision in buyer-supplier relationships is crucial for alignment, goal congruence, and strategic direction. They further noted that, a clear, shared vision helps firms set goals, capitalise on opportunities, and align priorities, ultimately enhancing collaboration and decision-making. Additionally, transparent goal articulation creates a structured framework that guides stakeholders in executing strategic plans, ensuring success and maximising collective value.

This evolution reflects a shift from traditional, transaction-based information-sharing towards strategic transparency of key data to foster stronger buyer-supplier relationships.

**Collaborative Communication and Coordination:** The findings highlight that collaborative communication is another key practice within buyer-supplier collaboration in South Africa's chemical manufacturing sector, continually evolving in response to recent disruptions. The findings emphasise that a clear, frequent, and timely communication plays a critical role in aligning expectations, proactively

addressing issues, and improving supply chain efficiency. This evolution has been supported by the adoption of technology platforms to enhance coordination (P3, P5, P7, and P8). This finding support the assertions of Scholten and Schilder (2015), Kotzé et al. (2017), Umar and Wilson (2021), and Zaman et al. (2024), who identified collaborative communication as a cornerstone of effective buyer-supplier collaboration. It involves how often and through what methods information is shared to influence outcomes (Scholten & Schilder, 2015). It acts as a bridge between partners, enabling them to recognise the benefits of sharing information and resources quickly, especially when adapting to disruptions (Zaman et al., 2024). By providing advance warnings of supply issues, it helps partners coordinate transitions and manage logistics more efficiently (Kotzé et al., 2017).

The emphasis on adopting digital tools such as Microsoft Teams and WhatsApp to enhance communication, facilitate real-time discussions, and reduce reliance on traditional methods (P3, P5). This shift aligns with Umar and Wilson (2021) and Shittu et al. (2018), who emphasised the importance of investing in telecommunications and leveraging mobile phones and internet-based tools to enhance efficiency and collaboration. Building on this, Nickel and Schliebener (2021) observed a similar trend, noting the increased use of Microsoft Teams and other virtual platforms during the pandemic, ensured seamless collaboration despite contact restrictions.

Recent disruptions reveal that collaborative communication has evolved beyond existing literature, now including engagements among suppliers' suppliers within buyer-supplier collaboration, ensuring broader alignment across the supply chain (P3). Additionally, communication frequency has significantly increased, shifting to weekly, biweekly, or even daily interactions during disruptions. While existing literature acknowledges the importance of frequent communication, it does not explicitly address the heightened interaction frequency in response to crises.

**Decision Synchronisation:** The findings reveal that decision synchronisation has emerged as a critical collaborative practice that enables stakeholders to align strategies, optimise costs, and jointly address supply chain challenges effectively. Practical examples include joint problem-solving during port congestion, risk assessments to identify vulnerabilities, collaborative cost-optimisation decisions, and

real-time scenario planning (P1, P3, P5, P7, P9, P10, and P11). These findings align with Kotzé et al. (2017), Scholten and Schilder (2015), Lotfi and Larmour (2022), and Duong and Chong (2020), who identify decision synchronisation as a critical practice in buyer-supplier collaboration.

Kotzé et al. (2017) emphasised that this process involves jointly seeking solutions, leveraging shared expertise, and pooling resources to enhance overall supply chain performance. Expanding on this, Zaman et al. (2024) highlighted that decision synchronisation is essential for partner alignment in decision-making and problem-solving, ensuring shared goals and greater supply chain resilience.

**Joint Forecasting and Demand Planning:** Another key finding was the evolution of joint forecasting and demand planning practices. This includes a shift from isolated forecasting to a more collaborative, long-term approach, reducing reliance on spot buying. This transition integrates suppliers into production scheduling and prioritises upfront orders over forecasts, particularly for high-volume supply or limited buyers, ensuring suppliers are not left with unsold planned stock (P1, P2, P3, P7 and P8). This shift supports prior literature by Lotfi and Larmour (2022) and Duong and Chong (2020), who emphasised the role of joint forecasting and demand planning in improving SCRes.

Building on this, the study offers new insights which extend existing literature by identifying upfront purchase order commitments; particularly for high-volume supply or limited buyer base as a key strategy for mitigating supply risks, including supplier stock-holding risk (P1). This approach demonstrates a deeper integration between buyers and suppliers. Additionally, the findings highlight that the effectiveness of joint forecasting and demand planning depends on maintaining strong communication between partners (P3). Suggesting that for successful implementation, this practice must also align with collaborative communication strategies to ensure consistency and coordination, offering a more comprehensive perspective than previous studies.

**Incentive Alignment:** The findings reveal that incentive alignment as an emerging collaborative practice, encompassing cost-sharing and absorbing initiatives, risk-distribution including adapting contracts, shared accountability and ownership,

consignment stock arrangements, and strategic pricing models (P2, P3, P5, and P7). This aligns with Scholten and Schilder (2015), Duong and Chong (2020), and Lotfi and Larmour (2022), who highlighted incentive alignment as an important practice in buyer-supplier collaboration. For instance, buyers and suppliers may distribute cost burdens and risks equitably to address challenges such as product shortages or rising raw material costs caused by supply constraints. This balanced approach strengthens mutual trust, enhances resilience, and ensures continuity across the supply chain (Scholten & Schilder, 2015; Duong & Chong, 2020).

The findings extend beyond literature by demonstrating that in the South African context, economic instability has driven the need for more adaptive incentive structures, including joint strategic pricing adjustments and cost-effective product re-development tailored to market conditions (P6).

**Financial Support and Development:** Findings highlight financial support and development as an emerging practice in the South Africa's chemical manufacturing sector, particularly during crises and capability investments, to ensure supplier sustainability and SCRes. Insights reveal how partners have supported each other during recent disruptions, with some providing financial assistance and others investing in supplier capabilities or co-funding tools and equipment focusing on local supplier developments. These actions demonstrate a deeper commitment to mutual growth and long-term sustainability (P2, P3).

This aligns with Umar and Wilson (2021), who identified informal financial support as a critical practice in disaster-prone regions. They further emphasised that partners often invest directly in each other to address immediate financial needs, providing loans, raw materials, equipment, or labour financing to support recovery from disruptions and ensure continuity, ultimately benefiting all parties involved.

However, the findings expand on this perspective by showing how global disruptions have accelerated buyer-driven financial support and investment in local suppliers, reducing reliance on imports (P3). This demonstrate how buyers are increasingly engaging in deeper partnerships with local suppliers, driving the country's economic resilience and self-sufficiency at the national level.

**Joint Knowledge Creation:** Although joint knowledge creation was less mentioned, it has emerged as an important practice in post-disruption adaptation. Partners share lessons from disruptions through joint risk assessments and collaborate on co-product development in buyer-supplier relationships (P2, P11). This aligns with Scholten and Schilder (2015), Kotzé et al. (2017) and Lotfi and Larmour (2022), who highlighted joint knowledge creation as an important collaborative practice within buyer-supplier collaboration by emphasising the role of joint learning by reviewing disruptions, and product development in strengthening SCRes.

**Resources-Sharing:** Although resource-sharing was another less mentioned practice among the sampled participants, one participant identified joint logistics and shipment consolidation as an emerging practice for strengthening SCRes. In this approach, organisations and shippers utilise a consolidation hub in Antwerp, Belgium, where goods from across Europe are combined before being shipped to South Africa (P10). This finding aligns with Scholten and Schilder (2015), Mustapha et al. (2022), Kotzé et al. (2017), and Lotfi and Larmour (2022), who recognised resource-sharing as a key collaborative practice within supply chain networks. However, it is particularly consistent with Lotfi and Larmour (2022), who emphasised the role of resource-sharing in horizontal network collaboration, specifically in distribution, where partners optimise costs by consolidating freight loads.

However, since this study focuses on vertical network collaboration, specifically buyer-supplier relationships, which differ from the scope of horizontal collaboration, this practice will be omitted from further analysis in this study.

**Multi-Stakeholder Participation:** Multi-stakeholder participation within buyer-supplier relationships is emerging as an important collaborative practice, moving beyond traditional approaches where only a single representative from each organisation maintained engagement or relationship. Instead, senior members across multiple departments within buyer-supplier relationship are now actively involved, fostering deeper, more strategic collaboration (P6, P7). This extends on existing literature reviewed, introducing a new approach not previously documented.

It highlights how interactions extend beyond isolated exchanges to encompass strategic actions that drive value across the entire organisation.

This should be recognised as a standalone collaborative practice within buyer-supplier collaboration to ensure continuity and prevent relationships from resetting when a single representative leaves the organisation. Embedding it as a structured approach strengthens long-term collaboration, safeguards organisational knowledge, and ensures sustained strategic alignment.

### **6.2.2 Process Evolution**

Insights from participants highlighted several process enhancements aimed at improving the effectiveness of buyer-supplier collaboration and aligning with global supply chain practices. These enhancements include technology integration for supply chain visibility (such as ERP systems and logistics sensors), technology-driven communication (including virtual platforms and WhatsApp), procedural optimisation and adaptation, and cultural and strategic organisational shifts (P1, P2, P3, P4, P5, P8, and P10).

The integration of digital communication technologies aligns with Umar and Wilson (2021) who emphasised the importance of investing in telecommunications, leveraging mobile phones and internet-based tools. Similarly, Nickel and Schliebener (2021) highlighted the increase used of Microsoft Teams and similar virtual platforms during the pandemic ensuring seamless collaboration despite contact restrictions.

The adoption of technology for supply chain visibility is consistent with the findings of Akter et al. (2022), Akhavan and Philsoophian (2023), and Nickel and Schliebener (2021), who emphasised the role of blockchain, ERP systems, data analytics, and tracking tools (such as sensors) in JIT deliveries. These technologies enhance supply chain visibility, accelerate data sharing, and improve decision-making speed (velocity).

The cultural and strategic organisational shifts align with Kotzé et al. (2017), who emphasised that cultural differences between supply chain partners can hinder

cohesive collaboration. Meaning that for buyer-supplier relationships to be effective, a cultural shift is necessary to align values, expectations, and communication practices. Similarly, Duong & Chong (2020) highlighted that organisations with a collaborative culture are more likely to actively engage with partners, fostering strong buyer-supplier relationships. However, the findings extend beyond literature by emphasising the strategic organisational shift, where buyer-supplier engagements evolve beyond strategic collaboration but to align with long-term business objectives, fostering resilience and competitive advantage.

Furthermore, the procedural optimisation and adaptation identified in this study extend beyond existing literature. While this process may have naturally evolved alongside the adoption of collaborative practices, it has not been explicitly recognised in prior research and may have been occurring in the background. This study brings this to the forefront, explicitly highlights its role in evolving collaborative dynamics, making it a critical factor of process changes in sustaining effective buyer-supplier collaborative practices.

### **6.2.3 SCRes**

The findings confirm that buyer-supplier collaboration is essential for enhancing SCRes, improving flexibility, visibility, and velocity through collaborative practices. Findings emphasise that timely information sharing, effective communication, decision synchronisation (joint problem-solving and decision-making), joint forecasting and demand planning, and other collaborative practices play a critical role in anticipating, responding to, and recovering from disruptions (P2, P3, P5, P7, P8, P9, P10, P11). These findings align with Scholten and Schilder (2015), Kotzé et al. (2017), and Umar and Wilson (2021), who highlighted that collaborative practices enhance key supply chain antecedents such as flexibility, visibility, and velocity which ultimately enable SCRes.

### 6.3 Discussion to Findings for RQ2

What are the key challenges or barriers organisations face in fostering collaboration within the buyer-supplier network in South Africa's chemical manufacturing sector, and how have these challenges been addressed to enhance SCRes?

#### 6.3.1 Challenges and Barriers to Buyer-Supplier Collaboration

The findings highlight several challenges and barriers hindering buyer-supplier collaboration, including trust and relationship constraints, misalignment issues, cultural differences, economic pressures, vendor management issues, resource limitations, communication barriers, regulatory constraints, and information-sharing difficulties.

**Trust and Relationship Challenges:** The findings emphasise trust issues, as perceptions and mutual scepticism often strain relationships, particularly in contexts involving diverse geographies (P1, P3, and P7).

*"Without trust, we don't truly collaborate; we merely coordinate or, at best, cooperate. It is trust that transforms a group of people into a team."*

Stephen R. Covey

These findings align with Mahmud et al. (2021) and Nunes et al. (2022), who noted distrust as a major barrier to inter-organisational collaboration, resulting in reduced information sharing, misaligned objectives, and reluctance to invest in joint initiatives. Similarly, Duong and Chong (2020) highlighted that disruptions can create doubt, weakening collaboration and creating perceptions of unreliability, of which a strong foundation of trust and relationship management can mitigate these barriers, driving resilience and effective collaboration in both business and humanitarian contexts.

**Information-Sharing Challenges:** Although mentioned less, the findings indicate that delayed or untimely information exchange remains a challenge in buyer-supplier collaboration within South Africa's chemical manufacturing sector (P9). This aligns with Kotzé et al. (2017), Panahifar et al. (2018), Vosooghizaji et al. (2020), and Nunes et al. (2022), who emphasised that deficient, incomplete, or delayed

information flow weakens collaboration, hinders decision-making, and disrupts supply chain efficiency.

**Communication Barriers:** Delayed communication, lack of follow-ups, and communication breakdowns were identified as significant barriers to collaboration, particularly during disruptions (P3, P6, and P10). These findings align with those of Kotzé et al. (2017), Mahmud et al. (2021), Nunes et al. (2022), and Anderson et al. (2023), who highlighted the detrimental impact of inadequate or lack of data communication on collaborative efforts among partners.

**Misalignment Issues and Cultural Dynamics:** Differences in objectives, mind-sets, and cultural backgrounds, along with power imbalances, and resistance to buy-in, have been identified as significant barriers to collaboration based on findings. These challenges are particularly pronounced in global trade, where distance further complicates alignment and coordination (P1, P2, P5, P6, P7, P9, and P10). This aligns with Kotzé et al. (2017), Duong and Chong (2020), and Anderson et al. (2023), who emphasised that variations in organisational culture, values, and mind-sets among supply chain partners can hinder the development of cohesive collaboration strategies. The emphasis on challenges pronounced in global trade, aligns with Anderson et al. (2023), who emphasised that both physical and cognitive distances create additional barriers to effective cooperation between partners.

Furthermore, the findings on misalignment due to differences in objectives or goals and power imbalances align with Duong and Chong (2020), Mahmud et al. (2021), and Nunes et al. (2022), who highlighted that diverging goals hinder effective collaboration. Similarly, Zissis (2023) emphasised that supply chains operate with multiple independent decision-makers, with distinct objectives and preferences, each prioritising their own interests, which hinders information sharing and ultimately weakens collaboration. Power imbalances resonate with the challenge around lack of clarity on partners' roles, expectations, and capabilities in collaboration highlighted by Anderson et al. (2023), because both create asymmetries in decision-making authority and influence, which hinder effective cooperation.

Additionally, resistance to buy-in as a collaborative barrier aligns with the findings of Mahmud et al. (2021) and Scholten & Schilder (2015) who argued that short-term relationships and a lack of mutual dependence weaken collaboration between buyers and suppliers. When stakeholders hesitate to fully commit to collaborative initiatives, they may engage in transactional interactions rather than fostering long-term partnerships, reinforcing collaboration challenges. This reluctance to invest in deeper engagement mirrors the dynamics of short-term relationships, where partners do not establish the mutual reliance needed for sustained collaboration.

**Economic Pressures:** Findings reveal that economic challenges, such as rising costs, intense competition, and shipping delays due to reliance on imports, have created significant barriers to effective buyer-supplier collaboration. One of the key challenges is the increasing costs faced by suppliers, which often lead them to pass these costs onto buyers, thereby straining relationships (P1, P3, P8, and P9). This aligns with Duong and Chong (2020) and Mahmud et al. (2021), who identified economic factors such as market dynamics, pricing policies, and demand fluctuations as key challenges that weaken collaboration.

The cost-passing behaviour highlights a fundamental issue of incentive misalignment, where cost burdens are not equitably shared among partners, undermining supply chain collaboration. This finding aligns with Kotzé et al. (2017), who identified the reluctance to share both risks and benefits as a major barrier to effective collaboration. In a truly cooperative supply chain, cost burdens should be distributed in a manner that prevents any single entity from disproportionately absorbing financial strain. However, when suppliers shift rising costs fully onto buyers rather than adopting a shared risk-distribution approach, it reflects a reluctance or breakdown in collaborative risk-distribution which is the cost risk in this case. This also aligns with Mahmud et al. (2021), who highlighted that pricing constraints contribute to supply chain instability, further weakening buyer-supplier relationships. When suppliers operate in a cost-passing rather than cost-sharing framework, pricing pressures escalate tensions and ultimately weaken long-term partnerships. Ultimately, this finding underlines that the absence of incentive alignment is a key driver of these challenges, reinforcing the need for a more

structured and proactive approach to aligning incentives in buyer-supplier collaboration to overcome these barriers.

The findings expand on this by highlighting how intense competition due to economic pressures results in more collaboration challenges (P1, P8). This challenge resonates with Kotzé et al. (2017), who highlighted how prioritising short-term financial gains often undermines long-term commitments, including collaborative partnerships. For instance, in highly competitive environments, organisations may prioritise short-term financial survival over long-term strategic partnerships, leading to transactional rather than collaborative relationships. Therefore, this highlights how both findings align in illustrating the same challenge.

**Vendor Management and Resource Challenges:** The findings reveal that managing a large number of buyers or suppliers with limited manpower restricts organisation's ability to build meaningful collaborations. A critical issue is the need to prioritise key suppliers, which, while necessary, often leads to the neglect of smaller vendors (P4, P6). While not explicitly addressed in Anderson et al. (2023), the current findings resonate with their argument that strict budget constraints and resource limitations hinder collaboration. They further noted that a lack of insufficient personnel further hinder collaborative initiatives, preventing organisations from fully engaging in collaborative efforts. Thus, both the findings and the literature highlight how resource limitations whether in manpower, expertise, or budget restrict collaboration efforts. The necessity of prioritising certain suppliers due to man power constraints reflects a broader issue where limited resources force organisations to make strategic trade-offs, often at the expense of broader, more inclusive collaboration.

**Regulatory Constraints:** Although less mentioned, the findings identified regulatory challenges as a barrier to buyer-supplier collaboration. Specifically, the lack of REACH certification for products in European markets restricts collaboration, as compliance with regulatory requirements is mandatory (P1). This aligns with Kotzé et al. (2017), who identified regulatory frameworks as a barrier to collaboration, particularly in the petrochemical industry, where strict regulations limit certain information exchange between buyers and suppliers. However, the findings extend

this perspective by demonstrating how country-specific regulations, such as REACH registration in Europe, create additional restrictions on cross-border collaboration.

### **6.3.2 Solutions to Overcoming Collaboration Barriers**

Participants identified several key strategies and enablers (solutions) that organisations in South Africa's chemical manufacturing sector have adopted to enhance collaboration or overcome barriers to buyer-supplier collaboration. These include trust and relationship building, strategic sourcing and supplier management, contractual agreements, reputation enhancement, and technology adoption.

**Trust and Relationship Building:** Insights from the findings consistently highlight trust and relationship-building as foundational enablers of collaboration. This revolves around fostering open communication, cultivating strong partnerships with mutual benefits, ensuring transparency through open book approach, and demonstrating reliability. It also involves understanding partners' needs, showing genuine care for their business and challenges, and aligning on shared goals, values and objectives. Additionally, it emphasises practicing reciprocity, honesty, and mutual respect, engaging in bonding sessions, embracing flexibility, demonstrating a willingness to compromise, dedicating sufficient time to the relationship, supplier visits, and prioritising long-term partnerships over short-term gains (P1, P2, P3, P4, P7, P11).

*"Trust is the highest form of human motivation. It brings out the very best in people."* Stephen R. Covey

The findings reinforce the literature's assertion that trust-building is foundational enabler to effective buyer-supplier collaboration (Duong & Chong, 2020; Villena et al., 2021; Umar & Wilson, 2021).

The emphasis on open communication, transparency, reliability, reciprocity, honesty, and mutual respect as key enablers of trust-building. Additionally, the importance of cultivating strong partnerships with mutual benefits and aligning on shared goals, value and objectives. Aligns with Villena et al. (2021), who emphasised that

reciprocity and respect promote effective collaboration in buyer-supplier relationships, citing Toyota and Honda as examples of companies that establish norms of reciprocity, solidarity, and trust with key suppliers. Similarly, Zhang et al. (2021) further emphasised that commitment and shared goals between supply chain partners enhance transparency, reduce inefficiencies, and create more resilient and reliable relationships. Building on this, Ruel et al. (2018) highlighted that value alignment enables partners to integrate more effectively, strengthening both collaboration and long-term cooperation. Further supporting this perspective, Marinelli and Salopek (2020) echoed that trust, transparency, and shared objectives builds a collaborative ethos that enables seamless integration and joint success. Additionally, Likewise, Durach et al. (2020) noted that transparent communication and reciprocal actions; where positive gestures are met with mutual support contribute to relational satisfaction and mutual understanding.

*“The quality of your life is the quality of your relationships.”*

Tony Robbins

The emphasis on bonding sessions, dedicating time to relationships, supplier visits, understanding partners' needs while demonstrating genuine care for their business and challenges, and prioritising long-term loyalty over short-term gains, aligns with Duong and Chong (2020), who emphasised relationship building as an enabler that results in effective partnerships. This further aligns with Durach et al. (2020), who identified social bonding as a key factor in reinforcing partnerships. Similarly, Lotfi and Larmour (2022) highlighted that bonding within collaborative networks strengthens social connections, ensuring mutual commitment and strategic alignment. This perspective is further supported by Villena et al. (2021), who found that personal interactions enhance collaboration by fostering mutual understanding and facilitating win-win solutions.

Scholten and Schilder (2015) and Umar and Wilson (2021) highlighted that mutual dependence in a supply chain links organisational success, encourages dedicated investments, and reinforces long-term stability and reliance. This aligns with the emphasis on prioritising long-term loyalty over short-term gains, as both focus on

trust, commitment, and interdependence to strengthen partnership stability and resilience over time.

Lastly, the emphasis on embracing flexibility and a willingness to compromise aligns with Duong and Chong (2020), who noted flexibility as a critical factor in successful collaboration. In most cases, flexible partners actively seek solutions that create mutual benefits, fostering stronger and more sustainable partnerships. Collectively, these reinforce the central role of trust and relationship-building in buyer-supplier collaboration, demonstrating that strong interpersonal connections contribute to long-term trust, alignment, and overall SCRes.

**Strategic Sourcing and Supplier Management:** Findings highlight strategic sourcing and supplier management as a critical strategy for overcoming collaboration barriers. This includes diversifying suppliers to reduce dependence on a single source, particularly those abroad, and consolidating purchases across companies within the group to strengthen purchasing power and improve negotiation leverage (P2, P8, and P9).

The emphasis on reducing dependence on a single partnership aligns with Nunes et al. (2022), who highlighted the risks of overreliance on a single partner or group, which can create vulnerabilities and challenges during disruptions. Similarly, Umar and Wilson (2021) noted that while mutual dependence enhance SCRes, by fostering collaboration and stability, it can also reduce flexibility in switching partners when the relationship is no longer beneficial. These findings expand the literature by highlighting the benefits of consolidating purchases within a group company to enhance purchasing power and negotiation leverage (P8, P9).

**Contractual Agreements:** The study found that moving away from spot-based procurement towards a well-structured contractual agreements such as long-term supply contracts, service level agreements (SLAs) with exclusivity and flexibility clauses were instrumental in overcoming collaboration barriers (P1, P5, P7, P10). This finding aligns with Lotfi and Larmour (2022), who asserted that contracts are essential for successful collaboration by establishing clear rules and objectives. Similarly, Villena et al. (2021), asserted that contractual explicitness enhances

clarity, reduces uncertainty, and ensures objectivity in partnerships.

The emphasis on flexibility clauses within contractual agreements further supports Marinelli and Salopek (2020), who highlighted that contractual flexibility is essential for collaboration, requiring a balanced approach between adaptability and contractual rigidity to build cooperation and efficiency. Similarly, Duong and Chong (2020) emphasised that flexibility between partners is a key driver of successful collaboration, as it demonstrates a willingness to adapt and evolve to support cooperative efforts.

**Technology Adoption:** Although mentioned the least, technology adoption was found to play an important role in enhancing collaboration and overcoming collaboration barriers. The findings indicate that it reduces information gaps, increases the frequency of communication, and ensures that all stakeholders have access to relevant, real-time information while maintaining alignment (P9). This aligns with existing research. Literature has shown that traditional approaches are often slow and exclude many partners, whereas innovative technologies such as blockchain, artificial intelligence, cloud platforms, and data analytics enhance transparency, responsiveness, and traceability (Babich & Hilary, 2020; Cisneros-Cabrera et al., 2021; Nickel & Schliebener, 2021; Akter et al., 2022).

These technologies enable secure, decentralised, and tamper-proof information sharing, ensuring synchronised and accurate data access across the supply chain through consensus mechanisms. As a result, they enhance visibility, flexibility, and velocity, fostering a more resilient and efficient supply network (Babich & Hilary, 2020; Islam, 2023; Akhavan & Philsoophian, 2023). Literature adds that while emerging technologies such as blockchain continue to reshape modern supply chains, existing systems such as ERP, EDI, and tracking tools for JIT processes remain instrumental in strengthening SCRes by improving decision-making and visibility (Nickel & Schliebener, 2021). In essence, while technology adoption is key, it is not solely about implementing the latest innovations but about strategically balancing emerging and existing technologies to optimise supply chain performance, enhance stakeholder alignment, and build resilience. This highlight technology integration and adoption as key.

**Reputation Enhancement:** While reputation enhancement was less mentioned, findings highlight that a strong reputation is crucial for overcoming trust-related barriers to collaboration. Performance excellence and being publicly listed enhance trust, reinforcing the company's stability and credibility (P1). This aligns with the findings of Ruel et al. (2018), who emphasised that a strong reputation enhances a firm's credibility, which in turn builds trust between partners. They noted that credibility, as a key component of trust, reflects a business's fairness and integrity, ultimately strengthening its reputation and long-term collaborative potential.

### 6.3.3 Lessons

The findings on lessons from Buyer-Supplier Collaboration in South Africa's Chemical Sector highlight that SCRes is not a static concept but an ongoing process requiring continuous adaptation. While maintaining higher inventory levels can enhance resilience, this approach is financially unsustainable due to working capital constraints. To address this challenge, companies may need to reconsider a JIT strategy, with a stronger emphasis on localised sourcing to reduce dependence on global supply chains (P1). Further insights on lessons highlight that increasing collaboration with local suppliers can help reduce lead times and mitigate risks associated with global disruptions (P2). These lessons highlight the need to reconsider JIT and support local manufacturing by strengthening collaboration with local suppliers, reducing global disruption risks, and enhancing long-term SCRes and economic sustainability. This reflects a long-term shift in supply chain management, where companies are increasingly prioritising domestic supply chains to improve resilience.

Additionally, the lessons highlight the deeply interconnected nature of supply chain partnerships. To effectively manage disruptions, supply chain partners must engage in continuous communication, idea exchange, and joint planning to maintain efficiency. Continuously nurture relationships and evaluate if the collaborative practices are working for both partners. Excellence is a deliberate process that requires clear intentions, dedicated effort, and strategic execution (P2, P10, and P8). These lessons reinforce the importance of collaborative communication in supplier

relationships, as emphasised by Schilder (2015), Kotzé et al. (2017), Umar and Wilson (2021), and Zaman et al. (2024). Moreover, they highlight that collaboration is not about having short-term relationships but about building strong, trust-based partnerships built on mutual dependence. Aligning with existing studies that emphasise the significance of trust-building, mutual dependence and contractual explicitness as foundational enablers of buyer-supplier collaboration (Scholten & Schilder, 2015; Duong & Chong, 2020; Villena et al., 2021; Umar & Wilson, 2021; Villena et al., 2021).

Another key lesson relates to the need for balancing supplier loyalty with flexibility. While exclusive contracts with suppliers build trust and long-term commitment, they can become a liability when market conditions change but contractual terms remain rigid (P7). This lesson highlights the importance of adaptability in supplier relationships, suggesting that organisations should adopt a strategic approach by incorporating flexibility clauses into contracts. This aligns with the concept of incentive alignment in buyer-supplier collaboration, ensuring that risks and benefits are equitably distributed (Scholten & Schilder, 2015; Duong & Chong, 2020).

Furthermore, the findings on lessons emphasise the significance of strategic partnerships, technology integration, and resource allocation in strengthening buyer-supplier collaboration. Without sufficient resources and commitment, even well-intended collaboration efforts may fail to yield meaningful results. Technology adoption should be mutually aligned between partners to ensure seamless integration and effective collaboration (P1, P2). This lesson aligns with various studies that emphasised the critical role of collaborative partnerships in strengthening SCRes (Scholten & Schilder, 2015; Kotzé et al., 2017; Tarigan et al., 2021; Nickel & Schliebener, 2021; Nunes et al., 2022). Including this current study. Moreover, it reinforces findings by Anderson et al. (2023), Mahmud et al. (2021), Mustapha et al. (2022), and Zissis, (2023) that resource limitations hinder collaboration. Lastly, it also aligns with studies that highlighted the importance of technology integration in facilitating effective collaboration (Babich & Hilary, 2020; Cisneros-Cabrera et al., 2021; Nickel & Schliebener, 2021; Akter et al., 2022). Similarly, with Zissis (2023), who emphasised that limited access to digital

technologies and compatibility issues between partners hinder seamless collaboration and information flow.

Another key lesson is the value of early supplier involvement in planning processes, which enhances efficiency, minimises waste, and improves cost-effectiveness (P3). When combined with multi-stakeholder participation, this approach not only strengthens collaboration but also ensures continuity, preventing disruptions when key individuals leave (P11).

Additionally, findings from lessons highlight the importance of resource-sharing initiatives, particularly through joint warehousing, as a strategic improvement they would like to see in buyer-supplier collaboration (P6). This lesson about this practice reflects a growing need within supply chain networks for companies to leverage shared infrastructure, driving operational efficiencies and enhancing resilience. This lesson reinforces the importance of resource-sharing as a collaborative practice (Scholten & Schilder, 2015; Kotzé et al., 2017; Lotfi & Larmour, 2022; Mustapha et al., 2022) while also suggesting that organisations not currently adopting such practice should begin to explore its potential benefits.

Overall, these insights derived from these lessons provide businesses with seven actionable steps to enhance buyer-supplier collaboration. Firstly, strengthening resilience through prioritising local buyer-supplier collaboration to mitigate the impact of global disruptions. Secondly, engaging partners early in the planning to build better alignment. Thirdly, building trust-based collaboration by transitioning from individual-based partnerships to multi-stakeholder participation, ensuring broader and more resilient relationships.

Additionally, partners should engage in proactive communication and real-time collaboration to enhance transparency and responsiveness in supply chain operations. Continuously adapting collaboration practices to stay agile in a dynamic environment. Businesses must balance supplier loyalty with the flexibility to adapt to changing market conditions. Lastly, invest in long-term partnerships and digital technologies, while leveraging resource-sharing initiatives to optimise costs and further enhance SCRes within buyer-supplier relationship.

## 6.4 Conclusion

This chapter has provided a comprehensive discussion of the evolution of buyer-supplier collaboration in South Africa's chemical manufacturing sector, demonstrating how these practices have adapted to recent disruptions to enhance SCRes. Key collaborative practices include information sharing, coordinated communication, incentive alignment, financial support and development, and multi-stakeholder participation an emerging practice that extends beyond literature. Additionally, joint activities such as decision synchronisation, joint forecasting, demand planning, and joint knowledge creation play a critical role. Resource-sharing was omitted from the study. The discussion revealed that while many of these practices align with existing research, some extend beyond prior studies by introducing new insights and evolving collaborative approaches.

The chapter further discussed the process evolution necessary for the implementation and adaptation of these collaborative practices, highlighting their alignment with existing literature while also extending by introducing new perspectives. A notable change is around the organisational shift alongside procedural optimisation and adaptation within process changes. Building on this, the discussion highlighted how these collaborative practices enhance key supply chain antecedents such as flexibility, visibility, and velocity which collectively strengthen SCRes, aligning with existing theories. The discussion on challenges and barriers to collaboration, along with the solutions to overcoming these barriers, aligns with existing literature while also offering a small extension under regulatory constraints and strategic sourcing and supplier management related to group product volume consolidation.

The lessons highlight key actionable steps for enhancing buyer-supplier collaboration and resilience: Prioritising stronger local buyer-supplier collaboration, engaging partners early in the planning process, build trust-based collaboration through multi-stakeholder participation, proactive communication and real-time collaboration, continuously adapting collaboration practices, balance supplier loyalty with the flexibility, and investing in long-term partnerships, adopting advanced technology, and leveraging resource-sharing initiatives.

## CHAPTER 7: CONCLUSION

### 7.1 Introduction

This chapter presents the summary of this study on the evolution of buyer-supplier collaboration for resilient supply chains in South Africa's chemical sector. It begins with a recap of chapter 1 to 4, followed by key findings. It integrates the findings with existing literature to form a comprehensive set of conclusions that directly address the research questions. This chapter also provides recommendations for stakeholders, including managerial implications based on the findings, outlines the study's limitations, and suggests directions for future research.

### 7.2 Summary of The Study

#### 7.2.1 What was Studied and Relevance

This study explored two constructs in chapter two such as SCRes and SCC. **SCRes** has gained prominence due to its critical role in maintaining business competitiveness and sustainability amidst global disruptions, including the COVID-19 pandemic, natural disasters, and geopolitical conflicts (Simba et al., 2017; Han et al., 2020). Its key enablers include supply chain agility, SCRM, and SCC, which effectively mitigate various types of disruptions (Jain et al., 2017; Simba et al., 2017; Shekarian & Mellat Parast, 2020; El-Baz & Ruel, 2021; Aityassine et al., 2022; Kazancoglu et al., 2022; Ming et al., 2021; Juan et al., 2021; Dickens et al., 2023). While other enablers enhance resilience, their effectiveness is maximised when integrated with collaboration frameworks, which enable coordinated and synchronised responses across supply chain partners (Mustaffa et al., 2018; Nickel & Schliebener, 2021; El-Baz & Ruel, 2021; Aityassine et al., 2022). Thus, SCC is both a critical enabler of SCRes and a catalyst for integrating other resilience enablers, supporting inter-organisational efforts to manage disruptions and achieve shared goals.

**SCC** is a key mechanism for organisations seeking to improve their performance and resilience within supply chains (Adobor & McMullen, 2018; Han et al., 2020). It fosters

inter-organisational teamwork to collectively address supply chain disruptions and challenges (Juan et al., 2021). Ultimately, organisations that accept collaboration with suppliers are able to create a competitive edge, deliver value to customers, and adapt to market changes (Patel, 2023). Two primary forms of SCC are vertical collaboration and horizontal collaboration (Umar & Wilson, 2021; Lotfi & Larmour, 2022; Mustapha et al., 2022). Buyer-supplier collaboration, represents a specific form of partnership within the vertical collaboration ecosystem, focuses on the relationship between purchasing organisations (buyers) and their suppliers (Scholten & Schilder, 2015; Kotzé et al., 2017; Sá et al., 2018).

Key collaborative practices enhancing SCRes include information sharing, collaborative communication, incentive alignment, informal financial support, and joint activities such as joint knowledge creation, joint planning and forecasting, decision synchronisation, resource sharing, and joint performance management (Scholten & Schilder, 2015; Kotzé et al., 2017; Duong & Chong, 2020; Umar & Wilson, 2021; Mustapha et al., 2022; Lotfi & Larmour, 2022). These practices improve supply chain antecedents such as velocity, flexibility, and visibility; ultimately contributing to greater SCRes (Scholten & Schilder, 2015; Kotzé et al., 2017; Juan et al., 2021; Umar & Wilson, 2021).

However, collaboration faces significant challenges and barriers, including information-related risks, regulatory constraints, trust deficits, communication barriers, resources limitations, lack of preparedness, over reliance on a single supplier and excessive collaboration, misaligned inter-organisational issues, cultural issues, lack of incentive alignment, and economic challenges (Kotzé et al., 2017; Panahifar et al., 2018; Vosooghizaji et al., 2020; Duong & Chong, 2020; Mahmud et al., 2021; Villena et al., 2021; Nunes et al., 2022; Mustapha et al., 2022; Zissis, 2023; Anderson et al., 2023).

Effective collaboration among partners is grounded in foundational enablers such as trust; commitment and alignment of interests, reciprocity, and respect; relationship building, personal interactions and mutual dependence. These enablers or influential factors are essential for building collaboration and overcoming collaboration barriers (Scholten & Schilder, 2015; Umar & Wilson, 2021; Villena et al., 2021; Lotfi &

Larmour, 2022; Nwankwo et al., 2024; Duong & Chong, 2020; Zhang et al., 2021).

Overcoming collaboration barriers or risks requires strategic interventions, including explicit and flexible contractual agreements, strategic data-driven processes, vertical information sharing, leveraging digital technologies, and employing bonding and bridging strategies (Scholten & Schilder, 2015; Ruel et al., 2018; Marinelli & Salopek, 2020; Duong & Chong, 2020; Durach et al., 2020; Umar & Wilson, 2021; Villena et al., 2021; Lotfi & Larmour, 2022; Nunes et al., 2022; Zissis, 2023; Tsolakis et al., 2022; Babich & Hilary, 2020; Nickel & Schliebener, 2021; Cisneros-Cabrera et al., 2021; Akter et al., 2022; Islam, 2023; Akhavan & Philsoophian, 2023).

### **7.2.2 Research Context and Relevance**

The study investigated the evolution of buyer-supplier collaboration in South Africa's chemical manufacturing sector, particularly in response to recent disruptions. To ensure a well-structured and comprehensive analysis, this study used an integrated framework combining the RBV, Dynamic Capabilities, and the Stakeholder Model as guiding principles to effectively achieve the research objectives (Barney, 1991; Teece et al., 1997; Mahajan et al., 2023; Ahmed et al., 2020). This study focused on the South Africa's chemical manufacturing sector, given its significant contribution to the country's economy and its role in global trade (Majozi & Veldhuizen, 2015; Mugwenhi et al., 2019). This was particularly relevant in the context of recent disruptions such as the global pandemic, port congestion, and Ukraine-Russia war that have impacted the sector in recent years (Du Plessis, 2019; Misra, 2021; Mondliwa et al., 2021; Horner, 2021; Svabova et al., 2022; Allam et al., 2022; Beškovnik et al., 2022; Kuźmicz, 2022; Khuluvhe & Ganyaupfu, 2023). Further, compounding to the socio-economic crises in South Africa (Mbunge, 2020; Van Heerden, & Roos, 2021).

### **7.2.3 Existing Knowledge and Research Gaps**

Previous studies have demonstrated that buyer-supplier collaboration enhances SCRes through improved antecedents to SCRes such as velocity, visibility, and flexibility (Scholten & Schilder, 2015; Kotzé et al., 2017; Duong & Chong, 2020; Umar

& Wilson, 2021, Lotfi & Larmour, 2022; Mustapha et al., 2022).

However, research gaps remained regarding the adaptation of vertical network collaboration, including buyer-supplier relationships and its associated practices, in response to recent disruptions. Additionally, applicability of buyer-supplier collaborative practices within the South Africa's chemical sector and their alignment with other findings to address their broader generalisation (Kotzé et al., 2017; Lotfi & Larmour, 2022).

This study addresses these gaps by providing empirical insights into the evolution of buyer-supplier collaboration and its practices within the chemical manufacturing sector, offering a focused evaluation of their impact on SCRes in a changing supply chain environment.

### **7.3 Summary of The Research Questions and Methodology**

#### **7.3.1 Research Questions Addressed**

The first research question, addressed the evolution of buyer-supplier collaboration within South Africa's chemical manufacturing sector in response to recent disruptions, focusing on how these changes have been adapted and contributing to enhancing SCRes.

The second research question, examined the key challenges and barriers that organisations encounter when building collaboration within the buyer-supplier network in South Africa's chemical manufacturing sector, exploring how these obstacles have been addressed to enhance SCRes.

#### **7.3.2 Research Methodology**

The research employed an exploratory design, guided by an interpretivist philosophy and an inductive approach, to investigate the evolution of buyer-supplier collaboration within South Africa's chemical manufacturing sector (Creswell & Creswell, 2017; Dean, 2018; Liu, 2016; Saunders & Lewis, 2018; Olawale et al.,

2023).

A qualitative methodology was chosen for its flexibility and ability to capture subjective meanings and social contexts (Levitt et al., 2018; Pilcher & Cortazzi, 2024). This method facilitated an open-ended exploration of buyer-supplier collaboration, enabling the collection of rich, detailed data through semi-structured interviews and document analysis. This approach was particularly suitable for understanding the complex dynamics of collaboration and supply chain resilience (Rahman, 2017; Azungah, 2018).

A case study strategy was employed, focusing on a single organisation with multiple subsidiaries in the South African chemical manufacturing sector to gain an in-depth understanding of collaboration within this specific context (Saunders & Lewis, 2018; Priya, 2021). This approach allowed the researcher flexibility to choose data collection methods that best suited the objectives, as long as the methods were practical and ethical (Priya, 2021). The study used a cross-sectional time horizon, providing a snapshot of buyer-supplier collaboration at a specific point in time, influenced by recent disruptions (Saunders & Lewis, 2018).

Purposive sampling targeted key supply chain and sales personnel, including Procurement Managers, Supply Chain Managers, Product Managers, and Business Unit Managers, who had expertise and are directly engaged in buyer-supplier collaboration (Kumar, 2018; Saunders & Lewis, 2018; Carter, 2020). Following Kotzé et al. (2017). Eleven participants from a homogeneous group were interviewed. Data saturation was reached when no new themes emerged, ensuring comprehensive insights (Moser & Korstjens, 2018).

Data was collected through semi-structured interviews, conducted on virtual platforms like Microsoft Teams and with few conducted in-person, and supplemented with document analysis to validate some of the findings (Scholten & Schilder, 2015; Moser & Korstjens, 2018). The interviews were conducted over a duration of 45 minutes on average and for two participants, the duration was extended to 80–90 minutes to accommodate comprehensive note-taking. Accuracy and reliability were ensured by having participants review and verify the notes. Thematic analysis was

used to identify and analyse patterns of meaning, enabling the emergence of seven key themes relevant to the research questions (Joffe, 2011; Williams & Moser, 2019).

Ethical considerations were rigorously observed, ensuring participant confidentiality and the methodological integrity (Fleming & Zegwaard, 2018; Levitt et al., 2018; Ubi et al., 2020; Nii Laryeafio & Ogbewe, 2023). The informed consent letter was distributed and signed in accordance with the guidelines outlined by Fleming and Zegwaard (2018). Participation in the research was entirely voluntary, and participants were fully informed about the nature of the study and what it entailed, as emphasised by Laryeafio and Ogbewe's (2023) study. Most interviews, were recorded and transcribed within 24 hours to ensure accuracy while the discussion remained fresh, aligning with Scholten and Schilder's (2015) 24-hour rule. An audit trail was maintained to enhance data credibility and methodological integrity, ensuring transparency and trustworthiness of the findings (Lester et al., 2020).

## 7.4 Key Findings and Their Interpretation

### 7.4.1 Evolution of Collaborative Practices

The study identified eight key collaborative practices within buyer-supplier relationships in South Africa's chemical manufacturing sector, which have evolved in response to recent disruptions. **Information-sharing** was highly recognised as a key collaboration, involving sharing of purchase orders, inventory levels, demand forecasts, logistics and shipping details, anticipated disruptions, market trends, maintenance plans, and financial data (Scholten & Schilder, 2015; Kotzé et al., 2017; Lotfi & Larmour, 2022). Have evolved towards more transparent sharing of strategic business plans for shared vision (Verghese et al., 2022). **Coordinated collaborative communication** another highly recognised critical practice that has evolved from traditional approaches leveraging newer technology for efficient communication such a virtual platforms and WhatsApp for aligning expectations, addressing issues proactively, and enhancing supply chain efficiency (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson, 2021; Zaman et al., 2024; Shittu et al., 2018; Nickel & Schliebener, 2021). Recent disruptions have expanded collaborative communication to include engagements among suppliers' suppliers, enhancing alignment across the

supply chain. Additionally, communication frequency has intensified to weekly or even daily interactions during disruptions, exceeding the levels previously noted in existing literature.

**Incentive alignment** emerged as a key practice, involving cost-sharing, risk distribution, shared accountability (Scholten & Schilder, 2015; Duong & Chong, 2020; Lotfi & Larmour, 2022). The study extends this by revealing that economic instability in South Africa necessitates adaptive incentive structures, including joint strategic pricing adjustments and cost-effective product re-development. **Financial support and development** was highlighted as an emerging practice to ensure supplier sustainability and SCRes, particularly during crises and capability investments (Umar and Wilson, 2021). This study further revealed that global disruptions have accelerated buyer-driven financial support and investment in local suppliers, promoting local sourcing, reducing import dependency, and enhancing economic resilience and self-sufficiency.

**Multi-stakeholder participation** emerged as a new practice, with partners shifting from single-representative engagement to involving multiple members, fostering deeper strategic collaboration beyond transactional activities.

**Joint activities** such as **decision-synchronisation** emerged as an evolving practice, with partners shifting from reactive, independent decision-making to collaborative joint problem-solving, cost optimisation, and real-time scenario planning (Kotzé et al., 2017; Scholten & Schilder, 2015; Duong & Chong, 2020; Lotfi & Larmour, 2022). **Joint forecasting and demand planning** evolved from isolated forecasting to a collaborative, long-term strategy, reducing reliance on spot buying and integrating suppliers into production scheduling, thereby enhancing supply chain resilience (Lotfi & Larmour, 2022; Duong & Chong, 2020). The study extends this by highlighting upfront purchase order commitments as a strategy to mitigate supplier stock-holding risks, demonstrating deeper integration and strategic alignment. **Joint knowledge creation**, though less frequently mentioned, emerged as an important post-disruption practice through joint risk assessments, co-product development, and shared lessons from disruptions, contributing to adaptive collaboration (Scholten & Schilder, 2015; Kotzé et al., 2017).

### **7.4.2 Process Evolution**

The study identified adapted process enhancements in buyer-supplier collaboration, including the integration of digital communication technologies like Microsoft Teams and WhatsApp, which complement traditional methods by providing more efficient and effective platforms even for global partnerships (Umar & Wilson, 2021; Nickel & Schliebener, 2021). The integration of digital supply chain visibility technologies such as block chain, data analytics such as ERP systems and tracking tools (logistics sensors) (Nickel & Schliebener, 2021; Akter et al., 2022; Akhavan & Philsoophian, 2023).

Cultural and strategic organisational shifts emerged as essential process adaptations, necessary for enhancing buyer-supplier collaboration (Kotzé et al., 2017; Duong & Chong, 2020). The study extends existing literature by highlighting strategic organisational shifts that align buyer-supplier engagements with long-term business objectives, fostering resilience and competitive advantage. Additionally, the study introduces procedural optimisation and adaptation as a critical factor in evolving collaborative dynamics, which, may have naturally evolving with collaborative practices, has not been explicitly recognised in prior research.

### **7.4.3 Role of Practices in SCRes**

The study confirmed that buyer-supplier collaboration is essential for enhancing SCRes, improving flexibility, visibility, and velocity through collaborative practices (Scholten & Schilder, 2015; Kotzé et al., 2017; Umar & Wilson, 2021).

Sections 7.4.1 to 7.4.3 addressed research question one by demonstrating the evolution of collaborative practices and processes, highlighting their impact on enhancing SCRes. The findings on collaborative practices align with other studies, demonstrating their applicability and generalisation in supply chains with similar dynamics. For example, financial support and development, identified in this study within a developing country context, align with Umar and Wilson (2021) findings in disaster-prone rural food supply chains in South Asia, another developing region, reinforcing the generalisation of this practice.

#### **7.4.4 Challenges and Barriers to Buyer-Supplier Collaboration**

The study identified several challenges and barriers to buyer-supplier collaboration in South Africa's chemical manufacturing sector. These include, trust and relationship challenges (Duong & Chong, 2020; Mahmud et al., 2021 & Nunes et al., 2022). Information-sharing challenges (Kotzé et al., 2017; Panahifar et al., 2018; Vosooghizajji et al., 2020). Communication barriers (Kotzé et al., 2017; Mahmud et al., 2021; Anderson et al., 2023). Misalignment issues including power imbalances and cultural dynamics (Kotzé et al., 2017; Duong & Chong, 2020; Anderson et al., 2023). Economic pressures (Kotzé et al., 2017; Mahmud et al., 2021). Vendor management and resource challenges (Anderson et al., 2023). Lastly, regulatory constraints (Kotzé et al., 2017), however the study extends this perspective by highlighting how country-specific regulations create additional constraints on international collaboration.

#### **7.4.5 Solutions (Strategies and Enablers) to Collaboration and Barriers**

The study identified several strategies that organisations in South Africa's chemical manufacturing sector are using to overcome barriers and enhance buyer-supplier collaboration. These include, trust and relationship building (Scholten & Schilder, 2015; Duong & Chong, 2020; Villena et al., 2021; Zhang et al., 2021; Durach et al., 2020; Lotfi & Larmour, 2022; Umar & Wilson, 2021). Strategic sourcing and supplier management (Nunes et al., 2022; Umar & Wilson, 2021), the study extends this perspective by demonstrating how consolidating purchases within group companies improves negotiation leverage and collaboration. Contractual agreements with flexibility clauses (Lotfi & Larmour, 2022; Villena et al., 2021; Marinelli & Salopek, 2020; Duong & Chong, 2020). Technology integration and adoption (Babich & Hilary, 2020; Cisneros-Cabrera et al., 2021; Nickel & Schliebener, 2021; Akter et al., 2022; Islam, 2023; Akhavan & Philsoophian, 2023). Lastly, reputation enhancement (Ruel et al., 2018).

Sections 7.4.4 to 7.4.5 addressed research question two by examining the challenges and barriers to buyer-supplier collaboration and outlining key strategies and enablers for overcoming these barriers and enhancing collaboration.

#### **7.4.6 Interpretation**

The study has addressed empirical gaps and demonstrated the evolution of buyer-supplier collaboration for supply chain resilience using insights from recent disruptions, thereby closing the research gap identified by Lotfi and Larmour (2022).

The study identified eight collaborative practices, seven of which some align with Kotzé et al. (2017), except for resource-sharing, which was not observed in the buyer-supplier collaboration context. These seven practices also correspond with various findings from Scholten and Schilder (2015), Duong and Chong (2020), Lotfi and Larmour (2022), and Umar and Wilson (2021). These findings demonstrate the broader applicability or generalisation of these practices in managing disruptions with similar supply chain dynamics, addressing Kotzé et al. (2017)'s research recommendation.

#### **7.5 Contribution to Scholarly Debate and Conceptual Framework**

This study bridges a critical gap in recent research, which has predominantly relied on secondary data and lacks an in-depth focus on the evolving role of collaboration practices in enhancing SCRes in response to recent disruptions (Duong & Chong, 2020; Lotfi & Larmour, 2022; Villena et al., 2021; Mwesiumo et al., 2021; Nunes et al., 2022; Akhavan & Philsoophian, 2023; Maleki et al., 2023). The findings have provided empirical insights into the evolution of collaborative practices and processes in response to recent disruptions contributing to scholarly debates.

This study has expanded on Kotzé et al.'s (2017) empirical research in South Africa by offering updated insights into the conceptual framework for collaborative practices, based on the latest findings within the country's chemical manufacturing sector. Figure 1, section 2.6 presented an adapted version of Kotzé et al.'s (2017) conceptual framework, integrating insights from this study. While resource-sharing was not identified as part of joint activities, this study expanded the framework by including additional collaborative practices such as information-sharing, coordinated collaborative communication, incentive alignment, financial support and development, multi-stakeholder participation, and joint activities (decision

synchronisation, joint knowledge creation, and joint planning and forecasting). These findings aligned with other studies (Scholten & Schilder, 2015; Lotfi & Larmour, 2022; Umar & Wilson, 2021; Duong & Chong, 2020), with multi-stakeholder participation emerged beyond existing literature as a new practice influenced by recent disruptions.

This framework positioned SCRes as the ultimate goal, negatively affected by disruptions. It also demonstrated that the collaborative practices are constrained by collaboration barriers and shaped by foundational conditions and strategies. These include trust and relationship building, mutual benefit, reputation enhancement, strategic sourcing and management, contractual agreement and technology integration and adoption, serving as enablers and strategies to collaborative practices and barriers. When these foundational enablers and strategies are effectively implemented, and barriers are overcome, they create a conducive environment for collaborative practices. This fosters key supply chain capabilities such as velocity, flexibility, and visibility, which, in turn, enable supply chains to respond effectively to disruptions and maintain SCRes in dynamic and uncertain environments.

This framework emphasises that by proactively addressing barriers and being prepared for disruptions, supply chain partners can build adaptive, resilient systems that ensure continuous supply and operational stability, even during unforeseen disruptions.

Therefore, this study makes a significant contribution to the scholarly debate by expanding the existing body of research on SCRes and collaboration practices, particularly within the context of developing countries. It offers a more comprehensive conceptual framework that advances theoretical understanding for buyer-supplier collaboration networks aiming to enhance SCRes.

## **7.6 Managerial and Practical Implications**

The study significantly contributes to practical supply chain management by empowering businesses with effective buyer-supplier collaboration practices that

enhance SCRes. It provides clear guidance on the processes required for successful collaboration and offers solutions to overcome collaboration barriers, ensuring current and future resilience. Additionally, the comprehensive conceptual framework not only advances theoretical understanding but also providing practical guidance for businesses to build and manage effective buyer-supplier collaboration networks, ultimately strengthening SCRes.

The study further offers practical steps for South Africa's chemical manufacturing businesses to enhance SCRes by drawing on lessons learnt and best practices from companies with established buyer-supplier collaboration. These steps include prioritising stronger local buyer-supplier collaboration, engaging partners early in the planning process, building trust-based relationships through multi-stakeholder participation, proactive communication and real-time collaboration, and continuously adapting collaboration practices. It also emphasises the need to balance supplier loyalty with flexibility, invest in long-term partnerships, adopt advanced technology, and leverage resource-sharing initiatives.

These strategies are designed to reduce the impact of disruptions and mitigate broader socio-economic consequences, such as job losses and business closures resulting from supply chain disruptions (Telukdarie et al., 2020; Mbunge, 2020; Van Heerden & Roos, 2021). By implementing these practices, organisations can enhance their resilience and sustain competitive advantage in dynamic and uncertain environments.

## **7.7 Limitations of the Study**

A limitation of this study was its focus on companies within a single large organisation. Although this provided in-depth insights, it may have limited perspective diversity due to the shared organisational culture and internal practices. This homogeneity could have led to quicker data saturation, potentially narrowing the range of insights compared to a more diverse sample from multiple independent organisations. Furthermore, the cross-sectional time horizon constrained the ability to understand long-term trends in collaboration practices, which might have been better addressed through a longitudinal time horizon (Saunders & Lewis, 2018).

Additionally, the timing of the interviews, conducted in December and early January, may pose a potential limitation. During this period, many participants were either winding down for the year-end or focusing on the transition into the new-year, which may have affected their level of engagement or the richness of the data collected. Lastly, although this study provides valuable insights, the framework may evolve further with ongoing disruptions.

## **7.8 Recommendations for Future Research**

A longitudinal study on the evolution of buyer-supplier collaboration and its impact on resilience could provide richer data and deeper insights. The findings of this study highlighted the importance of continuous monitoring collaborative practices to keep frameworks updated and relevant. Therefore, future research may benefit from this approach as it would enable the observation of changes and trends over time, providing a continuous insights of how collaboration practices evolve and adapt to ongoing disruptions. Furthermore, expanding the sample to include diverse, unrelated companies would enhance perspective diversity and test the repeatability of findings, potentially validating the resource-sharing practice not identified in this study.

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## APPENDICES

### Appendix 1: Semi- Structured Interview Guide

1. RQ1: What are current collaboration practices with your suppliers or buyers which has enhance supply chain resilience in your organisation? (Typical are joint forecasting and demand planning, resource- sharing, shared risk and cost distribution, risk assessment, collaborative communication, information-sharing, joint financial support, decision synchronisation, joint knowledge creation, joint problem-solving, incentive coordination/performance measurement).
2. RQ1: How have these collaborative practices been adapted or modified or evolved over time to respond to recent supply chain disruptions?
3. RQ1: What other new collaborative practices have emerged as a result of recent disruptions apart from those already mentioned?
4. RQ1: What are the outcomes and benefits of these new practices in enhancing SCRes?
5. RQ1: What specific changes have been or adapted to integrate these effective collaboration practices into your existing workflows? (E.g. mind-set, culture, technologies, processes, frequency of communication etc.)
6. RQ1: How has the frequency and mode of communication with your suppliers or buyers changed in response to recent supply chain disruptions?
7. RQ1: What mechanisms, technologies or platforms has the organisation implemented to enable communication and collaboration with your buyers or suppliers? Please elaborate on their impact.

8. RQ2: What challenges does the organisation face in establishing and maintaining collaboration practices with suppliers or buyers, how did you overcome them?
9. RQ2: What external factors (e.g. economic conditions (competition, International sourcing), regulatory changes) affected your collaboration with suppliers or buyers, how did you overcome these?
10. RQ1 or 2: Can you discuss situations where collaboration with suppliers or buyers did not go as planned? What were the impacts?
11. RQ2: How has the organisation strengthened relationships with key suppliers or buyers to improve supply chain resilience?
12. RQ2: What specific practices or initiatives have helped the organisation in building trust and mutual understanding with its partners?
13. RQ2: What lessons have organisations learnt from adapting their collaboration practices in response to disruptions?
14. RQ2: What changes or additional measures would you like to see in buyer-supplier collaboration to improve resilience in supply chain?

## Appendix 2: Consent Letter



To Whom It May Concern |

### Consent Letter

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA.

I am conducting research on the evolution of buyer-supplier collaboration for resilient supply chains in South Africa's chemical manufacturing sector with the aim of uncovering the evolving collaboration practices, identify best practices, key lessons learnt, and challenges.

I would like an opportunity to interview you regarding this topic. This interview should last about an hour. Your participation is voluntary, and you can withdraw at any given time without penalty. All data will be reported without identifiers (anonymity) and strictly confidential. If you have any concerns, please contact my supervisor or myself. Our contact details are provided below.

Researcher name:

Email:

Phone:

Signature of participant:

Date:

Signature of researcher:

Date:

Research Supervisor Name:

Email:

Phone:

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## Appendix 3: High Level Audit Trail: Codes, Sub-Themes and Key Themes

### Appendix 3.1: Table for Theme One of RQ1

Codes	Sub-Themes	Themes
ForecastandDemandPlanningSharing InformationSharing ForecastsSharingForQuarterorhalf-year MarketandCostDriversInsightSharing CostDriversInformationSharing ContractsSharing StrategicBusinessPlanSharing	<b>Information Sharing</b>	<b>RQ1: Collaborative Practices</b>
ClearCommunication Continuous Communication RegularCommunications TimelyCommunication ContinuousUpdates PlannerBuyerCoordination EffectiveCommunication StockAvailabilityUpdates WeeklyShipmentStatusReports SupplierBuyerCoordination ForecastReviewPractices FrequentShippingStatusCommunication ConstantCommunication DemandChangeUpdates CollaborativeDiscussions FrequentandEffectiveCommunication RegularSupplierCommunication RegularSupplierMeetingsandCommunication	<b>Collaborative Communication and Coordination</b>	
CollaborativeProblemSolving CollaborativeDecisionMaking JointProjects JointInvestigationandProblemSolving LogisticalIssueResolution TechnicalSupportProvision RiskAssessmentswithSuppliers DiversifiedShippingNetworks	<b>Decision Synchronisation</b>	
JointForecastingandDemandPlanning BiweeklyCollaborativeDemandPlanningandForecasting	<b>Joint Forecasting and Demand Planning</b>	
JointRiskAssessment	<b>Joint Knowledge Creation</b>	
CostsandrisksDistribution CostSharingInitiatives JointStrategisingOnPricing Cost-EffectiveProductsRe-development IncreasedVolumeDiscountStrategy JointCostDistribution ConsignmentStockSupport ReducedWorkingCapitalBurden ConsignmentStock AlleviationofWorkingCapitalConstraints	<b>Incentive Alignment</b>	
InformalFinancialSupport SupplierCapabilityEnhancement	<b>Financial Supports and Development</b>	

Source: Author's own

## Appendix 3.2: Table for Theme Two of RQ1

Codes	Sub-Themes	Themes
JointForecasting UpfrontOrderRequests LongTermjointForecastingandDemandPlanning. JointForecastingIntegration	<b>Joint Forecasting and Demand Planning</b>	<b>RQ1: Evolution Collaborative Practices</b>
OpenCommunication RegularPlanningSessions ProgressUpdates SupplierBuyerCheckIns IncreasedCommunicationFrequency FrequentCommunication WeeklyCheckIns DailyCheckIns RobustSupplierBuyerDiscussions PrioritisedCommunicationChannels ResourceUnavailabilityManagement InternalExternalTeamCollaboration FrequentSupplierCommunication OpenChallengeDiscussions BiWeeklyCheckIns RegularCollaborativeMeetings TimelyForecastUpdates CloselyEngagingLicensor FrequentTransparentCommunication	<b>Collaborative Communication and Coordination</b>	
StrategicPlanInformationSharing RealTimeInformationSharing FlexibleContractAgreementsSharing JointBusinessContinuityPlansSharing JointStrategicBusinessorGrowthPlanSharing TwowayBudgetAndStrategySharing	<b>Information Sharing</b>	
CollaborativeRiskMitigation CollaborativeProblemSolving JointStrategyDevelopments RiskAssessmentImportance ScenarioPlanningWithSuppliers RiskIdentification JointSolutionFinding JointlyExpandedLicensorApprovedSupplierList PricingAdjustment Diversificationof ShippingRoutes	<b>Decision Synchronisation</b>	
ShareCostsandRisks CostsAbsorption NegotiatingFlexibleContracts FlexibilityClausesImportance FlexibilityClauseinContracts AdaptiveSupplyAgreements	<b>Incentive alignment</b>	
JointRiskAssessment Co-ProductDevelopment	<b>Joint Knowledge Creation</b>	
SeniorMemberInvolvement CollectiveSupplyChainIssueResolution BroaderStakeholderParticipation ExpandedStakeholderInvolvement	<b>Multistakeholder Participation</b>	
ColInvestmentInToolsAndEquipment	<b>Financial Supports and Development</b>	
ConsolidationHub	<b>Joint Logistics and Consolidation (Resource-Sharing)</b>	

Source: Author's own

Appendix 3.3: Table for Theme Three of RQ1

Codes	Sub-Themes	Themes
SystemChanges ERPsystemSAPAdoption Real-TimeTrackingviaSensors ERPSystemUtilisation ForecastingOptimisation DemandPlanningOptimisation ImplementedSensors Predictive analyticsandCentralisingdataviaSAP	<b>Technological Integration for Supply Chain Visibility</b>	<b>RQ1: Process Evolution</b>
MicrosoftTeamsUsage WhatsAppUsage VideoCallUsage VirtualPlatformUsage MicrosoftTeamsandGoogle Meeting InstantMessagingUsage	<b>Technological Integration for Communication</b>	
InternalSupplyChainWorkStreamTeam AdoptionofSupplierRelationshipManagementProcedure VendorManagementReviewProcess	<b>Procedural Optimisation and Adaptation</b>	
SupplierBuyInDiscussions CulturalShift StrategicLocalSupplierPartnerships Near-Shoring Mind-SetChanges	<b>Cultural and Organisational Strategic Shift</b>	

Source: Author's own

Appendix 3.4: Table for Theme Four of RQ1

Codes	Sub-Themes	Themes
Decision-Making EnhancedCommunicationThroughDigitalTools	<b>Supply Chain Velocity and Flexibility</b>	<b>RQ1: Supply Chain Resilience</b>
TimelyInformationSharingandPreparedness TrustBuildingandDifferentiation StrengthenedCommunicationandCollaboration JointProblemSolvingandCommunication CollaborativePractices CollaborativeCultureandCommunication	<b>Supply chain Flexibility, Visibility and Velocity</b>	
QuickerDecisionMaking BetterSolutionsDevelopment	<b>Supply Chain Velocity</b>	
ProactiveDecision-Making AnticipatePotentialDisruptionsThroughDataandPredictiveAnalytics	<b>Supply chain Flexibility and Visibility</b>	

Source: Author's own

Appendix 3.5: Table for Theme Five of RQ2

Codes	Sub-Themes	Themes
TrustIssues PartnershipHesitation UnFavourablePaymentTermChallenges MutualScepticism SupplierExploitConcerns BuyerProfitMaximisationConcerns RigidContractAgreements	<b>Trust and relationship challenges</b>	<b>RQ2: Challenges to Buyer-Supplier Collaboration</b>
MisalignmentOfGoals CulturalDifferences PowerDynamicsChallenges RegionalCommunicationDifferences CulturalMindSetDifferences	<b>Misalignment and Cultural Dynamics</b>	
LackofREACHCertification	<b>Regulation Challenges</b>	
MisalignedObjectives InitialResistanceToRegularMeetings StakeholderBuyInChallenges LackofAlignment Misalignmentof ObjectivesandStrategies ResistancetoChange	<b>Misalignment Issues</b>	
RisingCosts ImpactOfWeakRandRaisingCostsHigh GlobalSourcingShippingDelays RelianceonGlobalSourcing IntenseCompetition	<b>Economic Conditions Challenges</b>	
DelayedCommunicationandLackOfFollowUp CommunicationBreakdownImpact MiscommunicationorlapseinCommunication	<b>Communication Challenges</b>	
HighVendorCount SmallerVendorNeglect ManagingMultipleBuyers/Resource-constrained KeyBuyerSupplierPrioritisation LimitedEngagementWithOthers	<b>Vendor Management and Resource Challenges</b>	
LackOfTimelyInformationSharing	<b>Information-Sharing Challenges</b>	

Source: Author's own

### Appendix 3.6: Table for Theme Six of RQ2

Codes	Sub-Themes	Themes
CommitmentHonouringandReliability PromiseHonouring/TimelyPayments UnderstandingBuyer-SupplierRelationships SharedGoalsFocused Reciprocity,Honest,Transparency BondingSessions PromiseKeeping StrategicGrowthPlanSharing OpenCommunication RegularInteractions FeedbackSessions SeniorMemberInvolvement OpenBookApproach StrategyAndPlanSharing SupplierIntegrationIntoStrategy SupplierPartnershipNurturing OpenAndTransparentInteractions GenuineCareForSuppliers MutualRespect HonestyandOpenDialogue PersonalAndProfessionalUnderstanding BuyerRapportDevelopment ConsistentCommunication JointAnnualSeminarsAttendance OpenandClearCommunication IdeasSharing CollaborativeDialogueWithSuppliers SupplierPerspectiveUnderstanding MutualSupportDuringUncertainty SupplierVisitsandInvolvementInLocalMarkets SupplierInvolvementsinCustomerTechnicalDiscussions SupplierAsPartnersApproach SharedCommitment LoyaltyAndCollaboration FlexibilityAndCompromise TransparentCommunication SupplierVisits HonestConversations JointProvidingConstructiveFeedback BusinessInterconnectednessAndMutualBenefits StrategicPlansSharing TransparentandStraightforwardCommunication StrategicPlansSharing RegularSupplierCommunicationandVisitations LongTermPartnershipDevelopment CultureAndValuesAlignment MutualRespectAndPrinciples PartnerUnderstandingEfforts SignificantTimeInvestment	<b>Trust and Relationship Building</b>	<b>RQ2: Solutions to Collaboration Barriers</b>
JSEListingCredibility TrackRecordOfPerformance	<b>Building Reputation</b>	
FlexibleLongTermSupplyAgreements LongTermContractswithSharedBenefits FlexibleContractAgreementsandCollaborativeProblemSolving FlexibleServiceLevelAgreements ExclusivityAgreements Long-TermContracts ContractualAgreementsandServiceLevelAgreements (SLAs)	<b>Contractual Agreement</b>	
NewSupplierPartnerships DemandCombinationAcrossSubsidiaries IncreasedPurchasingPower LocalSupplierCollaborationandSupportInitiatives PurchasingPowerEnhancement VolumeAggregation ConsolidatedGroupPurchasing	<b>Strategic Sourcing and Supplier Management</b>	
TechnologyAdoption	<b>Technology Adoption</b>	

Source: Author's own

Appendix 3.7: Table for Theme Seven of RQ2

Codes	Sub-Themes	Themes
StrategicPartnerships EnhanceduseofTechnology ResourceAllocation LongTermThinkingforLocalCollaboration EarlyBuyer-SupplierInvolvement EnhancedFrequencyofCollaborative engagements UnderstandingYourPartnersMore JointWarehousing InternalStakeholdersAlignment Decentralising procurement EffectivelyMonitoringofCollaborativePractices AlignedAdvancedDigitalTools DeeperUnderstandingOfSuppliers	<b>Improvements on Buyer-Supplier Collaboration</b>	<b>RQ2: Lessons</b>
ResiliencelsNotStatic ResilienceThroughCollaborationandLocalisation SupplyChainPartiesInterconnectedness EffectiveCollaboration OpenCommunication ExchangeofIdeas RobustBusinessContinuityPlans RegularPlansReviewand Updating ImportanceofFlexibility AdaptivePlansAndStrategies LessonsDocumentationandKnowledgeTransfer ContinuousImprovement CustomerUnderstanding ProactivePlanning MaintainingAlternativeSupplyRoutes BalancingLoyaltyWithFlexibility ProactiveandMaintainConstantCommunication AccurateandTimelyInformationImportance JointlyConstantEvaluatingCollaborativePractices Flexibility and proactivity ImportanceofCommunicationandProactivePlanning	<b>Various Lessons</b>	

Source: Author's own