

**SUPPLY CHAIN RESILIENCE AND OPERATIONAL  
PERFORMANCE OF MANUFACTURING SMALL AND  
MEDIUM ENTERPRISES OPERATING WITHIN THE  
INDUSTRIAL AREA NAIROBI COUNTY**

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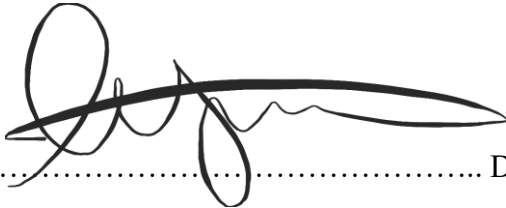
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## DECLARATION

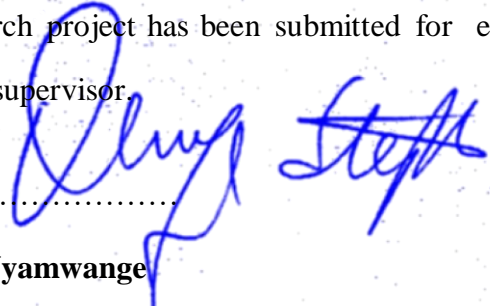
I declare that this research project is my original work and has not been presented for a degree in any other university for purposes of examination.

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This research project has been submitted for examination with my approval as the university supervisor

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Thanks to my family, friends, and associates for keeping me going.

## **DEDICATION**

I dedicate this project to my family, who have always been supportive of my decision to get an MBA.

## **TABLE OF CONTENTS**

<b>DECLARATION .....</b>	<b>2</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>3</b>
<b>DEDICATION.....</b>	<b>4</b>
<b>LIST OF TABLES.....</b>	<b>8</b>
<b>LIST OF FIGURES.....</b>	<b>9</b>
<b>LIST OF ABBREVIATIONS ACRONYMS.....</b>	<b>10</b>
<b>ABSTRACT.....</b>	<b>11</b>
<b>CHAPTER ONE: INTRODUCTION.....</b>	<b>13</b>
1.1 Background of the Study.....	13
1.1.1 Supply Chain Resilience.....	14
1.1.2 Operational Performance.....	17
1.1.3 Manufacturing Small and Medium Enterprises within Industrial Area, Nairobi County.....	18
1.2 Research Problem.....	19
1.3 Research Objectives.....	22
1.4 Value of the Study.....	22
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>23</b>
2.1 Introduction.....	23
2.2 Theoretical Literature Review.....	23
2.3 Supply Chain Resilience Strategies.....	25

2.3.1 Risk Mitigation Strategies .....	26
2.3.2 Supply Chain Reengineering Strategy .....	26
2.3.3 Lean and Agile Strategy .....	26
2.3.4 Strategic Collaboration .....	27
2.4 Operations Performance Measurement .....	27
2.5 Empirical Literature Review .....	28
2.6 Conceptual Framework .....	30
<b>CHAPTER THREE: RESEARCH METHODOLOGY .....</b>	<b>31</b>
3.1 Introduction .....	31
3.2 Research Design .....	31
3.3 Population .....	31
3.4 Data Collection .....	32
3.5 Data Analysis .....	33
<b>CHAPTER FOUR: DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION .....</b>	<b>35</b>
4.1 Introduction .....	35
4.2 Response Rate .....	35
4.3. General Information .....	36
4.3.1 Ownership status of Small and Medium Enterprise's .....	36
4.3.2 Years Small and Medium Enterprise have been in operation .....	37

4.3.3 Small and Medium Enterprise Legal Formation .....	38
4.4 Supply Chain Resilience Practices .....	38
4.4.1 Risk Mitigation Strategies .....	38
4.4.2 Supply chain reengineering strategies .....	40
4.4.3 Lean and Agile Strategies .....	41
4.4.4 Strategic Collaboration Strategy.....	43
4.5 Operational Performance .....	44
4.6 Effect of Supply Chain Resilience Practices on the Operational Performance.....	45
<b>CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS...48</b>	
5.1 Introduction .....	48
5.2 Summary of Findings.....	48
5.3 Conclusion.....	49
5.4 Recommendations.....	50
5.5 Limitations of the Study.....	51
5.6 Suggestion for Further Studies .....	51
<b>REFERENCES .....</b>	<b>53</b>
<b>APPENDICES .....</b>	<b>60</b>
Appendix I: Letter of Introduction .....	60
Appendix II: Research Questionnaire.....	61
Appendix III: List of Manufacturing SMEs at Industrial Area.....	66

## LIST OF TABLES

Table 4.1: Response Rate.....	36
Table 4.2: Small and Medium Enterprise Legal Formation .....	38
Table 4.3: Risk mitigation strategies .....	39
Table 4.4: Supply Chain Reengineering Strategy and Operational performance of Small and Medium Enterprise's.....	40
Table 4.5: Lean and Agile Strategy and Operational performance of Small and Medium Enterprise's .....	41
Table 4.6: Strategic Collaboration Strategy and Operational performance of Small and Medium Enterprise's .....	43
Table 4.7: Operational performance .....	44
Table 4.8: Model Summary.....	45
Table 4.9: ANOVA <sup>a</sup> .....	46
Table 4.10: Coefficients <sup>a</sup> .....	46



## **LIST OF FIGURES**

Figure 2.1: Conceptual Framework .....	30
Figure 4.1: Small and Medium Enterprise's Ownership .....	36
Figure 4.2: Years Small and Medium Enterprise have been in operation .....	37

## **LIST OF ABBREVIATIONS/ACRONYMS**

**ANOVA:** Analysis of Variance

**BSC:** Balanced Scorecard

**DEA:** Data Envelopment Analysis

**GDP:** Gross Domestic Product

**KAM:** Kenya Association of Manufacturers

**KPI:** Key Performance Indicators

**KNBS:** Kenya National Bureau of Statistics

**SCRes:** Supply Chain Resilience

**SMEs:** Small and Medium-Sized Enterprises

**SPSS:** Statistical Package for Social Sciences

## **ABSTRACT**

Supply chains have become more complex as a result of recent advancements in globalization and digital trade, making them more vulnerable to unanticipated disruptions in the environment they operate in. Growth in our country's economy and society is played can be attributed to businesses of all sizes, both large and small (SMEs). The supply chain role within the company, among other critical functions, contributes to the success of such businesses. Suppliers, end users, and state and non-state stakeholders form important participants in the supply chain network.

The study aimed to investigate supply chain resilience techniques widely adopted by manufacturing SMEs and to determine the impact of supply chain resilience on manufacturing SMEs' operational performance in Nairobi County's industrial region. The study was powered by the theories of dynamic capacity, resource-based, and strategic decision-making. According to information received from the Nairobi County licensing department, there are 58 registered manufacturing SMEs operating in Nairobi County's industrial sector. As part of this research, 58 manufacturing SMEs were surveyed. As a result, the entire population was analyzed using a census survey method. This study relied widely on closed-ended questionnaires for data gathering. Based on the study's goals, a series of statements and questions were prepared for the survey. The quantitative information collected from respondents in the survey was measured using the SPSS software. The study also employed regression analysis in order to show a correlation between manufacturing SMEs' supply chain resilience tactics and operational performance. There was a 95% confidence interval for the R squared value of the manufacturing SMEs working in Nairobi County's Industrial region's operational

performance, according to the study's findings. The findings in this study show that many of the SMEs in the Industrial Zone, Nairobi County are using these practices to increase their resilience during economic downturns with a 79 percent variation on operational performance measures. Research has shown that there is a direct correlation between the R-value of 0.839 and research variables. As a result of this study, it is recommended that strategic and middle-level managers in Nairobi County's Industrial Area devote additional resources to the implementation of supply chain resilience strategies to earn long-term benefits from exceptional operational performance. According to the findings of this study, SMEs in Kenya should boost their investments in supply chain resilience measures to counter supply chain vulnerability and efficiently boost operational performance.

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

Productivity of manufacturing companies may be severely impacted by supply chain interruptions. This complicates corporate operations and necessitates worldwide flexibility and lean operations in order to resist the global competitiveness faced by manufacturing enterprises. In a world of increasing connectivity and globalization, organizations have become more cognizant of their own operational complexity and macroeconomic weaknesses of supply chain management as indicated by Skipper and Hanna (2009) as well as Scholten and Fynes (2014).

The ongoing pandemic of COVID 19 has emphasized the need for a more robust supply chain based on real-world experiences (Remko 2020). Consequently, global trade has suffered, with supply chains almost completely ceasing their regular operations. Because of the global impact of government-imposed restrictions aimed at slowing the virus' spread, global trade and the flow of goods were significantly hampered. Delayed shipments from merchants, carriers, and manufacturers can have disastrous results, such as food shortages. Even though interruptions might occur, a strong supply chain is capable of overcoming these setbacks in order to keep up with the shifting demands of stakeholders such as its consumers, shareholders, and other key players in the industry. For understandable reasons, being able to predict disruptions in the supply chain is critical for any business. Organizations that are able to anticipate and plan ahead of time will be better positioned during a disruption than those that aren't. (Jüttner & Maklan, 2011, Chopra & Sodhi, 2014)

Research was conducted examining theories of dynamic capability, resource-based, and strategic decision. There is a relationship between leadership decisions in dynamic business environments and corporate performance, according to the strategic choice theory. When it comes to achieving stated objectives, the objective is inclusion of agility into the decision-making process of managers (Child, 1972). The effectiveness of an organization's operations is determined by the way it responds to unforeseen events. According to the theoretical foundation of the resource-based theory, competition for an organization is dependent on the availability of resources and internal competencies. It is necessary for companies to provide the precise resources needed to limit the effect of risks while identifying, evaluating, monitoring, and mitigating these dangers (Zba, & Arslan, 2020) It is important for organizations to adapt and change in response to an ever-changing business environment, by reconfiguring resources and capabilities.

A crucial component of Kenya's economic growth is the manufacturing sector, according to the Kenya Vision 2030 (Kenya, 2018). According to (KAM, 2015), the industry is predicted to play a significant part in Kenya's economic development by contributing up to 20% of the country's GDP. At the current rate of employment in the manufacturing sector (13 percent), there are 280,300 direct employees and 1.6 million individuals benefiting indirectly through the informal economy, which is 20 percent of the overall workforce (KAM, 2018).

### **1.1.1 Supply Chain Resilience**

Resilience is achieved by supply chain's reaching and maintaining pre-disruption levels or desired levels after unanticipated occurrences. (Belhadi et al. 2021). Supply chain flexibility, rapidity (velocity), and visibility are all key components of resilience. A vital

component of a modern supply chain is its ability to be reconfigured. However, the tradeoff is that it's sometimes difficult for upstream suppliers to foresee which business needs will require, necessitating reactive manufacturing. A system's ability to recover in the shortest period of time possible is an example of flexibility, according to Scholten and Schilder, (2015). Following a calamity, Velocity is the pace at which services can be provided in the lowest amount of time feasible. Shortened lead-times and a focus on value-added processes can help accomplish this goal. When all parties in the network benefit, supply chain visibility serves as a means of exchanging information by allowing feedback communication. The goal is tracking all the information that an organization needs to run smoothly and effectively.

Complexity in supply chain networks, procedures, and worldwide sourcing creates a high level of risk, which necessitates the need for resilience. Resilience is about preparing for the unexpected and being able to recover quickly from any setbacks that may arise (Jutter & Maklan, 2011, Chopra & Sodhi, 2014). It is possible to obtain a competitive advantage by implementing strategies for supply chain resilience that aim to plan and construct the supply chain network in advance, to anticipate unanticipated occurrences, respond adaptively to interruptions and preserve control of management over the functions as ascertained by (Ponis & Koronis, 2012). The supply chain must be reimagined, and stakeholders from all parts of the network must be included. Lean and agile supply chains are vital, as is the formation of an organization's risk mitigation culture (Grant & Stolt, 2020). Supply chain networks may have a direct influence on the global economy, and companies are increasingly being warned about the risks posed by vulnerabilities in such networks. Supply chains are under attack from global pandemics, supply chain

disturbances, and technological innovation. It is vital that firms develop and implement resilience plans throughout their networks in order to maintain control (Goldbeck, Angeloudis & Ochieng, 2020).

For the vast majority of firms, risk mitigation plans are developed using statistical procedures and the data they generate. Unexpected occurrences, like as the worldwide COVID 19 pandemic and other natural calamities, put a strain on traditional methods of risk monitoring. Furthermore, conventional risk management strategies need capacity development to guarantee the application of resilience capabilities measures like performance contracts.

Brandon Jones, Squire, Autry, and Petersen (2014) argue that an organization's capacity to remain competitive in a rapidly changing marketplace is contingent on the resilience tactics it employs. The supply chain stakeholders must work together to devise mutually beneficial solutions from the information shared, trust, and unison in improvement measures in order to achieve resilient distribution networks. "Planning and executing activities as a team minimizes risks while also enabling the ability to quickly return to normal after an interruption. Players in the value chain collaborated with each other to design procedures that could be relied upon in the event of an interruption. Strategies that help mitigate risk and build supply culture visibility

In order to help disaster-stricken communities receive supplies more quickly and efficiently, relief organizations work to develop protocols and solutions. To guarantee that the humanitarian aid supply chain is as efficient and effective as possible, additional research and recommendations are needed. (Nyamwange & Nyaguthie, 2004)



### **1.1.2 Operational Performance**

The quantifiable consequences of a company's business operations, such as manufacturing cycle time, dependability, and inventory turnover, are known as operational performance. As a result, important performance measures like market share and customer satisfaction are affected by operational efficiency (Voss, Ahlstrom, & Blackmon, 1997). As an example, managers and academics frequently utilize operational performance as a dependent variable when comparing the performance of one company to another. There are a number of functions that have a direct impact on achieving operational success. These include, but are not limited to, HR development, marketing strategy, customer service, corporate reputation, CSR, and supplier relationship management. An in-depth description of the link between operational success and organizational performance is provided in Combs, Crook, and Shook (2017). Because operational performance contains all non-financial repercussions, arguably, organizational performance just includes the financial effects of a company's actions, they say.

There are four important dimensions in operational success that will be examined in this study: customer interactions, internal company processes, learning & development and financial viewpoint. The company's emphasis is on customers' perceptions and how it meets their expectations as viewed by customers. Businesses use their own internal business practices to serve customers better and to minimize mistakes. Learning and development are necessary for a firm to evolve and improve in order to achieve its stated objectives, which are expressed in its vision and purpose. Put simply, the firm is responsible for how its stakeholders perceive it and how it maintains its value from a financial standpoint (Harland, 2016).

The research will focus on four areas of a balanced scorecard, which are customer interactions, internal company processes, learning and growth, and financial viewpoint. The firm focuses on how its consumers will see it and how it will meet their expectations under the customer perspective. A company's internal business processes define the procedures and workflows it has implemented to achieve needs of its many stakeholders and clients. The organization must learn and grow in order to accomplish its vision and mission goals in order to evolve and improve continually. When it comes to the firm's value, it is up to the company to set the tone for its stakeholders. (Harland, 2016).

### **1.1.3 Manufacturing Small and Medium Enterprises within Industrial Area, Nairobi County**

Businesses that have a small number of workers and low sales volume are called Small and Medium Enterprises (SMEs) Rose, Kumar, and Yen, (2013). SMEs in Kenya are now being defined as micro-enterprises that have less than 10 workers, Small businesses and medium-sized firms with less than 49 workers and employing between 50 and 99 workers respectively. Research has found that up to 1% of Kenya's micro, small, and medium-sized businesses are classified as medium-sized. (KNBS, 2016).

Small businesses in Kenya don't require a lot of staff since their activities are so limited. It is possible to manage and operate a firm with only a few personnel, even if they are all highly qualified. Manufacturing, marketing, and accounting departments are just few of the divisions that SMEs in Kenya share with larger corporations (Ahn, Mortara & Minshall, 2013).

As SMEs in Kenya focus on a few products and services, they are able to build long-term and strong ties with their clients. SMEs who have solid business alliances grow more swiftly than those that don't (Zoghi, 2017). Successful customers are a pillar of success for an SME. Consequently, they would do all they can to make their clients happy and satisfied with their products and services. There are various manufacturing SMEs in Nairobi's Industrial Area, all of which cater to the diverse needs of the county's diverse population (Makori, 2013). SME's in the area are distinguished by their ability to work on a temporary basis, localized operations, and the utilization of local raw materials and labor.

The businesses rely heavily on their workforce, and the majority of their workers have only received a secondary or tertiary degree. In addition, since the managers or owners of the SMEs are so profit-conscious, these growth factors might readily impact them (Makori, 2013). Most small and medium-sized businesses present just a few samples of their goods.

## **1.2 Research Problem**

Kenyan SME's rely on a fluid supply chains to reap the benefits of operational success. This is made possible by the role that they play in contributing value to the national economy. The research on supply chain resilience has been more popular among small and medium-sized organizations as a means of preparing for supply chain interruptions and ultimately improving operational performance.

SMEs are important to the economy and society as a whole. Robust supply networks are necessary to overcome unforeseen supply interruptions. The resilience of SMEs has been studied due to their importance to the economy. With the changing business world, many SMEs are lumped together in terms of both size and privilege when it comes to this field.

Supply chain resilience for SMEs have been studied in order to find out how supply chain interruptions can be dealt with in an unexpected way. When it comes to their supply chains, small and medium-sized businesses in Kenya encounter a wide range of difficulties. Among these include technological advances, financial risk, political turmoil, and an increase in regulatory requirements (KNBS, 2013, Transparency International, 2013). As much as 21% of Kenyan manufacturing enterprises suffered a loss of more than Ksh 500 million in 2013 due to at least one disruption as indicated by Business Continuity Institute (2013).

Decreased resources, unstable politics, and economic concerns are affecting day-to-day operations and the financial livelihoods of Kenya's small and medium sized businesses (Otieno, 2013). Small and medium-sized manufacturing businesses have adopted the balanced scorecard as a measure of operational success (SMEs).

Measurement of operational performance, including customer viewpoint, learning/growth, internal business processes, and the financial perspective, was done using the Balanced Scorecard (BSC) tool. When clients are satisfied and focused on their demands, they are more likely to achieve the goal. By inventing and refining products and services, as well as establishing strong brands and customer ties, it attempts to build a favorable reputation with customers. To ensure that both shareholders and customers are satisfied, whether or not internal business objectives can answer this question "what internal business process must we excel at as business? As such, one of the most important business processes is determining the organization mission and define objectives that ensure long-term sustainability. This sets out the obligations of the firm to its stakeholders. Training and

development is seen as an important means of gauging the firm's employee motivation and how their skills are developing.

Awwed (2018) performed global research on Toyota's theory of supply chain resilience and found that stakeholder participation is essential for resilience. According to research by Macfadyen et al. (2015), Resilience requires stakeholder participation and is dependent on industry-specific factors. Researchers found that increased mobility and cooperation in the pharmaceutical industry's supply chain reduced disruptions in Malaysia, according to research by (Aigbogun, Ghazali, and Razali, 2014)

Poor mitigation strategy decisions can ruin the success of any business. According to Muniyandi (2016), a relationship between the operational success and risk-mitigation strategies adopted was evident. Numerous measures for enhancing resilience were identified in a report done by Aluda (2015) on proven strategies for determent of disruptions affecting supply chain networks among Kenyan distributors of telecoms equipment however, such measures have not been applied evidenced by the disconnect between IT infrastructure investments and growth. With challenges in the supply chain posing an increasing threat to business, stakeholders need to be able to receive reliable information. A research study by Bichanga and Mwangi (2014) found that manufacturing SMEs need reliable data for mitigating any interruptions. The research however, did not cover the supply chain resilience techniques and how they influenced operational performance amid unforeseen disturbances such as the global COVID 19 pandemic. Today's businesses must prepare themselves for such unforeseen events. The study intended to cover the gap portrayed by examining the following research questions, what are the supply chain resilience strategies adopted by manufacturing SMEs within the

industrial area of Nairobi County? And what is the effect of supply chain resilience practices on the operational performance of manufacturing SMEs operating within industrial area of Nairobi County?

### **1.3 Research Objectives**

The study's objectives were as follows,

1. To find out what supply chain resilience strategies manufacturing SMEs in Nairobi County's industrial area have adopted
2. To determine the influence of resilience strategies on operational performance of manufacturing SME's in Nairobi County's industrial sector

### **1.4 Value of the Study**

Resilience mechanisms for the supply chain in Kenya following the international COVID 19 pandemic have been identified in this study. The researcher's objective is to help companies spot weak supply chain linkages and plan for unusual disruptions, like the COVID 19 pandemic, with these findings. Resilience approaches can assist other companies recognize the need of dealing with uncertainties, dangers, and interruptions in their supply chains.

In addition, the study's vast findings will aid academics as they generate new information on resilience techniques and their influence on attempts to reduce the consequences of disruptions such as worldwide pandemics. As a starting point for additional research on supply chain resilience, this study's findings can be used by academics and researchers. In this way, the supply chain's knowledge base and theoretical foundation for risk assessment will be strengthened.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter discusses early research by a number of scholars. Fundamental components of this study include theories, empirical research, and resilience of supply chains, operational effectiveness, and a conceptual framework.

### **2.2 Theoretical Literature Review**

Existing theories, each based on well-documented facts and assumptions, attempt to explain observed events. Dynamic capacities, resource-based theory, and theories of strategic decision-making all served as foundations for this investigation.

The events and actions of organizations are intertwined in the Strategic Choice Theory. Strategic decision-making is essential in an integrated risk management strategy. Using this model, you can see how risk management, decision making, and overall performance are all intertwined in a company. The theory focuses on risk management options and procedures, as defined by Child (1997).

A firm is distinct because of the unique circumstances in its surroundings and decisions it takes internally with the changes it brings about externally. According to this view, management's actions are influenced by the company's adaptability and strategic options when taken as part of a holistic strategy. According to the theory's proponents, the guiding principle is the ability to think creatively and take risks. For example, established vendors will be used to get the raw materials needed for production.

In line with the resource-based view, a company's unique collection of readily available resources is what best positions it to gain a competitive edge. Assets can be either tangible or immaterial in nature. When it comes to assets, tangible means those that can be touched, whereas intangible means those that are developed by an organization's employees and management (Alvarez & Busenitz, 2001). Because of this, an organization's competitive advantage is based on its internal factors rather than external ones. A company's resources are classified according to a variety of factors, including its core competencies, assets, human resources, risk management capabilities, geographic location, and technical capabilities.

According to the resource-based hypothesis, companies compete on the basis of their unique resources and their ability to regulate disturbances that impact them (Das, & Teng, 2000). Competitive advantage and improved performance can only be achieved if a firm has a solid foundation of corporate resources. Resources are assumed to be dispersed in a non-uniform manner in the theory. For risk management, it utilizes resources that may be used to generate goals from within the business.

The resource-based approach is founded on the concept of economic rent. Firms are seen as a collection of resources that must be merged to compete effectively within the theory's framework (Willmott, 1994). It is therefore possible to exploit a company's unique capabilities in order to maximize its economic rent in accordance with market expectations and aspirations. A company's development and success are dependent on the uniqueness, rarity, and non-irreplaceability of its valued resources, according to (Wernerfelt, 1984).



Teece, Pisano, and Shuen developed the Dynamic Capability hypothesis (1997). In today's dynamic workplace, companies must be able to quickly adjust their skills and resources to keep up (Wang & Ahmed, 2007). Operational performance often relies on the company adapting to unexpected changes in the environment.

For Augier and Teece (2009), the procedures through which an organization obtains previously untested competencies and skills are referred to as "capabilities". Firm resources are utilized more effectively and efficiently because of the increasing capabilities of its employees.

Reconfiguring, renewing, re-creating, and integrating sustainable policies and vital resources that may be utilized to meet the organization's goals is possible. As a competitor's advantage, the Dynamic Capacity Theory is just a guide to best practices, critics contend. (Smith, Lyles and Peteraf, 2009).

### **2.3 Supply Chain Resilience Strategies**

The core of the supply chain is people: suppliers, consumers, and other key players. supply chain resilience includes risk management, recovery, resistance to risk, and the production of remedies for extreme supply network occurrences (Grant & Stolt, 2020). As a means of improving supply chains, risk reduction and cooperation are necessary, as well as the redesign of supply systems. The capacity of a supply chain to endure interruptions aids its ability to respond rapidly to client demands.

In order to boost customer value, (Goldbeck and Angeloudis and Ochieng, 2020) argue that a more resilient supply chain fosters purposefulness while reducing potential conflicts of interest and financial risks (2020).

### **2.3.1 Risk Mitigation Strategies**

When managing a company's supply chain, companies must embrace a risk mitigation culture from the top down in order to avoid any risks. To help their supply chains survive shocks, the strategic management team employs performance contracting. To improve trade connections, monitor activity, and avoid opportunism, the company should enter into contracts with its suppliers (Angappa, Nachiappan & Shams, 2015). Assigning responsibility for risk assessment to the appropriate business units and maintaining an up-to-date risk register through open lines of communication are both part of this process (Tran, Childerhouse, & Deakins, 2016).

### **2.3.2 Supply Chain Reengineering Strategy**

Supply chain reconfiguration and mergers may increase the company's flexibility and adaptability by eliminating the company's conventional limits, reducing costs while ensuring good customer service, and streamlining operations (Liu et al. 2018). If an organization's supply chain partners and their different goals can be better understood, then redundancy analysis, efficiency trade-off studies, and risk resource evaluations can all benefit.

### **2.3.3 Lean and Agile Strategy**

As Daudi and Zailani (2011) argued in their paper, "Lean management concepts should be applied to construct supply chains that focus on minimizing waste," supply networks must meet customer expectations first and foremost. As a result of rapid market fragmentation, growth-oriented and customer-focused initiatives in the global market, there is an agile supply chain. Both lean supply networks and agile supply chains are available. While the latter is more efficient, it is less adaptive than the former.

### **2.3.4 Strategic Collaboration**

In the context of business, collaboration refers to the ongoing contact between a company and its most important stakeholders. In terms of strategy and operational efficiency and capacities, it has a significant influence. It is crucial for a company and its suppliers to maintain a long-term, intimate relationship that allows them to work together to solve challenges and plan for the future. Limited engagement, long-term relationships, and the pooling of strategic and operational skills are three ways to cooperate. The benefits of cooperation are shared by all parties involved, and this ensures that all of the organization's key areas are kept active. It saves time and money since the firm only deals with vendors it knows. Suppliers may create new products in order to save the organization money, detect dangers, and assist in the design process. Risk assessment, product design, and company operations all need to be considered by suppliers in order to guarantee that customer expectations are satisfied.

### **2.4 Operations Performance Measurement**

Many tools and services can help you evaluate organizational performance, such as the Balanced Scorecard (which uses KPI's and other measurements), Performance Appraisals, and Reward and Recognition Programs. SME operational efficiency is evaluated using a balanced scorecard, which considers four distinct perspectives: customer, internal company process, learning and development and financial viewpoint. These are only few of many elements that are taken into account when creating a scorecard that is considered to be "balanced." The major focus of the customer viewpoint is on the firm's capabilities and meeting the client's demands. When we talk about customer service time, for example, transactions are processed quickly. Timely responses to inquiries and complaints are

addressed in a timely manner. Because of this, the business must conduct periodic surveys to gauge client happiness and act on the findings. (Kaplan & Norton, 2006).

The internal perspective of a corporation is to guarantee that the organization selects business policies and procedures that fulfill its special demands for shareholders and customers. Internal business policies are frequently classified as either mission-oriented or support-oriented based on the importance placed on them by the organization's overall mission processes. Another two advantages of this strategy include a quicker prospecting cycle and fewer rework (Ghosh et al., 2006).

The organization should be able to keep pace with its objectives, while responding to changes in the market (Kaplan & Norton, 2006). Using this information, your training budget may be directed in the right way. It's all about boosting production through employee training. Consequently, the aim may be achieved through cultivating and maintaining a positive company culture.

The Balanced Scorecard (BSC) tool recommends that a corporation must meet the financial expectations of its owners (shareholders) by producing indicators like additional quantitative cash flow metrics including financial ratios and consumer share (Ghosh et al., 2006).

## **2.5 Empirical Literature Review**

Stakeholder involvement, flexibility, supply chain reengineering, and risk mitigation measures, according to Awwed's (2018) research, make Toyota's supply chain more robust.

Macfadyen et al. (2015) found that merchants of food items have a major impact on

improving global food supply chain's resilience in terms of food distribution networks. Although global food supplies are not steady, they discovered that by incorporating stakeholders and modifying operations across wide areas, they might be rendered less subject to shocks and disruptions. An information-sharing architecture as established by Aigbogun, Ghazali, and Razali (2014) for promoting supply chain resilience can be used to strengthen Malaysia's pharmaceutical industry's supply networks. According to the findings of Frohlich and Westbrook (2001), companies that integrate their customers and suppliers into their operations perform better. Customers, suppliers, internal and external stakeholders, and the environment all benefit from a well-functioning supply chain, according to the conclusions of the research.

The performance of Kenyan recognized hospitals in terms of supply chain resilience was studied by Kariuki, (2018) at the local level. Researchers employed Data Envelopment Analysis (DEA) to measure hospital efficiency. Researchers compared the DEA ratings of private hospitals with those of public and faith-based facilities and found that the private hospitals had much higher scores. On the whole, private hospitals were found to be more efficient than public ones. In addition, the study found a correlation between a company's capacity for resilience and its operational efficiency. The researchers proposed employing outsourcing, reserve capacity, and local suppliers to reduce hospital operating risks.

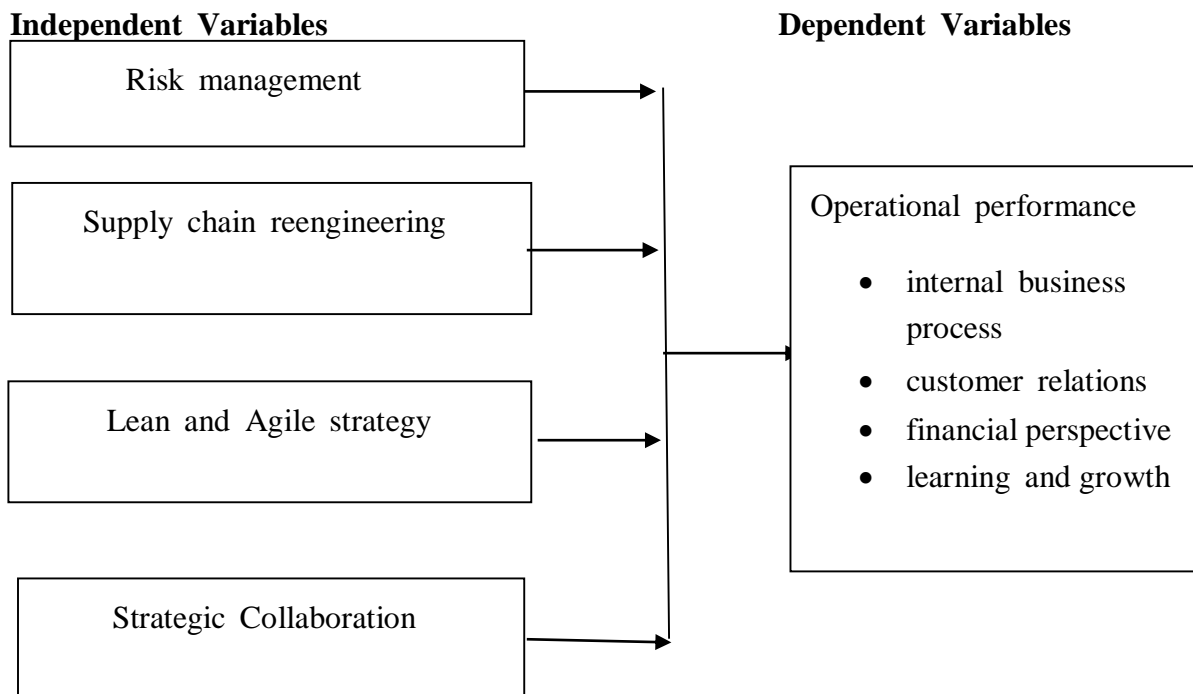
Ochieng, (2018) set out to find out how Nairobi's pharmaceutical manufacturing companies fared in relation to supply chain stability. Risk management and risk management culture, lean and agile integration of supply chain, and reengineering supply chain were determined to be the most commonly used resilience techniques. Resilient supply chains have an effect that is both significant and good on the performance of enterprises, according to the

research findings. Supply chain management, supply chain collaboration, these findings suggest a large and favorable impact on the performance of all Kenyan pharmaceutical companies that have lean supply chains and risk management cultures.

Supply chain resilience techniques were the subject of Muricho and Muli's (2021) investigation of the manufacturing companies in Kenya's food and beverage sector. Quantitative as well as qualitative methods were chosen for a cross-sectional investigation. The study advised food and beverage producers to focus on risk management, agility, cooperation, and supply chain integration, among other things.

## 2.6 Conceptual Framework

The theoretical underpinnings of research provide the framework for further investigation (Grant & Osanloo, 2014).



**Figure 2.1: Conceptual Framework**

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

The research design is discussed in this chapter, target population, and data collection and analysis.

### **3.2 Research Design**

According to Kombo and Tromp (2006), defined as a broad approach for conducting an inquiry, research design is Supply chain resilience strategies' influence on the performance of small and medium-sized enterprises (SMEs) during international COVID 19 pandemic was studied using a descriptive research approach. The descriptive study methodology made it easy to verify and characterize the variables under investigation. The design has to be flexible and accurate in order to fulfill the demands of a specific situation.

### **3.3 Population**

There are 58 Small and medium-sized manufacturing enterprises registered in Nairobi County's industrial sector, according to the licensing department. A total of 58 companies are responsible for most of the production in the industrial region of Nairobi County. A census survey was used to look at the 58 manufacturing SMEs in Nairobi County's industrial region since the entire population was being surveyed. The study was place in Nairobi, which is home to the headquarters of the majority of big firms. Investigators consulted with supply chain and top management officials to help them meet the study's objectives.

### **3.4 Data Collection**

Data was collected through closed-ended questionnaires. A series of statements and questions were prepared for the survey informed by study objectives. On the survey, there were three types of questions that could be answered. Supply chain resilience and operational performance were examined in Section C of the report, which focused on manufacturing small and medium-sized retail businesses in Nairobi County. Section B of the questionnaire addressed this issue. Closed-ended questions were included to the questionnaire in order to speed up data collecting and provide researchers a better understanding of the survey participants. Respondents will have plenty of time to give their replies since the surveys will be dropped and collected at a later time. Supply chain managers and other high-ranking personnel were among the participants in the poll, which was open to all levels of management.

Data-gathering instruments are judged on their ability to produce consistent results after multiple trials, which is known as reliability (LoBiondo-Wood and Haber, 2014). Because Cronbach's Alpha measures the correlation between independent and dependent variables, it may be trusted. From 0 to 0.9 Cronbach's Alpha calculates the reliability of a test. As alpha increases, so does the level of confidence. An accuracy rate of at least 0.7 is preferred in order to be considered trustworthy. In order to collect all of the required data, the study's data collection technology must be extremely trustworthy (LoBiondo-Wood and Haber, 2014).

Data collecting methods are judged on their capacity to properly assess the target qualities of the study (Cooper, Schindler & Sun, 2006). Conceptual validation was utilized to verify



the dependability of data-collection devices. The instruments used in the study must meet the study's objectives and be straightforward to understand and follow. Before the study could begin, a draft questionnaire was created in consultation with the research supervisor, pre-tested, and validated for usefulness.

### **3.5 Data Analysis**

SPSS, a statistical program for social sciences, was used to evaluate the quantitative data collected from survey participants. Descriptive analysis was used to assess the first objective, which includes measures of central tendency. Frequency and percentage tables presented important findings of the study. Supply chain resilience techniques were employed as an independent variable in the analysis of goal two, which focused on manufacturing small and medium firms. A regression analysis was used to examine the supply chain resilience strategies and operational performance of manufacturing SMEs.

Using a regression model, the data were analyzed as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where,

$\alpha$  is the model intercept

$\beta_1$ ,  $\beta_2$ ,  $\beta_3$ , and  $\beta_4$  are the various intercepts

$Y$  is the operational performance

$X_1$  is the risk management

$X_2$  is the strategic collaboration

$X_3$  is the supply chain reengineering

$X_4$  is the lean and agile

$\epsilon$  represents the error in the model

**Table 3. 1: Summary of Methodology**

<b>Research objectives</b>	<b>Data Collection</b>	<b>Data Analysis</b>
To find out what supply chain resilience strategies manufacturing SMEs in Nairobi County's industrial area have adopted	Questionnaire	Descriptive Statistics
To determine the influence of supply chains on operational performance of manufacturing SME's in Nairobi County's industrial area region	Questionnaire	Inferential Statistics

## **CHAPTER FOUR: DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION**

### **4.1 Introduction**

Small and medium-sized businesses (SMEs) operating in Nairobi County's industrial sector had their supply chains analyzed for ways to enhance performance. Figures and Tables were utilized to summarize and show the data obtained from the respondents in the research. Regression models for supply chain resilience and operational performance of manufacturing SMEs operating within industrial area of Nairobi County, are also presented in this chapter.

### **4.2 Response Rate**

The study focused on 58 manufacturing SMEs in Kenya's industrial area, Nairobi County. Only 52 participants took the time to answer the study's core question, according to the survey results. There were 89.66% of replies received, according to Table 4.1. In the academic community, it has been argued that response rates of 50%, 60%, and 70% and above are sufficient, acceptable, and extraordinary. Data processing and interpretation may proceed with an 89.66 percent response rate in this case.

**Table 4.1: Response Rate**

No. of questionnaires Returned	Target No. of respondents	Response Rate (%)
52	58	89.66%

Source: (Researcher, 2021)

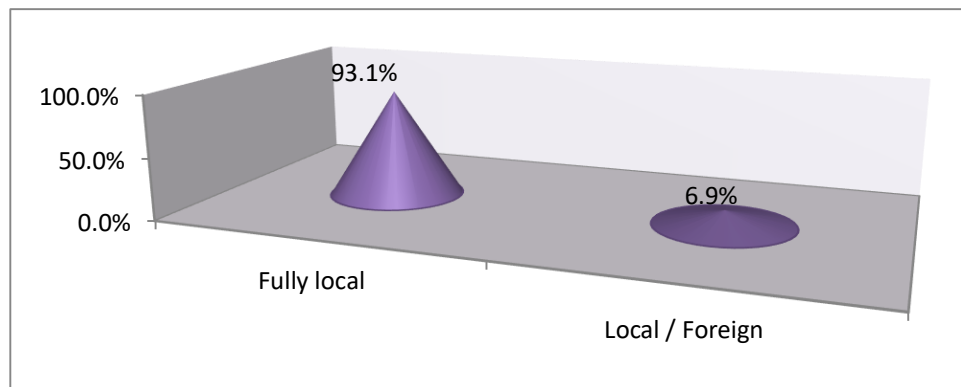
### 4.3. General Information

To ensure that the sample method was correct, the legal status, number of years in operation, and ownership of small and medium-sized firms were all examined.

#### 4.3.1 Ownership status of Small and Medium Enterprise's

The study focused on small and medium-sized businesses. The study's goal was to find out how small and medium-sized businesses' competitive advantages are affected by ownership distribution. Fig. 4.1 illustrates the study's results.

**Figure 4.2: Small and Medium Enterprise's Ownership**



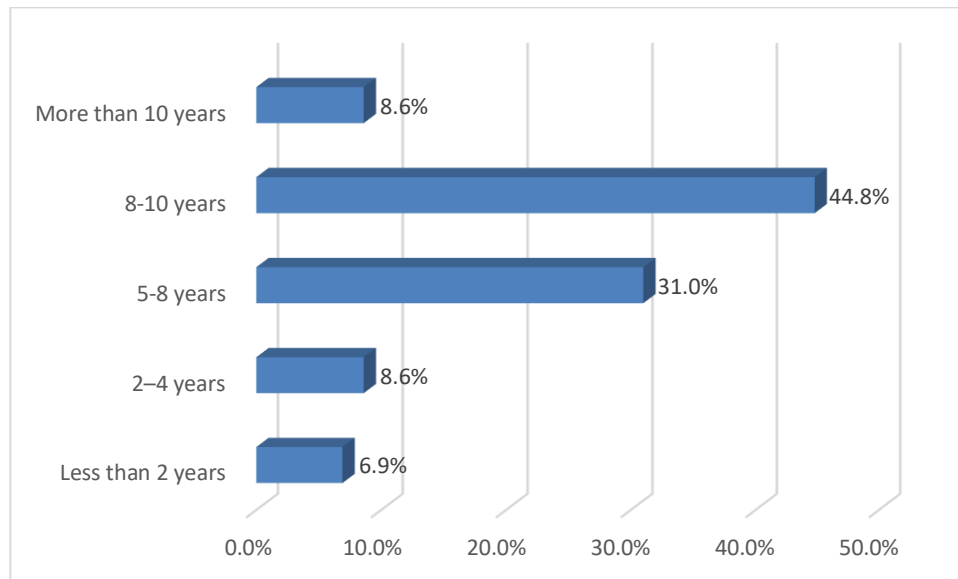
Source: (Researcher, 2021)

Nearly all enterprises were owned by locals, with just a small percentage owned by both locals and foreigners. Manufacturing small and medium enterprises in Nairobi County's industrial area are majorly owned locally.

#### 4.3.2 Years Small and Medium Enterprise have been in operation

Small and medium-sized firms were of interest to the researcher. Figure 4.2 depicts the results of the experiment.

**Figure 4.3: Years in operation for Small and Medium Enterprises**



**Source: (Researcher, 2021)**

In Kenya's industrial area, the majority of manufacturing small and medium businesses have been in operation for 8-10 years, with 44.8 percent of respondents reporting this, 31 percent reporting 5-8 years, and 8.6 percent reporting 2-4 years or less, as shown in Figure 4.2, Thus, there are more options for reliable data collection on the elements influencing manufacturing companies' operational success.

### 4.3.3 Small and Medium Enterprise Legal Formation

The researcher examined the legal status of small and medium-sized firms in Nairobi County's industrial zone. The study's findings are listed in table 4.2.

**Table 4.2: Small and Medium Enterprise Legal Formation**

	<b>Frequency</b>	<b>Percent</b>
Sole proprietorship	32	61.9
Partnership	14	26.9
Limited company	6	11.2
<b>Total</b>	<b>52</b>	<b>100.0</b>

**Source: (Researcher, 2021)**

Nairobi County's industrial sector has a total of 32 Small and medium-sized manufacturing enterprises, while 14 of them are owned by partnership (26.9 percent). Only six of the total number of manufacturing enterprises were small and medium-sized (SMEs) (11.2 percent). The majority of Small and medium-sized manufacturing firms in the industrial sector of Nairobi County were legally formed as sole proprietorships, according to these data.

## 4.4 Supply Chain Resilience Practices

### 4.4.1 Risk Mitigation Strategies

This study delved into how different risk prevention methods impacted small-to-medium-sized manufacturing facilities in industrial area Nairobi county. These results were tallied using a Likert scale by asking the subjects to rank the truth of a series of statements as

follows 1–strongly disagree, 2– disagree, 3–undecided, 4–agree and 5–strongly agree, was used to assess the current state of this variable. Table 4.3 displays the important findings from the research

**Table 4.3: Risk mitigation strategies and operational performance of manufacturing Small and Medium Enterprise’s**

	<b>Mean</b>	<b>Std. Deviation</b>
Risk management has enhanced the identification and maintenance of a risk registry for effective risk management.	4.31	0.88
With the collaboration of business partners, risk registers have been found to help allocate and share risks, resulting in improved commercial connections.	4.38	0.53
Through performance contracts, firms have been able to better protect themselves against unanticipated threats by sharing risk with one another.	4.13	1.14
It has become simpler to detect and reduce risks because of the popularity of a risk management attitude	4.23	1.06
Risk delegation, risk avoidance, and a culture of risk-taking contribute to greater outcomes.	4.13	0.69
The organization’s staff is proactive in detecting and minimizing possible hazards as they occur.	4.17	0.96

**Source: (Researcher, 2021)**

It has been shown that risk registers can aid in the allocation and sharing of risks, resulting in improved commercial relations, according to the conclusions of the study. Risk management has improved due to greater risk identification and the maintenance of a risk registry. As a result, risk management has grown more prevalent, making it simpler to detect and reduce hazards. From the study findings, risk mitigation measures have a

substantial correlation with the operational performance of manufacturing SMEs. According to the findings of the study, the strategic management team should use performance contracting to help their supply chains become more resilient to disruptions (Angappa, Nachiappan, and Shams, 2015). Contracts between a firm and its suppliers can strengthen trading relationships, exchange behaviors, and the company's ability to protect itself against opportunism. There is also a clear communication channel between the supply chain risk assessment team and the company's senior management in order to keep the risk register up-to-date.

#### 4.4.2 Supply chain reengineering strategies

This strategy has an impact on small, medium-sized businesses in Nairobi County's Industrial Area. These results were tallied using a Likert scale by asking the subjects to rank the truth of a series of statements as follows 1–strongly disagree, 2– disagree, 3– undecided, 4–agree and 5–strongly agree, was used to assess the current state of this variable. Table 4.4 displays the important findings from the research

**Table 4.4: Supply Chain Reengineering strategy and operational performance of manufacturing Small and Medium Enterprise’s**

	Mean	Std. Deviation
Supply chain reengineering has improved the organization’s competence.	4.31	0.70
Lower operational costs have been achieved as a consequence of outsourcing work to enterprises with specialized knowledge as a result of supply chain restructuring.	4.10	1.12
The suspension of supply from abroad necessitated the hiring of new suppliers.	4.00	1.12
Reengineering of the supply chain has resulted in a specialization of businesses.	4.29	0.64



**Source: (Researcher, 2021)**

According to the report, small and medium-sized firms in the industrial sector in Nairobi County have benefited from supply chain reengineering. By outsourcing their core capabilities to organizations that specialize in that area of expertise, small and medium-sized enterprises in the industrial district of Nairobi County have become more sustainable and cost-effective. Liu et al. (2018) state that a company's supply chain may be reengineered to merge supply chain operations with traditional boundaries, decrease costs, and provide better customer service in various conditions. Supply chain partners, their goals, the flexibility of the supply chain base may all be discovered by identifying risk resources and considering current methods, as well as considering redundancy and efficiency tradeoffs.

#### **4.4.3 Lean and Agile Strategies**

Lean and agile methods were also examined to see whether they had a good impact on the operational performance of manufacturing small and medium firms in the Industrial region of Nairobi County. These results were tallied using a Likert scale by asking the subjects to rank the truth of a series of statements as follows 1–strongly disagree, 2–disagree, 3–undecided, 4–agree and 5–strongly agree, was used to assess the current state of this variable. Table 4.5 displays the important findings from the research.

**Table 4.5: Lean and Agile Strategy and operational performance of manufacturing Small and Medium Enterprise's**

	<b>Mean</b>	<b>Std. Deviation</b>
Use delivery vehicles and distribution centers to their maximum capacity to save money and maintain a constant process flow.	4.15	1.16
Increased revenues resulting from the deployment of online stores in the shadow of supermarkets.	4.19	1.01
Retail establishments should restrict the number of employees working at all times to reduce the risk of transmission of disease.	4.21	0.72
If a product cannot be provided at a reasonable price, it is deemed unprofitable and removed from circulation until it can.	4.23	0.90
Restrict purchases of non-essentials to guarantee that everyone has access to the requirements	4.38	0.72
In order to increase sales, non-essential things are discounted.	4.35	0.76

**Source: (Researcher, 2021)**

As a result, it has been found that Kenya's Small and medium-sized manufacturing enterprises in the industrial zone of Nairobi County ensure the availability of things that are not financially viable at all times. Reducing the number of people working in retail and distribution facilities reduces the danger of transmission while also keeping prices low and a regular supply of goods flowing. According to Daudi and Zailani (2011), there are other ways to characterize supply networks, but the lean supply chain places an emphasis on cutting down on unnecessary waste. This indicates the supply chain must be able to meet customer needs. In today's global marketplace, a supply chain that is able to adapt swiftly

to market shifts, market fragmentation, growth-oriented and customer-focused activities is an agile supply network.

#### 4.4.4 Strategic Collaboration Strategy

An evaluation of how much agreement there was with various claims about the impact of Nairobi County's industrial area manufacturing SMEs of the Strategic Collaboration Strategy was analyzed. These results were tallied using a Likert scale by asking the subjects to rank the truth of a series of statements as follows 1–strongly disagree, 2–disagree, 3–undecided, 4–agree and 5–strongly agree, was used to assess the current state of this variable. Table 4.6 displays the important findings from the research.

**Table 4.6: Strategic Collaboration Strategy and operational performance of manufacturing Small and Medium Enterprise’s**

	Mean	Std. Deviation
Open channels of communication have made the fight against COVID 19 a shared responsibility for all employees.	4.10	0.77
Because of open communication lines, suppliers were able to promptly react to changes in their ability to offer.	4.60	0.63
Because of the collaboration of competitors, supply and price have been more successfully handled.	3.88	0.68
Authorities have worked together to ensure the enforcement of curfew legislation on time.	3.69	1.13
Since the firm and its suppliers have a strong relationship, information sharing has become easier.	3.79	1.32

**Source: (Researcher, 2021)**

Researchers found that small and medium-sized manufacturers in Nairobi County's industrial sector were able to quickly adapt to changes in their ability-to-provide suppliers

because of open communication channels. COVID 19 has become a collaborative endeavour because of free communication amongst all personnel.

According to Grant & Stolt (2020), the advantages of cooperation are mutually beneficial and the most important sectors of the organization are still involved. Reputable service providers might save time and money for the firm. Incorporating the needs of suppliers in the design and development of new goods may result in savings and improved customer satisfaction. All aspects of the supply chain must be examined to address possible risks and uphold reasonable expectations.

#### **4.5 Operational Performance**

Furthermore, a variety of assertions concerning manufacturing SMEs in Nairobi County's operational efficiency were examined in the research. These results were tallied using a Likert scale by asking the subjects to rank the truth of a series of statements as follows 1–strongly disagree, 2– disagree, 3–undecided, 4–agree and 5–strongly agree, was used to assess the current state of this variable. Table 4.7 displays the important findings from the research

**Table 4.7: Operational performance**

	<b>Mean</b>	<b>Std. Deviation</b>
Goods returned by customers	3.17	0.73
Number of new customers	4.33	1.12
Improved customer relationship	4.17	0.73
customer requirement in Product design	3.60	1.33
Improved manufacturing process	4.35	0.67
Improved inventory management	3.94	0.62
Increased flexibility	4.32	0.70
Improved delivery	4.46	0.61
Regular training to employees	4.48	0.90
Increased information capital	4.67	0.58
Employees satisfaction and attitudes	3.96	1.12

Employee performance	3.78	0.73
Increased profit	4.21	1.33
Increased revenue	4.32	0.67
Improved use of assets	4.12	0.62
Improved cost structure	4.26	0.70

**Source: (Researcher, 2021)**

Small and medium-sized enterprises in Nairobi County's industrial region that implemented supply chain resilience techniques saw enhanced information capital, frequent training for personnel, and improved delivery and production processes. This in turn led to an increase in revenue as well as improved customer relationships and increased profit. With the study results, Business Continuity Institute (2013) has shown that the supply chain has a significant impact in the operational success of Kenyan SMEs, since these companies play a vital part in the public and national life of the country.

**4.6 Effect of Supply Chain Resilience Practices on the Operational Performance**

SMEs in the industrial zone were subjected to a multiple regression analysis as part of the study of Nairobi County's manufacturing sector might benefit from supply chain resilience measures.

**Table 4.8: Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.916 <sup>a</sup>	.839	.799	1.211

Risk mitigation strategies, Supply Chain Reengineering Strategy, Lean and Agile Strategy, and Strategic Collaboration Strategy are all dependent variables.

**Source: (Researcher, 2021)**

Risk mitigation strategies, Supply Chain Reengineering Strategy, Lean and Agile Strategy, and Strategic Collaboration Strategy are have a combined influence on the operational performanc of manufacturing SMEs in the industrial zone of Nairobi County, according to Table 4.8. An R squared of 0.799 indicates that the independent variables account for 79.9% of the variance in their operational performance.

**Table 4.9: ANOVA<sup>a</sup>**

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	145.223	4	36.306	20.844	0.000
	Residual	81.874	47	1.742		
	<b>Total</b>	<b>227.097</b>	<b>51</b>			

a. Dependent Variable: Operational Performance

b. Predictors: (Constant), Risk mitigation strategies, Supply Chain Reengineering Strategy, lean and agile strategy, strategic collaboration strategy

The regression model's ANOVA statistics showed a 0.00 percent significant level since it was less than 5 percent, which was ideal for establishing the study's results. This indicates that supply chain resilience strategies would enhance the operational performance of manufacturing SMEs in the industrial region of Nairobi County by reducing the critical value from 3.01 to less than 3.01, which aligns with the study's findings.

**Table 4.10: Coefficients<sup>a</sup>**

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	4.123	0.364		11.3269	0.000
Risk mitigation strategies	0.712	0.241	0.134	2.95435	0.005
Supply Chain Reengineering Strategy	0.567	0.264	0.142	2.14772	0.038
Lean and agile strategy	0.671	0.234	0.121	2.86752	0.007
Strategic collaboration strategy	0.634	0.301	0.172	2.10631	0.042

a. Dependent Variable: Operational performance

**Source: (Researcher, 2021)**

The overall regression model was:

$$Y = 4.123 + 0.712 X_1 + 0.567X_2 + 0.671X_3 + 0.634X_4 + \epsilon$$

Businesses in the manufacturing industry in Nairobi County's industrial region benefit from having employees with higher integration skills. For every unit improvement in risk reduction measures, Manufacturing SMEs in the industrial area of Nairobi County are expected to improve their operational performance by 0.712. The Supply Chain Reengineering Strategy was shown to boost SME operational performance by 0.567 in Nairobi County's industrial region. Manufacturing SMEs in Nairobi County's industrial sector had an operational performance gain of 0.671 as a result of the lean and agile approach. Increasing manufacturing SMEs in industrial zones has a favorable influence on operational performance through the strategic partnership strategy.

# **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

## **5.1 Introduction**

This study aimed to parse out what supply chain resilience measures impacted operational performance of small and medium-sized businesses in the industrial area of Nairobi. The chapter finishes with policy recommendations, which are summarized, concluded, and endorsed. A discussion of possible research gaps as well as future directions is also given.

## **5.2 Summary of Findings**

This research major purpose was to improve the supply chain's resilience. Aims of the research included determining the effect of supply chain resilience on manufacturing SME firms in Nairobi County's industrial zone, as well as identifying supply chain resilience techniques among those firms.

Risk mitigation, lean and agile, strategic collaboration, and supplier chain reengineering are four supply chain resilience measures utilized by SME manufacturing enterprises in Nairobi County's industrial zone. Majority of respondents adopted these practices. Risk registers have been shown to aid in the allocation and sharing of risks among company partners, resulting in a better economic relationship. Using risk management techniques, it is now simpler to identify and reduce threats since a risk registry has been developed. Kenya's industrial sector has benefitted from supply chain reengineering, which has improved the sustainability of small and medium-sized firms, and supply chain reengineering has lowered operating costs by providing the supply chain.



With a lean and agile approach to production, the small-sized enterprises of Nairobi County industrial area maximize productivity and minimize cost, they identify items that make financial sense to offer by only making items available to customers that are ordered. In order to save money and ensure that business operations run smoothly, retail stores should employ as few staff as possible at all times. There has been a rapid response by Nairobi County's small and medium-sized enterprises (SMEs) in the industrial region as a result of open communication channels, a strong link between firms and suppliers, as well as shared responsibility for the battle against COVID19.

Using R squared of 0.799, manufacturing SMEs in industrial Nairobi County may credit 79% of their operational success to supply chain resilience. A result of 20.844 was calculated when compared to the 3.01 critical threshold. Risk mitigation measures ( $=0.712$ ,  $p=0.0050.05$ ) manufacturing SMEs working in the industrial area region of Nairobi County when the importance of individual components is taken into account. SMEs in Nairobi County's industrial zone saw an increase in their operational efficiency as a result of supply-chain reengineering ( $=0.567$ ,  $p=0.0380.05$ ). Because of this, lean and agile techniques have positively and significantly influenced the operational performance of manufacturing SMEs in the industrial region of Kenya ( $=0.671$ ,  $p=0.0070.05$ ). For small and medium-sized businesses in Nairobi County's industrial zone, strategic partnership strategy had a good and significant impact ( $=0.634$ ,  $p=0.042 0.05$ ).

### **5.3 Conclusion**

With a 95 percent confidence interval, the operational performance of Nairobi County's manufacturing SMEs can alter by 79.9 percent as a result of risk mitigation strategies, supply chain reengineering plan, and strategic cooperation strategy adoptions. These three

criteria account for 79 percent of the manufacturing SMEs in Nairobi County's industrial region operational efficiency. For a good correlation between the variables, the R-value is 0.839.

Supply chain resilience approaches such as risk mitigation and lean and agile strategy, strategic collaboration strategy, and supply chain reengineering were the most commonly adopted. Research on risk reduction measures found that risk registers helped to allocate and share risk, leading to improved business connections. Additionally, a risk management mindset has made it easier to identify and maintain a risk registry, making it easier to reduce risks. According to the findings, supply chain reengineering in Nairobi County's industrial sector has increased the competency of small and medium-sized firms.

#### **5.4 Recommendations**

The study recommends that all strategic and middle-level managers in small and medium-sized manufacturing firms in Nairobi County and other counties increase their investment in and adoption of supply chain resilience practices to have a significant and positive impact on their operational performance.

SMEs in Kenya are being urged to increase their investments in supply chain resilience measures in order to enhance operational efficiency as a result of the results.

Research shows that SMEs need to be prepared for a global supply chain crisis, and SMEs should think supply chain resilience in order to protect themselves. As evident in the study, the globalization of the economy introduces significant uncertainty, SMEs should quickly form a supply chain resilience strategy which can reduce risk and create stronger plans for dealing with disruptions.

### **5.5 Limitations of the Study**

In this study, small and medium-sized businesses in Kenya's industrial area were surveyed. 58 SMEs were included in this study. The results would have been more reliable and generalizable if the sample size had been larger and spread throughout Kenya

All of the factors that affect the operational performance of medium-sized enterprises aren't examined in this study. Various factors, including management, operating expenses, and more, have a role. If these concerns had been taken into account, the outcomes may have been different.

Some subjects were unable or unwilling to submit the needed information, resulting in delays. After all, the thought of finding fault had them worried. In order to alleviate these anxieties, the researcher set up early sessions and vowed to stick to a strict code of confidentiality for all responses.

Small and medium-sized manufacturing firm in Nairobi County's industrial region should only use the conclusions of this study, and data from other sectors should not be extended. You must be aware of the research's flaws if you plan to employ inferential statistical methods, however this study's results were unaffected.

### **5.6 Suggestion for Further Studies**

Focusing future research on methods that have an influence on supply chain performance widens a company's perspective on potential vulnerabilities. Number of other variables that should be taken into account in future research that aren't included in this one. For techniques of supply chain resilience outside of Nairobi, research into wholesale and internet models may be advantageous to increasing supply chain stability in these lesser

reached areas. When looking at supply chain resilience measures, researchers might also look at how these methods were adopted by other industries throughout the crisis. More supply chain resilience approaches should be investigated in future research than those addressed in this one.

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## **APPENDICES**

### **Appendix I: Letter of Introduction**

Dear Respondent,

#### **REF: REQUEST FOR YOUR PARTICIPATION IN MY RESEARCH**

#### **PROPOSAL**

I am Martin Muthuri Gitonga, a master of business student in the University of Nairobi. My research is part of my MBA degree requirements and is focused on supply chain resilience and operational performance of manufacturing small and medium enterprises operating within Industrial area Nairobi County. You've been chosen to participate in the research because your business is in the study's focal region. Please complete the questionnaire included with this letter and return it with the requested information. Your personal information is safe with us. Thank you so much for taking the time to participate.

Thank you.

Yours faithfully,

Martin Muthuri Gitonga

## **Appendix II: Research Questionnaire**

This questionnaire will only be used to acquire academic information. You may rest assured knowing that any information you provide us will be kept strictly private. Please try to provide the correct answers.

### **SECTION A: BACKGROUND INFORMATION**

1. Name of the organization (optional)

.....

2. Please indicate the SME's Ownership

Fully local            [   ]

Local / Foreign    [   ]

3. How long has your SME been in operation?

a)      Less than 2 years            [   ]

b)      2-4 years                            [   ]

c)      5-8 years                            [   ]

d)      8-10 years                          [   ]

e)      More than 10 years            [   ]

4. Please indicate your SME legal formation

a)      Sole proprietorship            [   ]

b)      Partnership                        [   ]

c)      Limited company                [   ]

**SECTION B: Extent of adoption of supply chain resilience practices**

5. Companies in the manufacturing industry have used a variety of strategies for supply chain resilience, including the ones listed below: What actions have you done to apply the following best practices in your company? Please try to provide the correct answers (where:

1- to a very small extent, 2- to a small extent, 3- to a medium extent, 4- to a large extent and 5- to a very large extent). Where suitable, tick the box.

<b>Statements</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Risk Mitigation Strategies</b>					
Risk management has enhanced the identification and maintenance of a risk registry for effective risk management.					
With the collaboration of business partners, risk registers have been found to help allocate and share risks, resulting in improved commercial connections.					
Through performance contracts, firms have been able to better protect themselves against unanticipated threats by sharing risk with one another.					
It has become simpler to detect and reduce risks because of the popularity of a risk management attitude					
Risk delegation, risk avoidance, and a culture of risk-taking contribute to greater outcomes.					

The organization's staff is proactive in detecting and minimizing possible hazards as they occur.					
<b>Supply chain reengineering</b>					
Supply chain reengineering has improved the organization's competence.					
Lower operational costs have been achieved as a consequence of outsourcing work to enterprises with specialized knowledge as a result of supply chain restructuring.					
The suspension of supply from abroad necessitated the hiring of new suppliers.					
Reengineering of the supply chain has resulted in a specialization of businesses.					
<b>Lean and Agile</b>					
Use delivery vehicles and distribution centers to their maximum capacity to save money and maintain a constant process flow.					
Increased revenues resulting from the deployment of online stores in the shadow of supermarkets.					
Retail establishments should restrict the number of employees working at all times to reduce the risk of transmission of disease.					

If a product cannot be provided at a reasonable price, it is deemed unprofitable and removed from circulation until it can.					
Restrict purchases of non-essentials to guarantee that everyone has access to the requirements					
<b>Strategic collaboration</b>					
Open channels of communication have made the fight against COVID 19 a shared responsibility for all employees.					
Because of open communication lines, suppliers were able to promptly react to changes in their ability to offer.					
Because of the collaboration of competitors, supply and price have been more successfully handled.					
Authorities have worked together to ensure the enforcement of curfew legislation on time.					
Since the firm and its suppliers have a strong relationship, information sharing has become easier.					

**SECTION C: Operational performance outcomes from the adoption of supply chain resilience practices in operations of the organization.**

6. The following are some of the benefits of incorporating supply chain resilience approaches into a company's operations. Please try to provide the



correct answers. It is reasonable to use a scale of 1 to 5. (where: 1- strongly disagree, 2- disagree, 3- not sure, 4- agree, 5- strongly agree). When it's suitable, tick the box.

<b>Statements</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>customer perspectives</b>					
Goods returned by customers					
Number of new customers					
Improved customer relationship					
customer requirement in Product design					
<b>Internal Business Process</b>					
Improved manufacturing process					
Improved inventory management					
Increased flexibility					
Improved delivery					
<b>Learning and growth perspective</b>					
Regular training to employees					
Increased information capital					
Employees satisfaction and attitudes					
Employee performance					
<b>Financial perspective</b>					
Increased profit					
Increased revenue					
Improved use of assets					
Improved cost structure					

Others (please specify)

.....

**THANK YOU!**

### **Appendix III: List of Manufacturing SMEs at Industrial Area**

1. Africa Tea Brokers Ltd
2. Alpha Woolens Ltd
3. Anurag Brothers Ltd
4. Apple Coolers Ltd
5. Asl Credit Ltd
6. Auto Aunciliaries Ltd
7. Avtech Systems Limited
8. Biodeal Laboratories Ltd
9. Capital Paints ltd
10. Chemical and School Supplies
11. Chemserv Cleaning Services
12. Chui Manufacturing Co.
13. Complast Industries Ltd
14. Computer Planet Ltd
15. Coninx Industries Ltd
16. Creative Edge Ltd
17. Dalco Kenya Ltd
18. FaramEa Ltd
19. Furniture Elegance Ltd
20. Ganatra Plant & Equipment Ltd
21. General Aluminium Fab Ltd
22. Gina Corporate Communications

23. Highland Forwarders Ltd
24. Joyknitts Garments Ltd
25. Kandia Fresh Produce Suppliers
26. Kentons Ltd
27. Keppel Investments Ltd
28. Laytons Branding Ltd
29. Manpower Kenya Ltd
30. Marketpower International Ltd
31. Master Power Systems Ltd
32. Mbokoni Transporters Ltd
33. Midco Ltd
34. Monte Services Ltd
35. Optiware Communications Ltd
36. Oriental Products Ltd
37. Panesar's Kenya Ltd
38. Powerpoint Systems (E.A Ltd
39. R & R Plastic Ltd
40. Radar Ltd
41. Rupra Construction Co.
42. Safety Tech Ltd
43. Sai Pharmaceuticals Ltd
44. Satguru Travel and Tours
45. Silverbird Plus

46. Specialised Hardware
47. Sujuzi Agencies
48. The Phoenix Ltd
49. Toolcrafts Limited
50. Transport & Lifting Services
51. Tropikal Ltd
52. Tyre king Ltd
53. Union Logistics Limited
54. Vajra Drill Ltd
55. Viva Productline Ltd
56. Wangezi Enterprises
57. Warren Enterprises Ltd
58. Waumini Insurance Brokers Ltd

***Source, Kenya Manufacturing Association (2020)***