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Strategies to Minimize the Impact of Supply Chain Risk on Business Performance

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Walden University

College of Management and Technology

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Jonathan Opata

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Walden University
2015

Abstract

Strategies to Minimize the Impact of Supply Chain Risk on Business Performance

by

Jonathan Opata

MBA, Southern New Hampshire University, 2013

BSc, Strayer University, 2011

BA, University of Cape Coast, 2008

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

September 2015

Abstract

The exposure of companies to turbulence, uncertainty, and vulnerability in their supply chain results in supply chain disruption with an estimate cost of \$10 million for each supply chain disruption. The purpose of this case study was to explore the strategies supply chain managers use to mitigate supply chain disruption on business performance in a pharmaceutical company in Maryland. Contingency theory of fit formed the conceptual framework for this study. Participant perceptions were elicited in interviews with 11 supply chain managers regarding strategies to mitigate risks associated with supply chain disruptions. Data from interviews and supporting documents were processed and analyzed using data source triangulation to discern emergent themes. Three main themes emerged: (a) supply chain design, planning, and forecasting; (b) flexible and multiple supplier base; and (c) resource allocation and demand management. The implications for positive social change include the potential of reducing supply chain risk, which could lead to lower prices of products for consumers, increased stakeholder satisfaction, and a higher standard of living.

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Dedication

This dissertation is dedicated to the Almighty God for He makes ALL things beautiful in His time. Education is worthless except we use it to better our lives, families, the community we serve, and the world as a whole.

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Section 1: Foundation of the Study

Supply chain disruption is a problem in the globalized marketplace, but it is also increasingly significant for business continuity. As such, it has become an area of significant concern in some organizations (Clark, 2012). Supply chain management involves the coordination among retailers, distributors, storage facilities, and suppliers that engage in the production, delivery, and sale of products to consumers (Ganesh & Nambirajan, 2013). Consequently, supply chain risk assessment is essential to business operation (Clark, 2012). Increasingly, managers have recognized the importance of efficient and effective supply chain management, and risk assessment is critical to functional performance as measured by cost, quality, and flexibility (Clark, 2012).

Supply chain experts have started to focus on supply chain strategy, planning, and operations to improve service and flexibility (Ganesh & Nambirajan, 2013). Supply chain managers are reducing the cost of the supply chain process to be competitive and deliver the best value (Ganesh & Nambirajan, 2013). However, managing supply chains in a competitive and turbulent market is challenging because of unforeseen circumstances (Clark, 2012). The frequent occurrences of natural disasters, labor disputes, and political changes within the areas of operation of the supply chain are risks that supply chain managers must minimize (Clark, 2012). Due to these uncertainties, surrounding market globalization changes may occur in customer requirements (Clark, 2012).

Supply chain managers can help increase the efficiency of physical, informational, and financial flows when there is an opportunity for joint problem-solving across supply chain partners to implement best practices (Wakolbinger & Cruz, 2011).

The efficiency includes advancements in technology as contributing factors to the development of new attitudes toward the supply of goods and services (Li & Chan, 2012). To identify and manage disruption risk, managers have focused on the extended supply chain for information sharing, as this is vital for the identification and assessment of potential supply chain disruptions (Wakolbinger & Cruz, 2011). The failure of information exchange in the supply chain potentially results in disruptions for all partnering companies searching for and extracting raw materials (upstream) and actual sale of that product to other businesses, or private individuals (downstream) (Bouncken, 2011). The consequent and unexpected variations in capacity constraints, product shortages, and natural catastrophes emerge as problems in the supply chain (Yang & Yang, 2010).

Background of the Problem

Supply chain management becomes increasingly complex when operations in the delivery of products are interrupted (L. Zhang et al., 2011). Supply chain disruption affects sales and increases the cost of transportation (Porterfield, Macdonald, & Griffis, 2012). Managers who can reduce supply chain risks make their businesses more resilient, thus enhancing the company's competitive position, supporting growth, and producing measurable returns (Pettit, Croxton, & Fiksel, 2013). To reduce the uncertainties in the supply chain, managers are taking risk-adjusted methods by looking at supply chains to improve fundamental areas in the downstream and upstream of the chain (Clark, 2012; Pettit et al., 2013). Because a supply chain is prone to costly disruptions, managers need

to develop techniques to minimize the effect of such disruptions, including implementing supply chain strategies (Carvalho et al., 2012; Wieland & Wallenburg, 2012).

Supply chain experts are using supply chain performance, and competitive strategies to reduce costs and to focus on core value-adding activities to address complexities (Sharma & Bhat, 2011). Supply chain managers promote risk strategy opportunities for joint problem-solving across supply chain partners. Moreover, these managers are implementing best practices in the extended supply chain for identifying and managing disruption risks (Hollstein & Himpel, 2013). Because supply chain operation is an essential aspect of customer satisfaction in a dynamic environment, procedures for managing supply chain risk are necessary to support both long- and short-term strategic decision-making (Yao, 2013). Managers are adopting risk-mitigating strategies within the supply chain because of the increasing complexity and disruptions in the system (Wakolbinger & Cruz, 2011). However, given that a supply chain network is difficult to track, trace, and monitor, managing the flow of products become problematic (Wildgoose, Brennan, & Thompson, 2012).

Problem Statement

Due to the global financial crisis in 2008, supply chain managers have increased implementation, cost-saving, and cost-cutting strategies to avoid supply chain disruptions (Gurnani, Ray, & Yunzeng, 2011). The disruptions were detrimental to operational performance due to the associated loss of profitability, shareholder wealth, and organizational reputation (Schotter & Thi My, 2013). The estimated cost of one supply chain disruption was \$10 million (Wildgoose et al., 2012).

The general business problem was the failure to manage supply chain disruptions, which result in economic and financial losses to stakeholders. The specific business problem was that some supply chain managers are unaware about how to develop strategies to mitigate the impacts associated with supply chain risk.

Purpose Statement

The purpose of this qualitative case study was to explore strategies implemented by successful managers in pharmaceutical companies to reduce the impact of risks in the supply chain on business performance (Frels & Onwuegbuzie, 2013). The research design was a case study designed to the understanding and gathering of insights into the participants' strategies used to reduce specific risks that affect the supply chain (Yin, 2012). The targeted population consisted of risk and supply chain managers in a pharmaceutical company in Maryland. I used semistructured interviews and document reviews to explore the strategies to mitigate the impact of risk on supply chain performance. The implications for positive social change included the potential to provide a smooth and uninterrupted flow of products to customers in the right quantity and at the right price. The value added given these more affordable prices may improve the lives of consumers, who will have a higher standard of living and will thus be more satisfied.

Nature of the Study

Because of the exploratory nature of the research question, the qualitative method was the best fit for this study. The type of information needed involves the participants' experiences surrounding the phenomenon and the nature of the sampling (Yin, 2009). I

used a qualitative method to explore the different risk issues relating to the supply chain (Frels & Onwuegbuzie, 2013). The qualitative method is useful when the researcher does not identify key variables (Yin, 2012). Since I was not interested in examining the relationship between variables or in trying to test a hypothesis, the qualitative method will be suitable for the research. The quantitative method was not appropriate for this study because the research does not seek to examine and compare (Frels & Onwuegbuzie, 2013). Likewise, the mixed method was also not appropriate for this study, as these are necessary when a researcher wants to explore and examine both the qualitative and quantitative aspect of a research question (Mertler & Charles, 2008).

The five qualitative designs include (a) case study, (b) grounded theory, (c) narrative research, (d) participatory action research, and (e) phenomenology (Naidu & Patel, 2013). Researchers who employ case study designs find solutions and justify research findings by using multiple data sources (Ellis & Levy, 2009). By using the case study, I explored the phenomenon under study to understand this complex issue (Yin, 2012). The use of case study research was relevant for managers to determine the risk issues in the supply chain, and also to illustrate discrepancies and system failures and to draw attention to strategies used by managers in organizations (Yin, 2012). Narrative researchers collect data in a chronological way to develop the skills used in problem-solving (Everett & Barrett, 2012).

The grounded theory involves a large number of members; the researcher initiates the research process and gathers the participants' views of a particular event via a theoretical framework (Reiter, Stewart, & Bruce, 2011). The grounded theory was not

appropriate for this study because the goal of the research is not to develop any theory, but rather to explore already existing ones. Likewise, as the research question for this study does not have a primary central phenomenological question, the phenomenological study was also not relevant (Marshall & Rossman, 2011). The phenomenological research was not appropriate for this study because the researcher does not intend to describe and interpret the experiences of the participants to a particular event from individual perspectives (Marshall & Rossman, 2011). Ethnographic researchers often generate hypotheses at the end of the research, since the researcher changes the design according to necessity identified during the research (Yin, 2012).

Research Question

Every organization faces risks, and the impact of those risks on the organization's supply chain affects the timely movement of supplies to consumers. Hence, the primary research question for this study was what strategies do managers use to reduce the impact of supply chain risk on business performance based on internal and external structures?

Based on the following subquestions, I narrowed the scope of the research:

Subquestion 1: How would managers identify strategies to reduce the supply chain risk in business performance?

Subquestion 2: How would managers implement strategies to reduce the supply chain risk in business performance?

Subquestion 3: How would managers determine the efficiency of a strategy to reduce the supply chain risk in business performance?

Subquestion 4: How would managers change the strategy implemented to reduce the supply chain risk in business performance?

Interview Questions

The objective of interviewing was to gather in-depth information from supply chain managers who have firsthand knowledge of the strategies that can help mitigate the impact of supply chain risk on business performance. By developing these interview questions, I gained insight into the problems:

1. How does your company identify and select a strategy that aligns with internal and external resources to reduce supply chain risk?
2. Do you have initial steps that you take to identify potential risk in a supply chain?
3. How do you select and implement a risk mitigation strategy on the identified and selected supply chain risk?
4. How do you as a manager adopt a strategy to address supply chain risk with your suppliers?
5. How does your organization's resources/structure determine the kind of strategy you apply to reduce supply chain risk on business performance?
6. What systems do you have in your company to support supply chain risk implementation?
7. How do you select, interact, and align strategies for mitigating supply chain risk?
8. How do you apply a different set of strategies for mitigating supply chain risk?
9. What are the current practices your company uses to implement consciously and manage the impact of supply chain risk?

10. How do you determine the most effective internal organizational design or responses to supply chain disruption?
11. Under what circumstances do you apply different strategies to the same problem in the supply chain?
12. Do you have any additional information, documentation, or processes that will help in this research study?

A copy of the interview questions is included in Appendix B.

Conceptual Framework

The fundamental theory underlying the research was the contingency theory of fit, which provides a foundation on which to prepare for and to reduce the degree of supply chain disruptions (Van de Ven & Drazin, 1985). The premise of the contingency of fit theory is that outcome is a *fit*, or result, of the use of multiple factors, and an essential part of the framework was that the theorist establishes bypasses of the disruption to minimize the effect of the disruption (Talluri, Kull, Yildiz, & Yoon, 2013).

In terms of contingency theory, theorists have posited that the appropriateness or effectiveness of risk mitigation strategies is contingent upon the internal and external environments; thus, there is no single strategy for solving a problem (Van de Ven & Drazin, 1985). Moreover, contingency theorists have observed via actual disruptions that when a response is organized and efficient, the effect of the disruption can be minimal (Van de Ven & Drazin, 1985). Similarly, supply chain theorists postulated that, by focusing on management of information linkages, fund flows, and the management of material flows, organizations can achieve sustained competitive advantage and business

performance (Talluri et al., 2013). The supply chain disruptions mitigate the damage and alleviate the confusion (Van de Ven & Drazin, 1985). Hence, for the efficient management of supply chain disruptions, managers have to design a response effort with supply chain integration (Talluri et al., 2013).

Operational Definitions

Competitive advantage. Competitive advantage is the capability of an organization to create a defensible position over rivals (Diugwu, 2011).

Performance and success. Performance and success are the profitability of the business and have a link to the firm's financial successes (Rosse-ruyken, Wagner, & Erhun, 2010).

Risk. Risk is the potential disturbance with the negative consequences of an event (Sharma, & Bhat, 2011).

Risk mitigation. Risk mitigation is the level of exposure to uncertainties that leaders must understand and effectively manage with strategies to achieve business objectives and create value (Diabat, Govindan, & Panicker, 2012).

Strategy. Strategy is a process of organizing, decision-making, and leadership to align different antecedents in various environments to achieve results (Grötsch, Blome, & Schleper, 2013).

Supply chain management. Supply chain management is an integrated approach of planning and executing operations of the supply chain with the purpose of satisfying customer requirements (Ganesh & Nambirajan, 2013).

Supply chain responsiveness. Supply chain responsiveness is the capability of promptness and the degree to which the supply chain managers can address changes in consumer demand (Sinkovics, Jean, Roath, & Cavusgil, 2011).

Supply chain risk management. Supply chain risk management is a collaboration between partners to deal with risks and uncertainties in logistics-related activities in the supply chain (Chen, Sohal, & Prajogo, 2013).

Supply chain strategy. Supply chain strategy is the understanding, development, and implementation of a plan to achieve results (Hajdul & Kolinska, 2014).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions in research are ideas the researcher believes to be valid, but proof of the ideas does not exist (Ellis & Levy, 2010). The data I collected related to supply chain risk strategies. The following were the assumptions. First, obtaining primary data from the company was difficult. The company was private, and the employees were reluctant to give any information specific to that company.

Acquiring questionnaire responses was the most difficult part of data collection because the respondents were not very much willing to give an opinion concerning sensitive supply chain issues. I submitted a clarification form to the members to explain the purpose of the research and that any respondent can withdraw at any time. I provided a consent form for approval (see Appendix D), and participants' information remained anonymous. The guaranteed participant anonymity eliminated any privacy concern on the part of the members. Additionally, the integrity of the interview process was an

assumption. I assumed that the participants would give honest answers to the questions I asked. The accuracy of the themes, coding, and the analysis of the data were assumptions. I explained the concepts to the participants before the interview so that the participants understood the requirements of the study (Marshall & Rossman, 2011). I assumed that the members answering the questionnaire provided honest and unbiased answers based on their experiences in the field of supply chain risk. Additionally, I assumed that participants have knowledge of supply chain risk at each level of the supply chain process.

Limitations

Limitations of the study include the internal and external factors that affect the reliability and the validity of the research (Ellis & Levy, 2010). The two sources of limitation in the research were the problems that the researcher experiences in conducting the study, and how the researcher conducted the study (Ellis & Levy, 2010). The limitations also included possible changes in the participants' behaviors due to my presence in the face-to-face meeting. Also, workload limited the number of participants willing to participate. However, I minimized the limitations by giving notice to members so that the participants can have available time to respond to the interview. I ensured that members realized that my presence should not influence any response the participants want to give. Moreover, the selected case study design was a limitation.

Delimitations

Delimitations are the boundaries of the study or the things that the researcher intends to accomplish (Ellis & Levy, 2009). Delimitations are (a) location of the study,

(b) sample population, and (c) sample size. The study sample population involves full-time supply chain managers who conduct business within Maryland. I selected the participants from a pharmaceutical company in Maryland. A participant sample size of 10+3 was satisfactory in qualitative studies (Francis et al., 2010); hence, my targeted total participant pool size was 10+3. I used chain purposeful sampling to identify participants to achieve appropriate, detailed understanding and insight after I completed enough interviews to achieve sufficiency and saturation (O'Reilly & Parker, 2012).

Attaining the saturation point presents a challenge to qualitative researchers, especially in the absence of explicit guidelines for determining data or theoretical saturation (O'Reilly & Parker, 2012). Saturation was essential to knowing when enough data have been collected and, therefore, has far-reaching implications for research designed to produce a theory transferable from the collected interview data (O'Reilly & Parker, 2012). In this study, I reached saturation after 11 interviews. The sample sufficiency and saturation are essential steps in determining an adequate sample size for the study (Rubin & Rubin, 2012). I considered the downstream and upstream segments of the supply chain because the risk involved in the upstream and downstream are of a more flexible nature and are thus easier to analyze (Childerhouse & Towill, 2011).

Significance of the Study

This research was necessary to understand the impact of supply chain risk on business performance, to improve supply chain service levels, and to reduce logistical cost. Supply chain practitioners in the pharmaceutical industry may improve supply chain performance in terms of service level and supply chain cost through this research.

Practitioners may gain an understanding of reliable strategies and tools for mitigating supply chain risk at different levels within the supply chain to enhance business performance. The following subsections include the contribution to the business practice and the implication for social change.

Contribution to Business Practice

The implications of this research for business practice involved how to minimize the impact of supply chain risk on business performance. The research was indicative of how supply chain managers used risk mitigation practices, which could allow managers to operate with high-performing standards. Practitioners could apply the principles and the findings from this study to formulate strategic plans that helped to minimize the impact of supply chain risk to ensure constant and uninterrupted supply of pharmaceutical products to health facilities. The information collected during the analysis phase was about making decisions in improving achieving cost, time, and performance objectives in the whole supply chain. Managers used company resources to minimize the uncertainties of supply chain risk on business performance. As applied to the practice of business, the benefits of this study included increased understanding regarding the different strategies supply chain managers used to mitigate risk for business performance. By undertaking supply chain resilience and reducing the impact of risk, supply chain managers in pharmaceutical companies learned about the potential disruptions in applicable operations to help gain a competitive advantage in the market.

The implication for business practice was that companies' leaders implemented supply chain risk mitigation strategies that had an impact on the relationship between

suppliers for supply chain responsiveness. Managers created a higher level of competitive advantage for the industry in terms of lower prices, higher delivery dependability, higher-quality products, innovation, and time to market. Business managers generated revenue and mitigated potential risks that negatively affected a product getting to market on time (Dyckman, 2011).

Implications for Social Change

The implications of the study for positive social results involve how efficient mitigation of supply chain risk can help minimize supply chain cost and improve customer satisfaction through the continuous supply of pharmaceutical products. Through this research, managers can implement best strategies and develop principles to improve efficiency for a sustainable supply chain. Managers can also improve the quality of life for customers with lower incomes because of reduced costs (Sekip Altug & van Ryzin, 2014). Disruption strategies minimize the impact of supply chain risk on business performance, which results in improvements in prices and quality standards from the bottom-up through increased worker empowerment and involvement (Yao, 2013). Stakeholders can gain participation among managers seeking to demonstrate a commitment to responsible supply chains.

Supply chain risk mitigation is good for consumers, who develop voluntary sustainability standards for commodity production that will be cost-effective, which may result in an increase in revenues and share values. The quality of life for consumers and corporate social responsibility are principles of social change. Consumers can enjoy lower prices because of an improved supply chain strategy to management risk (Isa,

2011). The value added in terms of affordable prices may improve the lives of consumers since consumers will have a higher standard of living because products will be at an affordable price. The mitigation of this supply chain risk will improve stakeholder engagement, which is vital to community development.

A Review of the Professional and Academic Literature

I used EBSCOhost, ProQuest, and SAGEjournals in the Walden Library database to get all scholarly peer-reviewed articles. The EBSCOhost and the Google Scholar websites include articles that relate to my research study. I used a Boolean phrase search to look for key terms, such as (a) *supply chain management*, (b) *supply chain disruption*, (c) *supply chain mitigation*, (d) *supply chain risk*, and (e) *supply chain cost*.

I investigated the problems surrounding supply chain disruption, and I have used relevant articles to explain the intent of the study. The purpose of the study was to explore the strategies managers of successful pharmaceutical companies are using to mitigate the impact of supply chain risk on business performance. The information in the literature is essential in showing that there are disruptions in the supply chain that can affect business performance. Through a literature review, I provided a comprehensive approach to explore the strategies managers are using to mitigate supply chain risk on business performance. The themes relevant to the study were part of the literature review.

The literature reviewed consisted of 167 peer-reviewed articles, and 95.2% of the articles had their date of publication between 2011- 2015. The literature reviewed consisted of theories that are relevant to (a) managing risk in the supply chain, (b) supply chain disruption and information technology, (c) supply chain mitigation, (d) supply

chain risk, and (e) supply chain cost. The commonly identified supply chain strategies included (a) supply chain collaboration, (b) information technology, (c) supplier evaluation, (d) sourcing, and (e) contingency planning. Finally, all the relevant concepts were in the review of the literature.

Relevant Concepts

I conducted research on various theories to gain an understanding of the strategies to mitigate the impact of supply chain risk on business performance. The fundamental theory underlying the research was the contingency theory of fit, which provides a basis on which to prepare for and to reduce the degree of supply chain disruptions (Van de Ven & Drazin, 1985). Contingency theorists assert that an outcome is a fit or result of the use of multiple factors, and an important part of the framework is that it establishes bypasses of the disruption and reduces the effect of the disruption (Talluri et al., 2013). The factors fit when internal and external strategies, consistent areas of a construct, perspective, and structure establish feasible structural alternatives for a solution (Van de Ven & Drazin, 1985).

Mitigating supply chain risk is an essential component of the total risk management strategy of an organization. In the context of contingency theory, theorists have posited that the appropriateness or effectiveness of risk mitigation strategies is contingent on the internal and external structures, and that there is no one-size-fits-all strategy (Van de Ven & Drazin, 1985). Even though there are risk management areas with different tools and techniques for effectively evaluating and managing supply chain disruption, most are not detailed. In the application of the contingency theory model to

the supply chain, the researcher will understand how different strategies can fit mitigating supply chain risk to achieve the best performance (Talluri et al., 2013).

Since there is no single best way of organizing supply chain to manage uncertainties and risks, firm-to-firm risk comparisons are therefore the result of demands and attributes in the environment that tend to be specific to the organization (Van de Ven & Drazin, 1985). The framework is useful in supply chain disruption, where theorists have focused on the management of information linkages and fund flows in addition to managing material flows to gain sustained competitive advantage and business performance (Talluri et al., 2013). Researchers can use contingency theory in developing a framework for improving long-term response to supply chain disruptions in the areas of financial, operation and system risk (Talluri et al., 2013). In supply chain risk, understanding the contingency theory of fit can help increase the response level to achieve supply chain security/stability (Talluri et al., 2013). The contingency theory of fit is essential in mitigating consequences of supply disruption, preparing for, and minimizing the residual effect of the disruptions to gain competitive advantages (Talluri et al., 2013).

Under such a premise, the theory is the basis for building a collaborative communications network to manage efficiently and mitigate the disruption to minimize the impact on business performance (Talluri et al., 2013). This study focuses on the application of contingency theory of fit strategies in the response to understand different methods of mitigating supply chain risk (Datta & Christopher, 2011). The fit among resources and strategies is a critical issue for organizations to manage any risk that may

rise in the supply chain operation (Datta & Christopher, 2011). Since supply chain integration is an essential strategy for dealing with quick risks issues disrupting the supply of products, services and equipment (Datta & Christopher, 2011), a contingency fit theorist can help the strategy working smoothly (Talluri et al., 2013).

As there are contingency effects in supply chains, contingency theory is essential because the theory aids in ascertaining if the mitigating risk in the supply chain demands different strategies in different situations. The concept underlying the contingency theory is that supply chain managers use different sets of strategies at different times to minimize supply chain risk (Talluri et al., 2013). The concepts of selection, interaction, and systems may help in understanding these strategies. Selection is associated with the organizational context and the available response strategy, since the root causes of supply chain risk determine the selection, interaction, response, and alignment to the strategy.

The concepts of selection, interaction, and response drawn from the contingency theory of fit may be useful in proving that managers can use different strategies to mitigate different supply chain risks to enhance business performance (Drazin & Van de Ven, 1985). In every supply chain, there are risks with root causes; and to select a supply chain strategy, it is essential to understand the causes and select the best fit to minimize the risk (Talluri et al., 2013). A further concept, which is relevant to contingency theory, is alignment. In the context of alignment, Drazin and Van de Ven (1985) argued that fit or alignment is an essential issue in a contingency theory-based model, and an organization should develop a strategy that aligns its strategic choices with its environmental needs. I posited that, if the alignment were in place, it would lead to

improved business performance. In the context of supply chain uncertainty, it can be argued that the performance of an organization relates to the alignment between sources of uncertainty and organizational resources (Datta & Christopher, 2011). Managers used different strategies to minimize supply chain risk based on the internal and external structures, and the business continuity plan of the organization (Talluri et al., 2013).

Grötsch et al. (2013) argued that, in the concept of selection and interaction, there is no suitable accounting system, which applies equally to all organizations in all circumstances. Instead, the particular characteristics of a suitable accounting system would depend on the specific situation in which an organization finds itself. Contingency theorists have suggested there is no general set of choices that is pre-eminent for all businesses; every best decision within an organization is reliant on internal and external factors, and the best way to put in order depends on the nature of the business environment (Datta & Christopher, 2011). The contingency theorist holds that performance reflects how well organizational resources align with the corresponding business environment. I based my conceptual framework on contingency theory because managers that function under risky situations will execute mitigation strategies whose suitability and effectiveness are contingent on the internal and external strategies (Singhal, Agarwal, & Mittal, 2011).

Researchers have utilized contingency theory in a similar view on risk mitigation by identifying internal and external risk need alignments and selection with different of strategies to resolve a problem (Datta & Christopher, 2011). In terms of the applicability of contingency theory in the context of selection, interaction, and response, I anchored

my work in the domain and evaluated different mitigation strategies with the premise that utilization of different strategies is essential in mitigating supply chain risk for business performance.

Overview and Discussion of the Literature

The unexpected variation and disruption in supply chains in terms of risks, such as natural disasters, have affected supply chain management and business performance (Yang & Yang, 2010). The increasing uncertainty in the business environment has increased the vulnerability of the supply chain (Evrard-Samuel, 2013). Managers have started using distribution and logistics partners, resulting in a very complex supply network leading to risk exposure (Evrard-Samuel, 2013).

Supply chain managers face both commercial and security threats; therefore, they need to utilize innovative resources to manage their risk strategies to stay competitive (Lassar, Haar, Montalvo, & Hulser, 2010). The risks in the supply chain network deteriorate in supply chain performance in terms of efficiency and responsiveness (Sodhi, Son, & Tang, 2012). Supply chain managers have to deal with an ever-evolving set of risks because of increasing globalization and the development of a broad range of products and services (Sodhi et al., 2012). To satisfy customers' specific needs, managers face higher vulnerability in the supply chain for a smooth flow of operation (Thun et al., 2011). Economic instability and a lack of awareness in managing supply chain risk is a concern for most businesses managers, and mitigating the effects are the primary objectives of survival in the market (Sodhi et al., 2012).

Supply chain uncertainty was a problem that managers in the supply chain field are encountering because of the complexity of global supply networks (Simangunsong, Hendry, & Stevenson, 2012). Supply chain managers can reduce supply chain uncertainty by incorporating a supply chain strategy into the supply chain system (Simangunsong et al., 2012). The concepts of alignment and contingency can aid in developing a model of supply chain management via the literature review to show the relationship between the sources of uncertainty and management strategies (Simangunsong et al., 2012). Managers need to understand the visibility of risk in supply tiers, which could be a threat to supply chain selection (Tse & Tan, 2011). There are hidden quality risks in the multi-tier global supply networks, which could include raw materials, the processes of manufacturing, and logistics suppliers (Tse & Tan, 2011).

Mitigating Supply Chain Risks

There are situations in which supply chain disruptions can occur, and these must be part of risk planning so that these supply chain disruptions can get an adequate response (Diabat et al., 2012). Supply chain risk management involves collaboration among partners to control the risks and uncertainties in logistics-related activities (Wildgoose et al., 2012). Managers can use various approaches to identify such potential disruptions in the supply chain (Yang, Wacker, & Sheu, 2012).

Additionally, managers use supply chain tools as indicators to measure and monitor companies' performances when there is a disruption (Cagliano et al., 2012). Operational risks and disruption risks are part of supply chain management (Tang, 2011). These uncertainties include customers' demand, uncertain cost of supplies, earthquakes,

and other natural disasters, and economic crises such as devaluation of the currency, which can disrupt cost (Tang, 2011).

Managers need to have effective risk management tools, which require an assessment of both the focus of control and the range of alternative control actions to respond to any disruption (Franklin, 2011). Various types of demand uncertainties exist in the supply chain network that can delay the smooth flow of goods and services to consumers (Yang & Yang, 2010). One solution is a normal accident theory, which means that aspects of catastrophic accidents enable the use of postponement as a means of mitigating supply chain disruptions (Yang & Yang, 2010).

Postponement method is a decision-making tool for managers to reduce supply chain disruptions. Also, there is also a relationship between supply chain context and complex supply networks. After a rigorous examination of the robustness of the supply networks by distinct network components, Nair and Vidal (2011) observed two operational mitigation strategies that a buyer can use to minimise against any risk disruption.

Tools for Managing the Supply Chain

Researchers have conducted a qualitative analysis that involved extensive literature reviews, including two case studies of six major global Brazilian companies (Dolci & Macada, 2014). The study consisted of two companies: one involved in the automotive industry and another involved in electronics. The top executives of both businesses, both with considerable experience in the supply chain area, had a great deal of knowledge of information technology (IT) investments (Dolci & Macada, 2014). The

survey instruments consisted of IT investments, supply chain governance, and supply chain performance (Dolci & Macada, 2014). Managers can measure supply chain performance by using the following instruments: (a) financial, (b) operational, and (c) market (Dolci & Macada, 2014).

Information technology innovation in asymmetric environments of the supply chain process is important parts of supply chain management (Michalski, Yurov, & Botella, 2014). The supply chain managers uncovered the dynamic of the relationship between trust and innovation and the increasing trend in supply chain organizations to implement prevention policies to reduce the impact of inherent risks (Michalski et al., 2014). The hidden risks of risk management included random risk assessment workshops and annual self-evaluation checklists, which could become another administrative burden taken on by employees (Diabat et al., 2012).

There are ways to manage the different types of supply systems, which include a contingent approach to network management based on product distinctions (Li & Chan, 2012). To get a picture of the existing supply chain categories and the strategic management literature related to innovation, there is a new supply system categorization based on product type (Li & Chan, 2012). The distinct supply system types identified were those for innovative, unique (rare exceptions to the typical offer), and functional products (Li & Chan, 2012). There are also management differences, including the nature of information and knowledge sharing; the relative emphasis on cost, service, quality, and innovation; and system complexity (Li & Chan, 2012). The network quality and

innovation are opposed to functional systems where cost and service are more essential according to managers (Li & Chan, 2012).

Existing interorganizational relations researchers have inadequately investigated the management of technological services, particularly those involving transactions of customized services rather than products (Co, David, Feng, & Patuwo, 2012). Four dimensions distinguish technology services. First, technology services often require specialized capabilities distributed across organizational boundaries of products (Co et al., 2012). Second, technological services, by nature, are highly uncertain products (Co et al., 2012). Existing interorganizational relations theories, transaction cost theory, capability theory, and institutional theories are essential to identify new research paths and products (Co et al., 2012). However, there is diversity in the levels of knowledge concerning dispersion, uncertainty, interdependence, and path dependency across technology service products (Co et al., 2012).

The Challenges of Global Sourcing and Vulnerability

The concept of the supply chain has grown beyond a succession of a product from the supplier to the manufacturer that involves a complex network of interdependent business chains (Wagner & Neshat, 2012). In a changing environment, supply chain managers find it difficult to identify the location of risk because the risk is inherent in every activity within the system (Wagner & Neshat, 2012). Power outages, natural disasters, terrorism, and bad management may all severely disrupt supply systems (Wagner & Neshat, 2012). Managers in organizations have created, or became part of,

supply networks that are increasingly vulnerable to a large number of risks (Omar et al., 2012).

Supply chain managers needed loss mitigation measures because of globalization and increased competition (Omar, Davis-Sramek, Myers, & Mentzer, 2012). Enhanced efficiency enables significant cost reductions, and low inventory levels lower the risk of product design obsolescence, which are both aspects that are vital to a supply chain (Silbermayr, & Minner, 2014). However, increased system vulnerabilities and disruptions of the supply chain could interrupt the functionality of the entire supply chain (Omar et al., 2012). The use of a reliable supplier during a shortage or using a direct supplier can improve reliability (Xia, Ramachandran, & Gurnani, 2011). Since the chances of disruption of a supply chain are significant, awareness was not enough for this study and application of safeguards to mitigate the risk (Świerczek, 2013). Managers of organizations are instituting corporate risk cultures that focus on risk management where defining risk encompasses any source of uncertainty (Wagner & Neshat, 2012). However, some managers do not have a risk management vision, which includes involving all the employees in the process by communicating awareness through the supply chain (Wagner & Neshat, 2012). The rapidly growing global supply chain and the ability to manage cross board logistics are vital to gaining cost leadership in a global environment (Speier, Whipple, Closs, & Voss, 2011). However, managers in manufacturing companies are enhancing the flexibility of international supplies in the firm's overall performance (Omar et al., 2012).

Information Technology and Supply Chain Risks

The selection of suppliers can be a supply chain risk because most firms tend to contract with suppliers with the lowest bid (Tang & Zimmerman, 2013). Hence, some suppliers may commit acts that are unethical to gain profit, and this can have an impact on sustainability (Tang & Zimmerman, 2013). IT is a tool, and not just a collection of soft and hardware (Bendoly, Bharadwaj, & Bharadwaj, 2012). This tool is essential in different ways, and the value to the organization is dependent upon how managers opt to utilize the tool in creating competitive advantage (Bendoly et al., 2012).

Managers of most organizations today have seen the power of IT, but have not understood the whole benefit of creating innovation for product and service differentiation (Bendoly et al., 2012). The potential for IT is endless in achieving cost leadership in companies (Prabhakar & Sandborn, 2012). However, the installation of automation simply for the sake of having IT does not guarantee innovative business possession (Ivanov & Sokolov, 2013). The real value for competitive advantage is by understanding and grasping the new ways of doing business (Ivanov & Sokolov, 2013). Managers of companies often choose to invest in IT to mitigate risk (Tang & Zimmerman, 2013). There has been significant research on the upside of the investment in IT infrastructure and a competitive advantage it gives companies (Otim et al., 2012).

Also, because of competition, managers want to develop new technologies to minimize the potential risk (Michalski et al., 2014). IT is essential and is one way to operate more efficiently and to maximize an organization's performance (Kwak, 2013).

IT investments would only lead to a reduction in downside risk if the industry also invests in this strategic vision (Omar et al., 2012). Managers need to invest in this infrastructure if they want to minimize the downside impact of the risk (Omar et al., 2012).

This investment needs to be industry wide; otherwise, it could affect other businesses that are not knowledgeable about technology. There is a correlation between the global economy and companies; things that affect one business affect all when it comes to supply chains (Mashaw & Pefkaros, 2013). Managers use IT and outsourcing in a global community to mitigate risk factors in supply chains (Diabat et al., 2012). There should be cooperation for supply chain managers to optimize and combine efforts to benefit and expand service in managing information flow (Mashaw & Pefkaros, 2013). Business managers who utilize innovative IT in a business activity have had their efforts paid off substantially by minimizing supply chain disruptions (Parmer, Mackenzie, Conn, & Gann, 2014). Managers are committed to conducting business that contributes to the companies' foundation, as well as the interests of the central and global community (Michalski et al., 2014). To accomplish operational efficiency, managers must focus on creating supply chain workflows, improving logistics, and investing in information systems (Kwak, 2013).

An individual company's managers must be willing to modify IT to fit the company's unique business model (Kwak, 2013). There has been significant research on the upside of the investment in IT infrastructure and a competitive advantage for companies (Otim et al., 2012). A comparative study of quality tools by managers suggest

that operations managers minimize risk in supply chains using supplier evaluation practices (Foster, Wallin, & Ogden, 2011). Moreover, these managers use collaborative strategies for supplier development and complaint resolution to help minimize supply chain disruption (Chan & Zhang, 2012). Good product design and quality assurance are also essential for a competitive advantage in the global market, and managers need to develop strategies to mitigate risk for a product's quality performance (Chan & Zhang, 2012). Researchers showed how superior quality continued to be central to a manufacturing company's success, and business managers were always striving for quality advantage over their competition (Narasimhan & Schoenherr, 2012).

According to researchers, supply chain managers must address disruptions in the supply chain and procurement (Xanthopoulos, Vlachos, & Lakovou, 2011). Managers should consider trade-offs between inventory policies and disruption risks in a dual-sourcing supply chain network that apply to different types of disruptions (Xanthopoulos et al., 2011). Supply chain managers have allowed for more response time because of the complexities of supply chain and demand risk (Giannakis & Louis, 2011).

Response time is useful in mitigating a series of risks rather than an individual risk within the supply chain at the operational and tactical levels (Giannakis & Louis, 2011). Supply chain practitioners have to manage supply chain risk, costly disruptions, and the associated consequences on business performance (Mizgier, Jüttner, & Wagner, 2013). Agus and Hajinoor (2012) used a structured survey questionnaire consisting of two principal parts: (a) variables measuring lean production practices, and (b) performance measures (Agus & Hajinoor, 2012). The lean production methods consisted

of (a) reduced setup time, (b) continuous improvement programs, (c) pull production systems, and (d) shorter lead-time (Agus & Hajinoor, 2012). Lean performance measures feature (a) global competitive advantages, (b) productivity increases, and (c) non-productivity benefits, which are essential for organizational growth (Agus & Hajinoor, 2012). Lean production is essential to product quality performance, as production managers of 200 companies from non-food-manufacturing industries in Peninsular Malaysia helped to prove (Agus & Hajinoor, 2012). Specifically, managers use statistical analysis and structural equation modeling (SEM) to conclude that lean practices offer positive structural contributions to supply chain risk (Agus & Hajinoor, 2012).

Additionally, Agus and Hajinoor (2012) proved that there was a statistically significant connection between lean production and business performance. Customer-based innovation involves reducing patient waiting time as well as expenses and medical costs (Lee et al., 2011). In the health care industry, there are three types of innovations: (a) customer-focused, (b) technology based, and (c) integrator (Lee et al., 2011). Innovation is about improving the efficiency of healthcare services and managers who are innovative in their supply chain bring about reductions in cost and lead-time (Lee et al., 2011).

Additionally, managers of health care organizations should investigate the potential benefits that come from an IT-enabled supply chain (Lee et al., 2011). Tools such as barcode technology, economic resource planning that could improve supply chain efficiency by supporting supply replenishment, and reduced operating costs can help achieve performance in the supply chain (Lee et al., 2011). Information and

communication adaptation are essential in determining the impact of market changes and performance on the supply chain (Lee, Chu, & Tseng, 2011). Supply chain managers can implement a mode to determine how organizational factors affect information adoption, information communication technology (ICT)-enabled business process re-engineering, and performance (Lee, Chu, et al., 2011). There are three types of information communication technology: (a) resource planning infrastructure, (b) e-commerce infrastructure, and (c) other infrastructures, such as surveillance systems (Lee, Chu, et al., 2011). Resource planning infrastructure encompasses early resource planning, supply chain management, and risk mitigation planning systems (Lee, Chu, et al., 2011).

The intensity of competition and market pressure are concerns for the dynamic environment that managers encounter, which is a risk that affects business performance (Lee, Chu, et al., 2011). Supply chain managers improve the company's performance of internal processes, customer satisfaction, and finances when they re-engineer strategic business objectives to align with IT (Lee, Chu, et al., 2011). Managers must encourage continuous learning, knowledge sharing, innovation changes, and creativity for continued success (Lee, Chu, et al., 2011). Supply chain managers need better methods of measuring the determining factors of susceptibility in terms of disruptions to the supply chain (Wagner & Neshat, 2012). For instance, by using enterprise technology within an organization between supply chain partners, managers can eliminate data error to reduce production costs in the supply chain (Li, 2012). Better operational performance results when supply chain managers minimize the impact of the operational risk (Li, 2012). Information technology implementation is vital to collaborative planning, forecasting,

and inventory replenishment in the supply chain, and this affects the ultimate goal of the supply chain (Li, 2012).

Also, supply chain collaboration between managers benefits a firm's operations performance (Zhang, Van Donk, & Van der Vaart, 2011). Contingency effects are vital for managers in choosing a precise collaborative planning initiative in the supply network (Danese, 2011). Operations management and information systems can help to determine the positive direct or indirect effect of ICT on performance and supply chain management (X. Zhang et al., 2011). Supply chain managers can use measurements and constructs in all three major variables of information communication technology, supply chain management, and supply chain performance to understand the effects of disruption of performance (X. Zhang et al., 2011). The firm's size and competitive environment are essential for the relationships between supply chain management, IT, and performance (X. Zhang et al., 2011). Managers should make a comparison between risk-averse decision-makers with risk-neutral decision-makers, maximizing utility or maximizing profit, respectively (Xanthopoulos et al., 2011). There should be the application of a risk management theory to safeguard against monopolistic practices that may disrupt a company's supply chain (Xanthopoulos et al., 2011). The application of a multi agent based framework to manage disruption and reduce supply chain risk can reduce the impact of manufacturing risks (Giannakis & Louis, 2011). Interorganizational information and communication technologies (ICT) are tools that managers use to reduce disruptions in the supply chain process by reducing information asymmetries (Xanthopoulos et al., 2011). Future researchers should analyze governance mechanisms

considering the level of risk in the relationship, the geographic location of the supplier, and using a longitudinal design (Gimenez & Sierra, 2013).

Contingency Planning and Task Prioritization

Supply chain risk is a complex problem many managers are encountering, and it is essential to develop contingency strategies to prioritize risk to develop actionable plans (Machowiak, 2012). Developing an emergency plan for all sectors of the supply chain, which spans from sourcing to product delivery, is a vital strategy (Machowiak, 2012). Training employees about the plan of action and communicating all the plans to both upstream and downstream partners in the supply chain delivery can prepare for any disruption (Machowiak, 2012).

There are three supply collaboration types used as risk mitigation strategies: (a) supplier collaboration, (b) customer collaboration, and (c) internal collaboration (Machowiak, 2012). Supply risk, market risk, and process risk represent potential supply chain risks affecting business performance (Neureuther, 2012). Collaboration is vital for mitigating the impact of supply chain risk on business performance (Kumar & Schmitz, 2011). Deviations in the inbound supply in delivering the right product at the time may create product orders that are incomplete (Kumar & Schmitz, 2011). Checking suppliers' performances by using evaluation techniques may help mitigate risk, even though, there are many factors that affect suppliers' supply chain collaboration (Jayaram & Pathak, 2013). When managers adopt a long-term perspective and work together, they can create a unique value that neither partner can achieve alone to mitigate the risk impact (Wieland & Wallenburg, 2012). Also, streamlining processing could help reduce system costs and

increase productivity (Childerhouse & Towill, 2011). Managers could make a significant contribution by streamlining processes to make the supply chain more efficient, which would enable pharmaceutical companies to take complete advantage of the growing demand for products (Kumar & Schmitz, 2011). Some managers have adopted the plan of risk assessment of the suppliers and taking advantage of technology to control facility access (Ivanov & Sokolov, 2013).

However, the gap in the flow of reverse logistic activities that involve drug returns affecting supply chain operations brings increased costs to the company (Kwame, Debrah, Parker, Owusu, & Prempeh, 2014). Managers are balancing supply chain strategies for cost efficiency and service level consumers by redesigning supply chain networks to mitigate some of the operational risks (Lund, Nordfjrn, & Rundmo, 2012). For suppliers to gain first-mover advantage in certain areas, the suppliers must make efforts to prioritize risk (Lund et al., 2012). There is an increasing supply chain network in global logistics with risk and uncertainties like labor relations and conditions (Sydow & Frenkel, 2013). Managers need to mitigate genuine uncertainties and calculable risk to improve or achieve the goal of the supply chain, which is the uninterrupted flow of products to final consumers (Sydow & Frenkel, 2013). The effectiveness of supplier assessment and the collaboration with the supplier's performance have a great impact and synergistic effect on business performance (Gimenez & Sierra, 2013). IT is an effective tool in the supply chain, which is also essential for operational and competitive performance in product delivery within a short frame of time, and minimizes cost (Clark,

2011). Managing product delivery depends on company processes, information, and people (Gmelin & Seuring, 2014).

The essential variables relevant to a successful supply chain are the integration of inter organizational resources such as sharing information and leading marketing responsiveness by prioritizing risk (Roh, Hong, & Min, 2014). Some of the tools managers can use include the use of a failure mode, effects, and criticality analysis technique to examine the supply chain disruptions by managers (Tuncel & Alpan, 2010).

Supply chain managers also require cost-effective tools to manage the impact of supply chain disruptions in the company (Tuncel & Alpan, 2010). It is not easy to identify, prioritize, and mitigate risk for better decision-making, even though the managers have access to information (Bode, Wagner, Petersen, & Ellram, 2011). Managers must have a risk management culture in the supply chain to minimize disruptions and start business activities quickly in the event of a disruption (Bode et al., 2011). The ability to follow up and come up with an effective risk mitigation strategy is essential (Bode et al., 2011). Supply chain managers are outsourcing more work to suppliers across the globe (Bode et al., 2011), but managing a different tier of suppliers makes it difficult to track, trace, and monitor production, and this has become a huge supply chain risk that managers are having problems with (Bode et al., 2011). Suppliers are encountering challenges such as supply chain disruptions, and managers are deciding to build a restoration capacity in mitigating the impact of the risk (Hu, Gurnani, & Wang, 2013).

Changing Demands and Supply Chain Risk Visibility

Visibility is one of the most cost-effective risk mitigation tactics used within supply chains. Visibility is the presence of cross-culture leadership (Bode et al., 2011). Managers should be capable of generating the appropriate methods to interact and analyze at the right touch points in the project and put all resources toward helping suppliers (Bode et al., 2011). Research featured in a World Economic Forum report shows that about 90% of companies surveyed have a supply chain risk (McCue, 2012). As a priority, managers are striving to address the vulnerabilities within the supply chain by planning for disruptions using business intelligence to validate suppliers and using technology to make decisions (McCue, 2012). Moreover, there are conditions under which labor may be a source of risk as well as a means for dealing with risk and uncertainty in the supply chain (Sydow & Frenkel, 2013). Concerning risk occurrence, there is a difference between the size of the markets, and managers need every approach available to mitigate the components of risk (Vikulov & Butrin, 2014). Future research is essential to understanding and illustrating the importance of alternative methods of innovation on socioeconomic influences such as green initiatives (Frey, Iraldo, & Testa, 2013).

Because businesses need to be competitive, business managers need to understand the potential impacts of major failures in the business infrastructure, including such things as political instability, insolvency of suppliers, and the procedures that lead to supplier failure (Vikulov & Butrin, 2014). Manufacturers encounter supply chain disruptions, which pose many risks for survival (Vikulov & Butrin, 2014). Managers are

creating comprehensive risk management plans that can provide a quick response to emergencies to protect the stakeholder or consumer (Vikulov & Butrin, 2014). The establishment of calculated plans for risk mitigation and business continuity are crucial for companies to operate effectively and efficiently (Hintlian & Kelly, 2014).

Managers are making plans that are vital in addressing supply chain risk against supplier failure by getting to know the total cost and trade-offs of risk mitigation strategies (Hintlian & Kelly, 2014). Inadequate visibility into the supply chain operation of suppliers and how committed the suppliers is another huge risk to business continuity (Yao, 2013). Managers of organizations are working to embrace a better balance between cost and risk. Managers are using sole sourcing to minimize costs and multi-sourcing to reduce the risk in the supply chain system (Yao, 2013). Managers are also ensuring that all stakeholders get involved in supply risk operations to be aware of any uncertainty that may occur (Yao, 2013).

However, an integrated approach is necessary to identify multiple risks in the supply chain (Clark, 2012). Forty-two percent of business interruptions are the result of a failure by suppliers to supply parts to manufacturers of the final product (Khalamayzer & Anya, 2011). A supply chain network is critical, and a robust way to guard against any disruptions, and demand uncertainty is prioritizing risk (Mak & Shen, 2012). In a globalized and competitive world, a way to connect trading partners and companies is by improving the supply chain risk (Pearson, 2014). To be able to accomplish supply chain growth, managers should be proactive and innovative to identify operational risks (Pearson, 2014). Supply chain disruption is a problem, and identifying possible

disruptions is essential to understanding a firm's selection of a buyer's contract in terms of orders and delivery (Xia, Ramachandran, & Gurnani, 2011).

Supply Chain Risk Implication

IT is vital for managers looking for ways to operate efficiently and maximize the processes for their companies (Kwak, 2013). To accomplish supply chain performance, a manager's focus on creating supply chain workflows, improving logistics, and investing in information systems are critical (Kwak, 2013). Managers are utilizing IT affect the ability to move inventory. Business managers reinvent themselves utilizing IT.

Moreover, managers in sustainable organizations are committed to conducting business in a way that contributes to the company's operation, as well as the interests of the central and global community (Speier et al., 2011). Also, managers use IT for the performance of supply chain automation in the industry (Gimenez, 2011). Some managers of companies are incurring costs because supply chain managers' operations are not achieving higher quality at the suppliers' end, resulting in waste (Khan, Jaber, & Guifrida, 2012). Managers need to understand and analyze the trends of risk involved in supply chains. The flow of information from managers of businesses to suppliers is essential for conducting and responding to supply chain disruptions (Tang & Nurmaya, 2011). Many areas require performance management in developing collaborative partnerships and the flexibility to improve business excellence to mitigate supply chain risk (Gimenez, 2011). Managers of pharmaceutical companies face complex issues in supply chain processes from risk management to pricing (Aigbogun, Ghazali, & Razali,

2014). Supply chain sustainability is essential for managers in minimizing the increasing environmental cost resulting from supply chain networks (Aigbogun et al., 2014).

Pharmaceutical supply chain practices should be in the upstream application of lean principles and interaction policies that require clinical trials to achieve the objective of a supply chain (Nagurney & Nagurney, 2013). Organization executives try to develop ways to adopt lean practices in the supply chain and sustainability to minimize supply chain risk (Aigbogun et al., 2014). Managers have to understand the supply chain risk to develop a roadmap to mitigate the impact from supplier audits to measure supplier performance (Aigbogun et al., 2014). Stakeholders are delving into sustainability, and the improvement of quality in supply chain concepts such as sourcing, process improvement, outsourcing, and supply delivery (Foster, Wallin, & Odgen, 2011).

There is increasing consumer concern and awareness concerning the environmental quality and supply chain sustainability, and lean management affects the profitability of companies (Aigbogun et al., 2014). Managers want to integrate supply chains for not only cost and value for the money, but also for environmental gains, which can be quantitatively and qualitatively assessed (Chan & Zhang, 2012). Managers gain sustainability and maximize supply chain performance with concept development through all production phases, and distribution to the final consumer (Chan & Zhang, 2012). Environmental quality, preservation, and the issues of emission reduction are essential issues for public policy, and the regulatory requirement that promotes sustainability in supply chains (Reiner, 2010). Manager's use supply chain risk management to deal with supply chain uncertainties (Wildgoose et al., 2012).

Furthermore, managers use the supply chain response to address changes in customer demand emerging from supplying chain disruption (Sinkovics et al., 2012). Managers want to integrate supply chains to achieve cost and value for the money (Nagurney & Nagurney, 2013). With uncertain environmental conditions, a company's managers have to operate with care using the right principles and applications to reduce the cost, satisfy customers, and stay in business (Nagurney & Nagurney, 2013). Because of global competition, managers are trying to decrease capital employed and reduce cost through lean manufacturing and outsourcing with the introduction of innovative technologies (Wright & Datskovska, 2012). Managers should expect all areas and components involved in manufacturing and distribution of products through visibility, flexibility, and maintainability of the global supply network environment (Samaranayake, Laosirihongthong, & Chan, 2011).

The postponement is a supply chain strategy used by applying the normal accident theory (Yang & Yang, 2010). Postponement concerns a delay in processing activities until precise customer order information becomes available, about consumer demand (Yang & Yang, 2010). Supplier Assessment and collaboration with suppliers are essential and have a synergistic effect on environmental performance, an assessment that is useful for collaboration (Gimenez & Sierra, 2013).

Additionally, the developing green initiative requires companies to leverage their social capital to acquire additional competitive advantages through environmental collaboration (Cheng & Hung, 2014). Implementing green initiatives will challenge

supply chain managers to collaborate efficiently to ensure socioeconomic factors as part of supply chain integration (Cheng & Hung, 2014).

There is a relationship between increased visibility of opportunities and drivers for change (Isaksson, Johansson, & Fischer, 2010). Supply chain managers develop can support different ways to enable operational effectiveness, which is a prerequisite for innovation in supply chains (Ferrer, Santa, Storer, & Hyland, 2011). The unknown innovation potential related to limited system knowledge and investments must take place under conditions that foster social cooperation and mutual benefit (Isaksson et al., 2010). The use of innovation through inter-firm collaboration and strategic alliances can help managers generate value for firms by stimulating the adoption of new products in the downstream of the supply chain (Erzurumlu, 2010). Collaboration and strategic alliance formation between suppliers to the complementary firm is essential (Erzurumlu, 2010).

The dominant consideration in the choice of supplier structure creates the positive value generated supply chain investment at different levels of the supply chain (Li & Chang, 2012). The impact on the type of collaboration and suppliers' investments in technology development depends on various factors (Erzurumlu, 2010). The use of technology in the supply chain can help managers gather, analyze, and store data on risk issues within the supply chain (Murphy, 2014). The rapidly growing global supply chain and the ability to manage cross-board logistics is vital to getting a competitive advantage in a dynamic environment (Omar, Davis-Sramek, Myers, & Mentzer, 2012). Managers can use buyer-supplier integration dynamics by explaining how managers in

manufacturing companies could enhance the flexibility of their global supplies and how that affects overall business performance (Omar et al., 2012).

There are different types of supply and demand uncertainties that exist in various nodes of the supply chain, giving rise to a variety of risks that are from different perspectives (Yang & Yang, 2010). There are approaches to supply chain risk identification, classification, and elimination about performance (Yang & Yang, 2010). No manager today could operate in a completely secure environment without risk, particularly considering trends of globalization and global sourcing (Wright & Datskovska, 2012). The impact of uncertainty on an organization's objectives is a risk and compounding the complexity of today's supply chains is the rigorous impact of disruptions (Sharma & Bhat, 2011). Managers are seeking high-performance processes and are taking more risk-adjusted approaches to supply chain management (X. Zhang et al., 2011). Managers are looking at the disruptions in the supply chain to improve the competitiveness of services (Sharma & Bhat, 2011).

Managers are transforming supply chain strategy because of unrelenting performance and competitive pressures (Sharma & Bhat, 2011). Concerns such as reducing costs, developing new markets, focusing on core value-adding activities, and addressing complexity are dominating corporate agendas for supply chain managers (Sharma & Bhat, 2011). Information sharing on risk strategies is a way to joint problem-solving across supply chain partners in implementing best practices to identify and manage disruption risks (Bode et al., 2011). Information sharing and supply chain

coordination between partners are strategies for improving the global performance of supply chain networks (Montoya-Torres & Ortiz-Vargas, 2014).

Information acquisition and distribution are necessary for identification, assessment, and understanding of potential supply chain disruptions (Wakolbinger & Cruz, 2011). With critical environment scanning tools, managers can identify processes essential to technologies on how to increase their product portfolios (Taifi, Lazoi, Corallo, & Passiante, 2012). For managers to implement design innovations for quality and efficiency, there should be knowledge sharing within the organization to improve the quality of decisions (Taifi et al., 2012). The challenges of dealing with supply chain risk include essential drivers in business differentiation and competitiveness (Blos et al., 2010). A mitigation framework includes a business impact analysis, supply continuity plan development, and supply continuity testing (Blos et al., 2010). With the development of supply chain management, supply chain managers have probed new ways to solve the problem through the excellent character of supply chain scheduling (Yao, 2013). Supply chain managers can achieve competitive advantage through cost reductions and improve market responsiveness by outsourcing an important component of the supply chain to reduce the risk (Sodhi et al., 2012). Business managers are increasingly relying on outsourced products, which makes the supply chain susceptible to disruption because the supply chain managers are facing internal and external risks in the supply chain network (Sodhi et al., 2012).

Suppliers with a high possibility of risk event incidents can implement extensive controls on the organization's revenue stream (Sodhi et al., 2012). Hence, it is essential

that supply chain managers have the means to analyze the risks associated with a supplier of outsourced materials (Sharma & Bhat, 2011). Managers who recognize the risks in the supply chain before they occur can ensure the success of firms (Sharma & Bhat, 2011). The various types of risk are difficult to identify in the supply chain, and risks may come from many directions (Sharma & Bhat, 2011). Many types of risk in the supply chain can hinder business continuity, and supply chain managers need to develop a predicting and planning strategy for risks in a complex process (Sharma & Bhat, 2011).

Transition

The consequences of uncertainties in the supply chain for the flow of goods and services can be numerous (Pettit et al., 2013), and many managers have not evaluated risks in supply chains in businesses that may take on a level of exposure (Sharma & Bhat, 2011). The negative impact of such negligence may outweigh the benefits derived from the reduced costs (Sharma & Bhat, 2011). Supply chain disruption was a problem, and managers need to identify areas within the supply network to address the issue (Xia et al., 2011).

Section 2 includes a description of the data collection method of the strategies to mitigate the impact of supply chain risk. Additionally, the section included information concerning the data collection instruments and analysis techniques. Section 3 included a presentation of the study findings, recommendations for professional practices, as well as recommendations for future research.

Section 2: The Project

The qualitative method was the most suitable approach for this research because of the varied perspectives of practitioners regarding supply chain risk. The collected data were from a survey interview completed by managers from a pharmaceutical company in Maryland. Because of the regional demographics, the transferability of results could be limited. I collected, coded, and analyzed the data using themes, conclusions, and recommendations. I analyzed the data in a way that will preserve reliability, validity, and integrity.

Purpose Statement

The purpose of this qualitative case study was to explore strategies implemented by successful managers in pharmaceutical companies to reduce the impact of risks in the supply chain on business performance (Frels & Onwuegbuzie, 2013). The research design was a single case study to understand and gather insights into the participants' uses of the strategies to reduce specific risks that affect the supply chain (Yin, 2012). The targeted population consisted of risk and supply chain managers in a successful pharmaceutical firm in Maryland.

The research was about the phenomenon in great depth to understand and explain the risk-mitigating strategies in the supply chain since that was the requirement of using a case study. The implications for positive social change include the potential to provide smooth and uninterrupted flow of products to customers in the right quantity and at the right price, which leads to customer satisfaction. The value added, in terms of affordable prices, may improve the lives of consumers. Consumers may have a higher standard of

living because products are affordable, and consumers can buy more products at a cheaper price.

Role of the Researcher

In this qualitative case study, my role as a researcher was to find the strategies that successful pharmaceutical companies are using to minimize the effects of supply chain risk on business performance. I was the primary means of data collection, interpretation, and analysis (Chenail, 2011). I guarded against any personal influence on members by being neutral, and by not offering any advice to the participants. My presence was as passive as possible, except when I needed to pursue additional information from one of the participants (Irvine, Drew, & Sainsbury, 2013). My knowledge in the research question, and working directly with members did not increase the risk of diminishing distance with participants (Bernard, 2013).

I complied with the established guidelines in the Belmont Report. The relevant themes in the Belmont Report include (a) respect for people, (b) informed consent, and (c) privacy/confidentiality (Saari & Scherbaum, 2011). My interests did not create a bias in the outcome of the study due to my current profession as a supply chain professor. The ideas of the concepts and strategies to mitigate the impact of supply chain risk did not change the opinion of the participants. In facilitating the interview, I introduced myself, and I notified the participants that I was taking notes, and that our conversations would be audio-taped during the interview session. I have kept the audio-tape after I transcribed the interview, and I will destroy the audio tape after 5 years. The interview lasted for approximately 35 minutes. During this time, I asked several questions. The rationale for

using an interview protocol was for consistency and for the ability to stay within the bounds of my designed research interview process.

Participants

The participants in this chain purposeful sample were supply chain managers in the pharmaceutical industry in Maryland. Chain purposive sampling represents participants who are part of the organization and are knowledgeable of the problem or the phenomenon being studied (Kindstrom, Kowalkowski, & Nordin, 2012). The eligibility criteria for the participants in this study were managers involved in the making of strategic plans concerning risk processes in a pharmaceutical company in Maryland. The targeted groups of participants for the study were full-time employed managers in the supply chain. I obtained data from voluntary participants of the survey instrument. I gained access to the participants by visiting the applicants in their offices on site, after the approval of the Human Resources Department. I established a working relationship with the participants by reassuring them of the confidentiality that pertains to the study (Marshall & Rossman, 2011). I built trust by explaining to the participants the use of consent form with a strict academic code of ethics. I ensured ethical protection was adequate by complying with the ethical standards set by Walden University, as well as the U.S. federal and civil regulations on ethical standards. Institutional Review Board (IRB) approval is a Walden University and federal regulation that keeps populations from being at risk (Crocker, 2012). The guidelines of the Walden University IRB governed the conduct and protection of participants in the research (Thresholds Institutional Review Board, 2011).

Research Method

The research method selected for this study in achieving the goal of the central research question was a qualitative approach. Qualitative research has been essential in business research for a long time (Bernard, 2013). The qualitative research involved data collection, analysis, and interpretation (Sandelowski, Voils, & Knafl, 2009). I maintained the validity of the qualitative approach through the accuracy of the findings and the use of a disciplined process, while reliability emerged through consistency in the research approach (Thomas & Magilvy, 2011). Mixed methods, the combination of quantitative and qualitative data, permit an improved understanding of the issue when quantitative or qualitative research alone may not answer the research question (Cameron & Molina-Azorin, 2011). In effect, the mixed methods approach, a combination of qualitative and quantitative methods, was not suitable for the study since my goal was to explore and not to examine any of the supply chain risk mitigating strategies. The mixed research method did not fit this study, however, because mixed methods essential for researchers to obtain understanding and explore the benefit of both the quantitative and qualitative research methods (Rowley, 2012). Thus, a mixed-methods approach was not appropriate for this study because the research question may be answered using a single research method.

Furthermore, the lack of quantitative data precludes a mixed-methods methodology from consideration for this study (Yin, 2012). The qualitative research method was beneficial for the analysis of participants' views because it involves uncovering the emotional and symbolic dimensions of the members (Rowley, 2012). In the quantitative research process, the researcher tests a theory by refusing or accepting

hypotheses (Neuman, 2011). The quantitative research method did not fit this study because it did not involve testing a hypothesis. In exploring the research question, a qualitative research approach was consistent because I used the method to understand the strategies for mitigating supply chain risk on business performance.

Research Design

The primary goal of this research was to explore the strategies used to minimize supply chain risk on business performance by using a case study. There are five potential qualitative designs: case study, grounded theory, narrative research, participatory action research, and phenomenology (Bernard, 2013). The narrative research consists of a collection of data in a chronological way to develop skills in solving problems (Everett & Barrett, 2012). Grounded theory research requires a large number of participants; the researcher initiates the research process and theorizes participants' views of a particular event (Reiter, Stewart, & Bruce, 2011).

Phenomenological researchers provide the participant's view in the generation of new meaning about lived experiences (Marshall & Rossman, 2011). The grounded theory was not appropriate for this study because the goal of the research is not to develop any theory but rather to explore existing theories. The phenomenological study should have a high central phenomenological question and the research question for the study does not have that type of problem (Marshall & Rossman, 2011).

The phenomenological research was not appropriate for the study because the researcher does not intend to describe and interpret the phenomenon or reactions of participants to a particular event from personal perspectives (Marshall & Rossman,

2011). Ethnographic studies are not appropriate because ethnography concerns the use of data to gather information on social effects or circumstances such as observations (Prior & Miller, 2012). Ethnographic researchers often generate hypotheses at the end of the research; the researcher changes the design according to necessity identified during the study (Yin, 2009). A distinguishing characteristic of a case study methodology is the use of more than one source of evidence. Yin (2012) identified six sources of evidence: (a) documentation, (b) archival records, (c) interviews, (d) direct observations, (e) participant observations, and (f) physical artifacts. Using a single-case study research design was the preferred strategy when answering how or why questions (Yin, 2012).

A review of the professional and academic literature and the nature of the study led to the decision to use a qualitative method. The participants' open-ended responses on risk mitigation strategies were necessary to understand the impact on business performance. Consistent with Lin and Chen (2012) who used a qualitative approach, I collected data through the views of the participants via interviews and archival records to ascertain the facts (Yin, 2012). The selection of a case study research design, over all other qualitative research designs was necessary to explore the strategies managers use to mitigate the impact of supply chain risk on business performance.

A multiple case study contains more than one case unit that involves several sites (Yin, 2012). One study (Shaw, 2012) showed that a multiple case study was not appropriate for this study, which is in a single facility. The principle of choosing a sample size determination in qualitative studies is data saturation (Carlsen & Glenton, 2011). Recognizing the saturation point presents a challenge to qualitative researchers,

especially in the absence of explicit guidelines for determining data or theoretical saturation. I used chain purposeful sampling to identify participants to achieve appropriate, detailed understanding and insight after I completed enough interviews to achieve sufficiency and saturation (O'Reilly & Parker, 2012). Theme saturation happens when the information from the interviews becomes repetitive and further interviews add no new information to the analysis (McGuire et al., 2013). In the study, I reached saturation after 11 interviews. I completed the interviews with 10+3 participants, as participant sample size of 10+3 was satisfactory in qualitative studies (Francis et al., 2010).

The concept of saturation is elastic, and actual saturation is dependent upon variables to include the purpose of the study (O'Reilly & Parker, 2013). The participants' homogeneity and the dexterity of the one doing the interview are some of the variables (O'Reilly & Parker, 2013). I concluded the interviews when the 11th participant gave me the same information, and there is no new information (Mojtahed et al., 2012). When no new information was forthcoming, I achieved data saturation. I ensured data saturation by creating themes and by getting verbatim transcripts checked, by making notes and the transcript.

Population and Sampling

Snowball sampling is a useful non-probability technique to use when it is difficult to locate participants (Konig & Waistell, 2012). I used chain purposeful sampling, which is a technique where individuals are involved in the study because of their unique characteristics (Wahyuni, 2012). Francis et al. (2010) revealed that, a sample size of 10+3

might be sufficient, given the nature of the study and style of the research. While a smaller number of participants are adequate, using a sample of 10+3 participants in this study provided an understanding of the strategies managers used to mitigate supply chain risk (Francis et al., 2010). While the approximate population number is 180, only 20 people have direct knowledge and interact with the supply chain in their departments. I used the chain purposeful sampling because the result is an accurate representation of the population, as opposed to any of the alternative methods of sampling. Also, it is easier to get a more specific sample size with the same characteristics. In a qualitative study, the sample size is not as essential as sampling procedures, depth of interview data, depth of inquiry, and validity of gathered information (Chenail, 2011). The target population for this qualitative case study consisted of managers involved in the supply chain process in the pharmaceutical industry in Maryland.

The eligibility criteria for choosing the population sample was that participants should be managers involved in the supply chain decision-making process in the company. Additionally, the place of the interview was a quiet environment at the participants' place of work. I maintained the same setting of a quiet environment when interviewing all participants to eliminate any variation in the data collection environment. I asked the same questions to remove any absence of variation in the data collection. For data source triangulation, I used the responses from the interview questions and archival data. Triangulation in research is a way of verifying patterns in information from at least three different sources of data (Torrance, 2012). Triangulation in research is the use of

different methodologies (Torrance, 2012). I used a semistructured interview process and archival data from the pharmaceutical company.

Ethical Research

I adhered to all regulations relevant to rights of participants, as required by both the institutional review board (IRB) and Walden University. Walden University IRB gave me permission before beginning with my interview. The IRB approval number for this research was 05-12-15-0436010. The interview was confidential, and participants were anonymous. The informed consent form included information such as ways to maintain the privacy, confidentiality, and the rights of respondents. Respondents agreed to the consent before answering the interview questions. The participation in the interview process was voluntary, and I told the participant they may stop (withdraw) answering questions at any time during the interview process. The withdrawal from the research process was without penalty.

The withdrawal procedure was for the participant to inform me about his or her plan not to continue with the research. In the process of data collection, I protected the participants' interests, which means I eliminated any ethical dilemma before the actual data collection (Wainwright & Sambrook, 2010). Participants volunteering to participate in the research interview were managers in the supply chain unit of the organization. I used one organization. The study included confidentiality agreement documents for the protection of respondents. Data was confidential, and the reports of the study did not include any information that might identify respondents.

There was no incentive given to volunteer respondents. Before I began the data collection process, I completed National Institutes of Health (NIH) training, which was an online training that related to the protection of human subjects when conducting research. I protected participants through informed consent and protocol implementation approved by the Walden University institutional review board (IRB). Before I started data collection, every participant understood the subject and had signed and returned the Informed Consent documents to me. For confidentiality and safety purposes, I have stored and locked the research interviews, raw and coded data, collective outcomes, and recommendations in a security-monitored location for a minimum of five years. I will shred the surveys after five years. I obtained a signed consent form from the participants prior to starting the interview (see Appendix A).

Data Collection Instruments

The primary tool for gathering the information on this research is a semistructured interview (Pezalla, Pettigrew, & Miller, 2012). Using survey techniques to explore supply chain management concepts helps understand and answer the central research question. I conducted an interview with the participants. Moreover, the participants got the opportunity to express their views and understanding of strategies to mitigate supply chain risk on business performance. I used Nvivo 10.0, software for qualitative data analysis. I used the software in the coding and analysis of the responses given by the participants during the interview for conclusion and recommendation. The in-depth participant interview helped the development of themes, which in turn respond to the research questions (Reiter, Stewa, & Bruce, 2011).

When I encountered participants on the day of the interview, I asked interview questions and follow-up questions in order. I read back the answers to the participants to confirm what I wrote were the exact response from the participants. In this semistructured interview, a face-to-face interview was the method for the study because of the flexibility and the control while conducting detailed interviews with the members (Mojtahed et al., 2014). I used Nvivo 10.0 in the coding process to explain the responses for transparency. I followed the steps in the data collection for responsive interviewing to reveal and explore complex, hidden phenomena (Rubin & Rubin, 2012). Responsive interviewing is the mutual involvement of both the interviewee and the interviewer and is essential to derive meaning (Mojtahed et al., 2014). To derive reliable and valid meaning, I built a reciprocal relationship with the interviewee and demonstrated respect to create a conversational partnership. I used an interviewing-the-investigator technique to determine realistic responses as well as to develop interviewing skills before the data collection (Chenail, 2011). The interview questions are in Appendix B.

Data Collection Technique

The semistructured face-to-face interview was data collection method. I visited the participants on the site to conduct the interview. The main advantage of using the face-to-face interview was the flexibility and the control while conducting detailed interviews with the participants to obtain additional information from the participants (Mojtahed et al., 2014). The disadvantage of using the face-to-face interview was that the participants' behaviors could change during the interviews because of my presence (Mojtahed et al., 2014). I minimized this change by using an interview protocol (see

Appendix C). I introduced myself, and I informed the participants that I was taking notes and audio-taped our conversations during the interview session. I told the participants to feel comfortable because I was only getting their opinions. I ensured the accuracy was through member checking. To collect the verbal responses, I used a smart pen, which is a digital pen and a single-subject notebook paper for note taking and recording of the data gathered from the interviews (Rubin & Rubin, 2012). I used the audio tape-recorder for a backup. In addition to conducting interviews with participants, I found existing literature on the research question to exemplify the transferability to one study from one another.

Data Organization Techniques

I coded and analyzed the information gathered from the participants. I used cataloging and labeling systems to group information under themes for easy understanding and referencing (Bernard, 2013). I used Nvivo 10.0 to analyze the participants' responses. I transcribed the answers to the interview questions word-for-word and coded the responses based on themes. I used an audit trail to list all research decisions that related to major topics, including collection and analysis of data and the research methodology used. A researcher could create an audit trail by making known decisions relating to the theory, methodology, and analysis of data (Neuman, 2011). Coding and organization of data are essential parts of the qualitative research (Bernard, 2013). I coded the responses into major categories with headings and subsections. I stored and locked the interview questions and responses, raw and coded data, collective outcomes, and recommendations in a security-monitored location for a minimum of five years. I will shred the surveys and destroy all research related data after the five years.

Data Analysis

A challenge for some qualitative researchers is to give convincing analysis based on the interpretation of the empirical data (Cacary, 2009). The triangulation technique used was data source triangulation, which refers to the use of more than one strategy for gathering data (Marshall & Rossman, 2011). A review of the literature and an understanding of concepts discussed in the literature, about risk mitigation, strategies helped in the analysis. I used peer reviews or debrief and gather data from reports on the subject and observation (Torrance, 2012). In this study, I explored the strategies to mitigate supply chain risk on business performance. The critical part of qualitative data analysis is process information coding (Bernard, 2013). The seven steps that I followed to analyze the data were:

1. Read and listened to the recorded responses.
2. Identified and labeled the themes that emerged.
3. Identified links between themes.
4. Categorized themes with proper headings from data.
5. Constructed a vivid structural description of participants' strategies.
5. Examined the themes for clear understanding.
6. Tabulated themes.
7. Wrote the findings. (Qu & Dumay, 2011).

I read, analyzed, and interpreted the information gathered in a consistent and unbiased way. I captured all answers respondents gave, which included follow-up questions, for an overall analysis. I transcribed every answer given by participants, and

the information collected was free from bias and influence. Thus, no personal knowledge or experience affected the conclusion and recommendation. I focused on themes, and I related the themes to the literature by asking specific questions related to the theme. I transcribed the interview, and themes based on information in the literature review. I identified themes and coded the themes. I later categorized the themes and used the themes as headings in the findings and analysis section. I used the steps to ensure the trustworthiness of collected data and improved the reliability and validity of coding, theme development, analysis, and study outcomes. After the data collection, I sent the themes and excerpts of the transcripts for member checking (Qu & Dumay, 2011). As explained by Van de Ven and Drazin (1985), there is no single fit appropriate in solving a problem, so I analyzed the data collected from the participants to explore the strategies for mitigating the impact of supply chain risk. I checked whether the outcome of the analysis was consistent with the interview questions underlying the contingency theory of fit.

Reliability and Validity

Reliability in qualitative research refers to when one finding is repeatable. I achieved reliability when the instrument for measuring results was consistent (Ihantola & Kihn, 2011). The validity of the study followed the approaches and consistency with other researchers. I reviewed the interview questions to eliminate ambiguity and to ensure that I provided the same questions to potential participants. The interview questions were free from having different meanings, and I used the same questions for all participants. I transcribed the responses gathered from the participants carefully and separately for

consistency purposes made the study reliable. I ensured that more than one observer agreed on the reports with the degree of openness. For the qualitative research to be reliable and trustworthy, the data collected was adequate with an unbiased interpretation. I applied triangulation techniques to in-depth, open-ended, semistructured interviews with respondents to make the research reliable. Thomas and Magilvy (2011) suggested three criteria for testing the validity of qualitative research, including credibility, transferability, and confirmability. To ensure credibility, I described the phenomenon of interest through the participants' eyes. Transferability refers to how the research result applies to other similar organizational entities and if the results assist other organizations struggling with a similar challenge.

Establishing the validity of the interview questions is useful in the data collection process. Thus, there is greater confidence in the interpretation of the results (Burton & Mazerolle, 2011). I used information from the literature, and the data included reviews of relevant documents to ascertain consistency, thus increasing the confidence in the results. In this study, I explained all significant decisions concerning research design. To ensure validity, I conducted a thorough assessment of the outcome of the study's content, and the justification of the validity is dependent on the verification of the techniques used. I applied triangulation techniques, peer review, and the review of multiple data sources and literature. To ensure the credibility of the study, I transcribed the responses given by the participants exactly and in a neutral way. Credibility, dependability, confirmability, transferability, and authenticity are essential in getting the study to be trustworthy (Thomas & Magilvy, 2011). I increased the authenticity and credibility of this study by

validating transcribed data with participants through e-mail follow-up as a method of member checking (Thomas & Magilvy, 2011). In addressing the confirmability of this study, I enhanced confirmability by using audit trails (Thomas & Magilvy, 2011). I will keep the records and preserve the data for potential inspection by readers. The area of transferability will be a rich description of my findings along with a detailed explanation to allow comparison of similarities between different research sites (Marshall & Rossman, 2011).

I enhanced transferability of this study by giving details that allow the readers to decide if the results are transferable to their organizations (Thomas & Magilvy, 2011). The emphasis of dependability is that, throughout the research study, I engaged in activities that brought about flexibility, which included journaling. In the journal, I recorded information from participants' perspectives on the research. Additionally, I used multiple gathering procedures like interviews and observations. In qualitative research, I needed enough information to reach saturation, which involved determining how many individuals or groups to interview in order to have enough data for analysis (O'Reilly & Parker, 2012). To ensure there is evidence of saturation, I used 13 as sampling size to collect data until I reached a point when there was no new information from the participants (O'Reilly & Parker, 2012). Specifically, I concluded the interview when the 11th participant gave me the same information, and I was not getting any new information (Rowley, 2012).

Transition and Summary

Supply chain managers need to understand how to develop different set of strategies for mitigating risk in supply chain In Section 2; I outlined the methodology for a qualitative case study that incorporated a single pharmaceutical company in the supply chain. The research question and the conceptual framework from Section 1 formed the basis for the detailed procedures introduced in Section 2. I have described the instruments to collect the data and the steps to analyze the data using Nvivo 10 application software. Section 2 has a discussion ethical research of reliability and validity. Section 3 is a presentation of the results of the analysis of the data, discussion of conclusions, application to professional practice, implications for social change, recommendations for future study, and reflections.

Section 3: Application to Professional Practice and Implications for Change

Overview of the study

I conducted a qualitative case study to identify what strategies managers used to minimize supply chain disruption in a pharmaceutical industry in Maryland. The central research question in this study was what strategies do managers use to reduce the impact of supply chain risk on business performance based on internal and external structures?

According to the data collected, analyzed, and interpreted, supply chain managers used different strategies to mitigate supply chain disruption in the pharmaceutical industry based on the internal and external structure of the organization. Strategies identified included (a) supply chain design, planning, and forecasting; (b) flexible and multiple supplier base; (c) resource allocation and demand management; (d) supplier collaboration and monitoring of trends; and (e) enterprise resource planning, and supply chain visibility. Supply chain managers do not have full visibility of their supply chains, which makes supply chain continuity plans difficult to coordinate and manage.

The primary sources of disruption to supply chains in the last 24 months were unplanned information technology issues, supplier failure, weather conditions, and service failure. The top three sources of disruption since 2012, according to the respondents, were (a) information technology issues, (b) supplier failure, and (c) adverse weather. A majority of supply chain managers demanded evidence of supplier assurance such as business continuity plans. The participants revealed that most losses from disruption were not recoverable due to the lack of insurance.

Presentation of the Findings

In this exploratory case study, I addressed the research question: What strategies do managers use to reduce the impact of supply chain risk on business performance based on internal and external structures? I developed the following themes based on the findings from the information gathered from the participants, documentation, and physical artifacts. The themes gathered from the thirteen participants were as follows: (a) supply chain design, planning, and forecasting; (b) flexible and multiple supplier base; (c) resource allocation and demand management; (d) supplier collaboration and monitoring of trends; and (e) enterprise resource planning and supply chain visibility. I conducted face-to-face interviews at the supply chain manager's offices.

The emerged themes from the participants, documentation, and physical artifacts were themes related to strategies managers used to minimize supply chain disruption. In the following subsections, I described (a) the five themes, (b) how the participants answered the 12 interview questions, (c) how I used the data in addressing the central research question, (d) how I aligned the findings with existing research, and (e) how I supported the choice of contingency theory as the conceptual framework for this research. Through semistructured interviews, documentation, and physical artifacts, I gained in-depth understanding of supply chain disruptions and the strategies used to minimize the disruptions. After careful and deliberate research and thorough analysis, I exposed several themes related to the phenomenon. The following is a description of the themes. I used physical artifacts as sources of evidence in this study.

Theme 1: Supply Chain Design, Planning and Forecasting

Participant 1 revealed that managers could minimize the disruption by segmenting, regionalizing, and containing the supply chain. The supply chain design was a strategy according to the participants to reduce the risk of disruption. This theme related directly to the conceptual framework because a contingency theorist purported that there is no single fit that is appropriate as a strategy (contingency theory of fit). For example, Participants 6 and 10 revealed that information sharing, team coordination between partners, and response times were essential strategies for minimizing supply chain disruption.

According to Participants 2 and 3, a detailed strategy formation can be a plan for the uninterrupted flow of materials from suppliers in times of crisis. Participant 11 mentioned that forming a crisis management team and appointing a leader for response readiness was a great strategy. According to Participant 11, managers must know about the allocation of scarce resources. Managers must have a full understanding of every product line they carry and the products' accompanying resources (Lambert & Enz, 2012). According to the participants, managers must respond to disruption incidents in the supply chain any time a risk occurs, but the way managers can respond depends on the configuration and design of the supply chain. The participants claimed that supply chain design is a way of assessing the entire supply chain regarding any possible risk that may affect negatively on the flow of goods from the source to the final consumer.

Theme 2: Flexible and Multiple Supplier Base

Participant 11 suggested the following to respond to a disruption in the supply chain: (a) detecting the disruption, (b) selecting a solution, and (c) using the solution. The participant explained that, even though it was expensive to build resilience, managers have a well-designed supply chain without increasing cost. For the second interview question, I asked the participants how they selected and implemented a risk mitigation strategy on the identified and selected supply chain risk. I concluded from the participant's response that managers must identify and select the risk based on supply chain design, severity, and impact. The strategies Participant 11 identified were in alignment with research conducted by supply chain theorists regarding risk identification and management (Dani, Chester, & Kalawsky, 2013).

According to the participants (a) demand risk, (b) supply risk, and (c) operational risk are the areas managers pay more attention to collaborative forecast planning with customer and product postponement as a strategy to minimize demand risk. For supply risk, they used supply base configuration by getting multiple suppliers and used a high inventory level. For operational risk, they implemented quality management and business disruption insurances. Participant 10, a procurement manager, indicated they sourced from multiple suppliers even though they may not achieve the lowest price; it was a good strategy to spread the risk. Sourcing from multiple suppliers required the managers to have in-depth knowledge of the interdependencies of the suppliers.

Participants 2, 4, and 8 also commented that requirements for clarification, specifications, outcomes, revising procedures, specifying quality assurance, product

standards, conducting product testing, and inspection can minimize the possibility of risk. The participants revealed that contingency planning, quality inspection, and compliance detection could reduce supply chain disruption and its consequence on business performance. The conclusion drawn by Chen, Chiang, and Guo (2013) supported the information given by the participants in this study that control supplier capacity with resource planning and quality inspection can minimize risk in the supply chain. Managers used supply control to ensure suppliers are sharing information on the demand forecast, and improved planning can help minimize disruption in the supply chain. Kramarz and Kramarz (2015) revealed that capturing events and communicating information to all parties involved could help improve supply chains against disruption.

On the third and fourth interview questions, Participants 8 and 9 elaborated that identification of risk and selection of a strategy to address supply chain disruption with suppliers can improve the business performance. On the third question, the participants revealed that in striving to minimize the chance of the unexpected disruption, their procurement unit has placed high emphases on the risk that relates to suppliers. Supply failure in terms of time and quality are the greatest risk. The inability of a supplier to fulfill their terms and conditions on time in terms of product supply can result in a disruption in production, which in turn affects customer fulfillment. The increased use of flexible and multiple supplier base themes aligned to the historical and new supportive body of the literature and relates to the contingency theory of fit. The contingency theory is about preparing for using different strategies. In a subsequent and similar study,

Inderfurth and Clemens (2014) revealed that using forecasting is a way to focus and build resilience to help communicate recovery procedures to ensure business continuity.

Participants 2 and 7 expressed again that quality issues in terms of supplier operation, which leads to defects and recalls, could bring about serious health and safety issues. This response was in line with the information in the literature concerning monitoring the changing levels of the environment (economic and political). Communicating the information to the suppliers can help build intelligence that can fuel better relationships with suppliers for business continuity (Inemek & Matthyssens, 2012).

Theme 3: Resource Allocation and Demand Management

According to Participants 4 and 5, managers assessed the risk landscape and tiered risk assessment to help check any relationship and impact of the risk event from their suppliers. Managers periodically reviewed their suppliers based on risk control practices and the process of verification of their new suppliers. Reporting of internal risk was another strategy according to the participants. Managers have set up a process to monitor risk to help gather information and report to suppliers. The interviewees expressed that collaborating with suppliers was a good strategy for minimizing risk with the vendors.

The body of literature is in alignment with the theme on resource allocation and demand management. Hajdul and Mindur (2015) claimed that the use and application of lean strategies with suppliers would minimize the impact of a disruption, which led to operational efficiency. Participant 7 revealed that managers verified the information of their supplier to make sure the information was current, and they centralized the

information they gathered to create consistent data for the procurement unit. Participant 3 expressed, “We examined suppliers’ certificates and financial information” and Participant 6 commented “working with supplier information helps the company save the cost and managing the process.” Participant 5 expressed that the most common risk they face was the disruption to the flow of supply that could be the result of industrial actions, material shortage, natural disasters, and other operational issues. The participant revealed that the fluctuation of price in terms of price volatility was a serious risk since most of their contracts are fixed-price contracts with prospective price redetermination. According to the participant, fixed-price contracts with prospective price redetermination were the method where the company, which in turn exposed their products to the high cost, reimbursed any future changes in price. Participant 7 revealed that the quality and delivery of goods was another risk because of poor quality and other changelings with logistics, which led to low sales.

Theme 4: Supplier Collaboration and Monitoring of Trends

According to Participant 7, sole sourcing and one large supplier was a risk, and the best practice they used was multiple suppliers, which led to change over issues and switching when it came to product delays. As seen in the body of literature, contingency theorists support the claim that collaboration and supplier relationships increased performance (Van de Ven & Drazin, 1985), and I reached the same conclusion. Participant 5 expressed that inspection and factory audits of their suppliers, looking through the supplier’s company records, helped the managers minimize risk. Participant 5 revealed that they collaborated with the company’s suppliers to identify risk in the

supplier's company or their business and develop plans that are contingent to minister the risk.

The information obtained from the third and fourth interview questions gained support from conclusions made by Gualandris and Kalchschmidt (2013). The authors claimed that using collaboration and postponement enables managers to reduce the negative impact of the occurrence of supplier failure. The fifth question was about how an organization's resources determine the kind of strategy the company applies to reduce supply chain risk on business performance. From the responses of the interviewees, the manager has used analytic tools to develop a system of financial monitoring that will issue warnings any time a supplier experiences a risk event. The procurement managers used the information to apply flexibility by shifting to another supply contract to help compensate for issues that may arise. Furthermore, the managers use collaboration between their suppliers and early resource planning to foster communication.

Participants 6 and 9 expressed the structure of the organization's support technology, which determines the best collaborative tools to use in the event of supply chain disruption. Participant 8 expressed, "They used analytical tools that made the company resilient in the area of visibility and flexibility. These technologies used to priorities and measure results in the supply chain to response to any disruption issue that may arise." Participant 9 revealed, "These disruptions are costly, and the impact reduces the value of the shareholder to about 12 percent." Participant 11 commented that the company has improved the visibility that helps managers to detect any disruption quickly in the supply chain, and that managers have well-placed resources that help them for

recovery plans both in the short and long term. Saghafian and Van Oyen (2012) revealed that managers exposed to risk in the supply chain should invest in training and technologies for collaboration to establish resilience in helping managers respond to the disruption. Participant 7 claimed managers are using the company's logistics to monitor and ensure their goods' safety in transit.

According to the participants, they have sensors in their shipping containers for monitoring any unauthorized tampering. For the sixth question, I asked participants which systems they used to support supply chain risk implementation. From the responses, I concluded that customer relationship management, enterprise resource planning, and decision support systems enable the managers to implement their support for supply chain risk.

Brandenburg and Rebs (2015) supported my conclusion that to circumvent any disruptive situation, there should be risk solutions that managers designed for decision support systems to minimize the impact of risk disruption. Participant 4 expressed that managers use enterprise resource planning applications to cover functional areas for support for shared data. I have observed the relationship between supply chain departments (procurement, warehousing, sourcing, production, transportation) and how the supply chain managers collaborate to minimize any risk. I can conclude that the supply chain managers worked together to manage any risk to the organization. I have observed and asked for the annual report on risk from the participants to check what procedures were in place minimize supply chain disruption. I concluded that every procedure in the 2014 annual risk report was in alignment with the responses from the

participants. The managers used all three modes of transport based on how fast consumers want the pharmaceuticals (Urbaniak, 2015). Participant 4 revealed that managers select, interact, and align strategies for mitigating supply chain risk by electronically connecting to the multiple supplier and their global partners (Kramarz & Kramarz, 2015).

Managers have the chance to monitor the external operation and the performance of the suppliers (Hentschel et al., 2015). Aligning standards across the board for all suppliers helps managers gather information promptly across internal and external suppliers. Participant 12 confirmed that managers selected risk based on volatility, uncertainty, ambiguity, and uncertainty as a risk, and managers used vision, clarity, and agility as a strategy to minimize the impact of risk. According to Participant 12, vision and collaboration can help minimize volatility and uncertainty in supply chain disruption.

On the eighth question of how managers applied a different set of strategies for mitigating supply chain risk, Participant 13 articulated that by using alignment and adaptability, managers achieve every risk mitigation objective. The conclusion reached by Jian, Yangyang, and Gengui (2015) confirmed the findings that using flexibility based on resources available in the supply chain can give way to different strategies to help manage the supply.

Theme 5: Enterprise Resource Planning and Supply Chain Visibility

On the ninth question concerning the current practices managers used to implement consciously and manage the impact of supply chain risk, all the participants mentioned integrating all departments within the supply chain, building relationships and

collaboration with suppliers, and the use of enterprise resource planning to help focus on supply chain visibility. Participant 7 commented that managers integrated customers and suppliers to understand better input in developing risk strategies. The response was in alignment with Gualandris and Kalchschmidt (2013), claimed that by reducing system complexity, supply chain managers can have an easier production process configuration, which can positively affect a supply disruption.

The tenth question explored how managers determined the most effective internal organizational designs or responses to supply chain disruption. According to Participant 8, managers developed response plans based on assumptions they appraised. The participant claimed the ability to gather accurate information concerning events when the disruption happens was based on pre-defined plans on the information. Almost all the participants revealed that the commonly used internal response to supply chain disruption was visibility. According to the participant response, the company had cross-culturally trained managers who have the capability to generate the timely interaction and analysis at the point of a disruption. The managers committed resources to support the developing supplier.

Participant 3 revealed that the best response approach was to minimize the impact of time, distance, and the communication between other partners. The responses were consistent with Glock and Ries (2013), who claimed that to minimize the impact of disruptions connected with various supply chains, it is essential to harmonize the flow of materials in the network of organizations. Managers pool resources with upstream and downstream members of the supply chain to advance operations and to safeguard supply

chain stability. Participants 2 and 6 revealed that they used different strategies to solve the same problem in the supply chain based on the objectives and the predicted impact the disruption might have on business performance. According to Participants 3, 4, and 7, in circumstances where the time and quantity of delivery or the demand of the customer may not be known with certainty, managers aligned demand to supply to increase robustness of the supply chain.

Under this situation, based on the customers they served, the type of product involved, the country, and the anticipated profit, the other participants claimed that managers established a manufacturing strategy, which included manufacturing flexibility that focuses on machine, labor, the flexibility of the market, and new products. The response Participant 3 gave was in alignment with the conclusion of Hentschel et al. (2015) that supply chain design should have the flexibility to enable managers to adapt to the vulnerabilities. Risk mitigation strategy was essential in every area of the supply chain. Managers used lean manufacturing strategy to mitigate labor risk, market risk, and production risk. The response is in alignment with Kim, Suresh, and Kocabasoglu-Hillmer (2013), who assert that managers can improve supply chain responsiveness by applying manufacturing responsiveness. On the final question, which requested for any additional information, documentation, or processes that will help in this research study, I reviewed all the documents and the information the participants have provided and concluded that flexibility, visibility, collaboration, and postponement are the answers for responding to changes and disruption in the supply chain.

From recently published articles, Alcantara (2015) claimed that three elements were conceptually related to supply chain resilience to mitigate disruption: (a) persistence, (b) agility, and (c) adaptability. According to Alcantara, managers must maintain the management set of interrelated risks that included complexity and uncertainty in a supply chain. Diabat and Richard (2015) identified strategies to manage supply chain disruption such as (a) alertness, (b) accessibility, (c) decisiveness, (d) swiftness, and (e) flexibility. According to these researchers, managers need to adapt to the changing environment by using flexibility and visibility. Diabat and Richard supported my findings in their recent research that disruptions to supply chains resulted in substantial financial and productivity losses. These researchers tracked the economic impacts of supply chain disruption and revealed that 13% of businesses surveyed from 2009 to 2013 reported losses of at least one million Euros in a given year. Supply chain managers must design and implement resilience strategies using (a) planning and forecasting, and (b) multiple supplier bases to mitigate the impact of supply chain disruption on business performance (Alcantara, 2015).

Applications to Professional Practice

The application of this study to professional practice is that supply chain managers will use the information in the findings to understand and provide better services for reliable, on-time delivery of products. By using risk mitigation strategies, managers can balance production and sourcing against changes in demand, which will in turn help in prioritizing demand during supply shortfalls (Disruptions). Using sophisticated tools to provide visibility on performance measures, as well as price, supply

chain managers monitor carrier relationships and performance in response to supply disruption (Ghadge, Dani, Chester, & Kalawsky, 2013). Managers can use the findings to implement strategies across the end-to-end supply chain in meeting their goal of producing the right product or service at the right time and the right cost.

Supply chain failures can occur in different forms. Selecting a mitigation strategy that is fitting for the supply chain from many types of risks concurrently is essential and preferred to strategies pertinent only to a particular kind of risk (Urbaniak, 2015). Risk managers should use an efficient approach that cuts across a variety of supply chain disruptions for uninterrupted operations. This approach has essential benefits for companies planning to minimize risks from both effectiveness and resource allocation standpoints. If a supply chain disruption strategy works well in soothing different types of disruptions, managers may allocate resources in developing that specific strategy instead of designing different strategies that might not be effective in terms of cost. Managers can plan a robust supply chain network that will allow the supply structure to avert orders to other supply channels and avoid disruptions for customers.

Participant 1 revealed managers must understand the various supply chain designs by collaborating with clients as they define and pursue supply chain excellence strategies. For companies to be competitive, managers must adopt the agility and insight strategies and rapidly respond to unforeseen disruptions (Azad et al., 2013). The use of real-time supply chain visibility across every supply unit can optimize the end-to-end supply chain that can help to define sourcing strategies and enable capabilities that minimize risk (Macdonald & Corsi, 2013). In planning for future supply chains,

managers must be able to visualize fully and understand their current supply chain process based on internal and external structures. By using continuous value analysis, managers can have visibility into their operations, which is an essential step in minimizing supply disruption. Managers will gain an insightful understanding of their global supply chain, which requires accountable sourcing to recognize the areas where suppliers need support for improvements.

Managers can collaborate with vendors who help reduce risks and drive trust and honesty for a positive change, hence creating an atmosphere for open dialogue (Macdonald & Corsi, 2013). Also to provide professionals a strong base for future research, this study is a source of managerial insights and has implications for the disruption management and recovery process for the pharmaceutical company. My work has significant implications for academics and managers and sets the stage for future developments. In this study, I have presented robust results based on a notion from which managers can benefit. In my study, managers can find robust disruption strategies for a variety of contingencies. The research was essential in making the decision for resource allocation for businesses because managers can focus on structuring and investing in competencies that can pacify a variety of supply chain risks (Hentschel et al., 2015). I found evidence that aligned with other literature showing the benefits of supply chain resiliency through flexibility, collaboration, and visibility as an efficient disruption mitigation strategy (Juttner & Maklan, 2011). Managers who are challenged by the task of using limited resources to manage disruption to use the readiness, response, and recovery (3R) model can use the findings in this research as a roadmap. Lastly, supply

chain managers can build into their contingency plans a way to respond to the changing competitive and supply environment as disruption becomes more or less likely.

Implications for Social Change

It is essential to understand that changes in the global business environment are triggered by factors like the global financial crisis and natural disasters. Customers are forced to shift to competitive companies with good products, low prices, and the most convenient location. These issues demand businesses and customers to move from suppliers that are prone to interruptions in their chain to vendors who have knowledge about disruptions and having effective response strategies in place (Urbaniak, 2015).

Through this study, managers could build plans to deal with natural disasters to get products to consumers at the right time. From this study, managers can develop a culture across the business to ensure everyone is aware of the threats to the supply chain. Using effective resilience strategies could lead to lower costs, greater global economic health, and social benefits (Juttner & Maklan, 2011). Wieland and Wallenburg (2012) explained that robust strategies could advance benefits to the stakeholders. Effective mitigation strategies could improve benefits to the consumer and society (Wieland & Wallenburg, 2012).

Managers could minimize the likelihood of recalls and unfavorable events associated with supply chain disruption by using supply chain design strategy. The use of the supply chain design could reduce risks from the severe economic loss that will benefit companies and consumers by decreasing costs or increasing performance. The reduced exposure of the supply chain risk will improve the economic health and social well-being.

Effective strategies could lead to lower costs, greater global economic health, and social benefits (Wieland & Wallenburg, 2012).

Recommendations for Action

There are many sources of disruption and strategies to minimize the disruptions, which include the 3R model. Also, strategies for collaboration, visibility, and task prioritization are essential for minimizing supply chain disruption. More significantly, there have not been previous studies in which researchers thoroughly analyzed the performance rate of every strategy to minimize supply chain disruption. There has been insufficient empirical research to validate the contingency theory on company performance. Other researchers must undertake a case study that is empirical to analyze internal factors that affect disruptions and how managers could manage risk in the service industry. Such research should pay more attention to disruptive internal factors and their strategies.

The scope of this research should be comprehensive to all sectors of manufacturing companies, including service industries in the supply chain. Supply chain managers and company executives could benefit from the findings of this study to contribute further to business practices and social change. As shown in the findings, managers must understand the relationship between supply chain disruption and business performance, and there should be an investment in strategic resilience programs which is similar to the findings of Juttner and Maklan (2011). Supply chain managers and risk management consultants may share essential information by subscribing to professional

organizations like the Institute for Supply Management. I will contact and share the findings of this study with supply chain leaders in pharmaceutical companies.

The summary of the findings in this study could further contribute to discussions amongst supply chain experts regarding the need to invest in strategies to mitigate supply chain disruption. Supply chain educationists may adjust policies and programs to support the emerging need for adopting supply chain security. The use of different channels for the dissemination of study findings will increase the chance for supply chain managers to have access to the information from this study. By publishing the approved study in the ProQuest/UMI dissertation database, students, and researchers, supply chain experts who are interested in the study can have access. Additionally, I will send a summary of the study findings and recommendations to all participants. My aim is to prepare an article on my study findings for publication in a peer-reviewed journal and finally look for other opportunities to discuss this study at conferences and seminars.

Recommendations for Further Research

The implications and discussions mentioned provide the foundation for budding future research that will deepen understanding of the relationships among the strategies managers employ to ascertain the success or failure rate of supply chain disruption. Financial department employees should be included in the future research because they may have some information on risk in the area of finance, which affects the supply chain.

Even though there was a limitation, the limitation does not minimize the contribution of the research. Future research should determine how these findings could be transferable to other organizations like logistics firms and other service firms. My

research focus was on strategies to minimize supply chain disruption; however, I will recommend that future researchers work on determining if there is any relationship between supply chain strategies and business performance.

Other areas such as how supply chain disruptions affect the types of decisions on future strategy should consider for future research. Researchers can explore a detailed study through both qualitative and quantitative techniques. It is essential that all analysis developed through qualitative research methods be examined thoroughly with a sample that is larger than the initial group of participants. Also, there is a limited theory on the topic of disruptions upon which to draw a firm conclusion. As a result, researchers should consider this study exploratory in nature. There are many opportunities for future research using supply chain disruption strategies to increase organization performance.

One direction for future research is the process of decision making in supply chain disruption (Petridis, 2015). There have been proposals for decision-making steps in supply chain disruption and their impact on business performance, for instance, how limited information and time impacts decision-making (Nagurney & Li, 2015). The strategies to minimize disruption must expand in order to strengthen and aid future research. Additionally, managers need to provide a detailed list of factors for decision-makers to consider when preparing for disruption recovery (Belzer & Swan, 2011).

Reflections

From this experience, I have erudited that there were different strategies managers used to minimize supply chain disruption based on their internal and external structures (Resources). I was excited about the concept of 3R, which included readiness, response,

and recovery as essential strategies for effective disruption reduction. Although I was cautious not to interpolate my personal bias concerning other procedures, the assessment of the document contents and responses of the participants eliminated my personal beliefs about other strategies to minimize supply chain disruption. From an interview-execution standpoint, the supply chain managers openly admitted that they cannot quantify the financial cost of each disruption they have experienced within their company. The development of themes, coding, and interpretation of data were more complicated than I initially thought. The long period of reflection helped me in developing meaningful themes to build my analysis. Careful analysis of the responses ensures the validity of the findings. The essence of maintaining the spotlight on the application to business practice was also a vital lesson.

There was the perspective to address the academic dialogues in several areas such as risk management, logistics, and procurement, all of which related to the research. My goal in carrying out the case study was to build my competence as a qualitative researcher while exploring an agenda that will improve stakeholder satisfaction. The participants in the study provided sincere responses to the interview questions. Moreover, documents given by the participants on their previous response strategies validated the content in the business literature describing the extent and consequences of supply chain disruption on business performance. I understood the strategies and initiatives managers employed to minimize supply chain disruption based on the analysis of the documents and the responses from the participants. After I had completed the interview, I shared with the participants the findings of other studies that may give the participants a positive

idea of other strategies. The discussion from the literature about investing in third party logistics and security instead of their own transportation system resonated with the participants of the study. In the process of my observation, there was no interruption from any staff member; I had a fully concentrated time with the participant.

The finding of this study related to me as a previous supply chain manager. There were similarities and differences in my experience as a supply chain manager. From the perspective of the participants, I gained knowledge of strategies and practices that supply chain managers use to minimize the impact of risk on business performance. Finally, I have enhanced my personal skills in the collection of the data, analysis of the data, and reporting of study findings.

Summary and Study Conclusions

I have provided data analysis that confirmed what my previous thoughts were on the subject of supply chain disruption. The first step in mitigating supply chain disruption was to develop strategies that identify and determine the cause of the supply chain risk. When supply chain resilience is effective, fewer disruptions occur within the supply chain, and efficiencies for both the supplier and the customer can increase. I have found five strategies that have direct relationships with mitigating disruption in the supply chain: (a) supply chain design, planning, and forecasting, (b) flexible and multiple supplier base, (c) resource allocation and demand management, (d) supplier collaboration and monitoring of trends, and (e) enterprise resource planning and supply chain visibility.

The contingency theorist purported no single strategy that is a good fit for a situation, which was the conceptual framework for this study. I have seen by using supply

chain collaboration managers can manage and mitigate supply chain risk. I conclude that managers that use (a) supply chain design, planning, and forecasting; and (b) enterprise resource planning and supply chain visibility strategies could potentially decrease production inefficiencies and reduce cost and risk to improve business performance.

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Appendix A: Consent Form

Hello,

The purpose of this research study is to explore strategies implemented by successful managers in pharmaceutical companies to reduce the impact of risks in the supply chain on business performance. Jonathan T. Opata at Walden University will conduct the research study. I invite you to participate in this research study because you are a successful supply chain manager in the company. Your participation in this research study is voluntary. You may choose not to participate. This form is part of a process called “informed consent” to allow you to understand this study before deciding whether to take part in it or not.

Voluntary Nature of the Study: Your decision to participate in this research study is voluntary, you may withdraw at any time, and no one will penalize you. There are minimal risks associated during the interviews and the risk is comparable or similar to those you are object to in your offices and daily lives. This may include minor discomforts like fatigue, stress, or becoming upset.

Informed Consent: The procedure to take part in this interview involves potential participants responding to series of questions. The interview will take approximately 35 minutes. I will observe policies and procedures, the company’s shipment times (daily, weekly, or monthly) the relationship with other supply chain department, the internal processes, and the risk reports documents of the company on supply chain. Every response is confidential. The interview questions will be about strategies to mitigate the impact of supply chain risk. In protecting your confidentiality, the interview process will

not contain information that will personally identify the participants or the company. The outcome of this proposed study is for scholarly purposes only, and Walden University representatives may have access to the reports. The information I will collect will be stored and secured in a security-monitored location. I will keep the data for a period of at least five years, after which I will destroy it. For the purpose of consistency, I will audio tape this interview. In a next step, I will ask you to confirm whether I have interpreted the information accurately from the interview session. There are no benefits to the participants in this study; however, to the larger community the outcome of this study will help to contribute knowledge to scholarly purposes and benefit managers planning to minimize risks from both effectiveness and resource allocation standpoints. If you have any questions about the research study, please contact Jonathan. T. Opatata at jonathan.opata@waldenu.edu. If you have any questions about your rights as participants, you may contact Walden University IRB through this email: IRB@waldenu.edu. Walden University's approval number for this study is 05-12-15-0436010 and it expires May 11, 2016. **Incentives:** There are no incentives to participants in this proposed study.

Observation: I would like to do some observation and request certain documents from you. Some of the documents include the company's annual risk report and any relevant document you may want to share with me. You are free to inform me about areas that should not be observed. My observation and request for documents will be towards the end of the interview. While doing my observation, I will ask questions that may arise out of the observation. I will write down everything I will observe. I will use the last 10

minutes of the interview time to request for the additional documents and do my observation. The observations will be done with participants only.

The following are areas/things to observe while doing the interview

1. Policies and procedures to be followed in an appropriate sequence and structure for ensuring compliance.
2. Internal processes: I will solicit for information about a supplier's internal processes from the company's documents in the areas of supplier audit, supplier evaluation etc, and the control systems managers have put in place during the manufacturing process in the production unit when doing the interview.
3. Shipment and delivery accuracy: I will observe the shipment times (daily, weekly, monthly etc.), and the mode of transportation the managers use (air, land or sea), and ask participants about the rerouting procedures when natural disasters interrupt trade lanes.
4. I will observe the relationship between supply chain departments (Procurement, warehousing, sourcing, production, transportation) and how the supply chain managers collaborate to minimize any risk
5. I will observe and ask for the annual report on risk from the participants to check what procedures are in place

Consent to participate in the Study: I have read the above information and I understand the study well enough to make a decision about my involvement. By signing below, I consent; I understand that I am agreeing to the terms described above. You will be given a copy of the consent form.

Printed Name of Participant

Date of consent

Participant's Signature

Researcher's Signature

Appendix B: Interview Questions

1. How does your company identify and select a strategy that aligns with internal and external resources to reduce supply chain risk?
2. Do you have initial steps that you take to identify potential risk in supply chain?
3. How do you select and implement a risk mitigation strategy on the identified and selected supply chain risk?
4. How do you as a manager adopt a strategy to address supply chain risk with your suppliers?
5. How does your organizations resources/structure determine the kind of strategy you apply to reduce supply chain risk on business performance?
6. What systems do you have in your company to support supply chain risk implementation?
7. How do you select, interact, and align strategies for mitigating supply chain risk?
8. How do you apply a different set of strategies for mitigating supply chain risk?
9. What are the current practices your company uses to consciously implement and manage the impact of supply chain risk?
10. How do you determine the most effective internal organizational designs or responses to supply chain disruption?
11. Under what circumstances do you apply different strategies to the same problem in the supply chain?
12. Do you have any additional information, documentation, or processes that will help in this research study?

Appendix C: Interview Protocol

Institutions: _____

Participant (Title): _____

Interviewer: _____

Date of the interview _____

Time of the interview _____

B: Department/Unit

Introductory Protocol

Supply chain strategies for risk mitigation

I will conduct semistructured interviews on the participating company premises either in the office of the participant or a business room office. The length of the interviews will be 35 minutes approximately. I will introduce myself, the research topic and state the purpose of the research, and then I will ask the participants the department they head. During this time, I will ask several questions that I would like to cover based on my sample interview questions. If time begins to run short, it may be necessary to ask participants for more time to push ahead and complete this line of questioning.

Introduction: I kindly ask you to accept my invitation to be interviewed because you are supply chain manager with experience in supply chain risk management. I would like you to share with me the strategies used to mitigate supply chain risk in the organization. My research project focuses on strategies for mitigating supply chain risk on business performance. This research will help explore the strategies your organization uses to reduce supply chain risk.

Appendix D: Letter of Cooperation

Dear Jonathan,


You have the permission for you to conduct the study entitled Strategies for mitigating supply chain risk on business performance within the Origene Technology. As part of this study, I authorize you to contact participants, data collection, member checking, observations and collect company documents from participants and results dissemination activities. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,
Dr. Rich Hamer
rhamer@origene.com



VP OPERATIONS.

Appendix E: Observational Protocol

Institutions: _____

Department: _____

Interviewer: _____

Date and time of the observation _____

Observation Template

What was observed (this can be one of the previously stated arguments or an unforeseen event, thing, or person).

My comments regarding what was observed.