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The Impact of Supply Chain Risk Management on the Current Global Supply Chain Situation

"A case study of Weatherford Egypt's supply chain "

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Abstract:

In today's dynamic global business environment, effective supply chain risk management (SCRM) is essential to ensure the resilience and competitiveness of supply chains. This paper explores the effect of SCRM practices on the current state of the global supply chain, with a specific focus on Weatherford Egypt's supply chain operations.

The paper begins by reviewing relevant literature on SCRM theories, frameworks, and empirical studies to establish a theoretical foundation. Utilizing a mixed-methods approach, the research collects quantitative data through a structured questionnaire administered to procurement, planning, and logistics professionals within Weatherford Egypt's supply chain department.

The quantitative analysis examines the relationship between SCRM practices and key dimensions of supply chain resilience, such as agility, adaptability, and robustness. Additionally, qualitative insights are derived from internal company documents, industry reports, and observations to provide context and depth to the findings.

The results highlighted on the effectiveness of SCRM practices in enhancing supply chain resilience and mitigating disruptions. Key findings highlight the importance of proactive risk identification, collaboration with supply chain partners, and the integration of technology in SCRM processes.

This paper investigates the impact of supply chain risk management (SCRM) on the current global supply chain situation, with a specific focus on Weatherford Egypt's supply chain. Through a comprehensive literature review and empirical analysis, key SCRM strategies, challenges, and opportunities are identified. The findings highlight the critical importance of proactive SCRM measures in mitigating risks and enhancing supply chain resilience. Based on the paper’s results, actionable recommendations are proposed to strengthen SCRM practices and improve supply chain performance. By implementing these recommendations, organizations can enhance their ability to navigate disruptions and uncertainties, ultimately driving sustainable growth and competitive advantage in today's dynamic business environment.

1. Introduction:

the onset of the COVID-19 pandemic, initially perceived as a localized issue in China, swiftly evolved into a global crisis, disrupting supply chains worldwide. Reports indicate that 95% of Fortune 1000 companies with ties to China experienced operational disruptions, highlighting the vulnerability of global supply networks (Khan, Qureshi, & Irshad, 2022). Extensive research has explored the impact of supply chain risk management (SCRM) on the efficiency of global supply chains, emphasizing the need for organizations to address social and environmental concerns in their SCRM practices (Christopher & Lee, 2019). Additionally, the governance decisions made by firms regarding their supply chains can have both positive and negative ramifications on various stakeholders, underscoring the importance of effective risk management strategies (Rashad et al., 2022).

The COVID-19 pandemic, coupled with geopolitical conflicts such as the Russia-Ukraine war, has further accentuated the challenges faced by global supply chains. Amidst these disruptions, there is a growing recognition of the significance of resilience in supply chain management (Kovacs & Sigala, 2024). Lessons learned from crises like COVID-19 offer valuable insights into enhancing supply chain resilience and preparing for future disruptions (Flynn et al., 2021). As businesses navigate through uncertainties, it becomes imperative to reevaluate supply chain strategies and adopt proactive measures to mitigate risks and ensure continuity of operations (Zhang & Liu, 2024). Additionally, addressing structural deficiencies in supply chains, such as fragmentation and lack of transparency, is crucial for building resilience and minimizing the impact of unforeseen events on global supply networks (Shaban, 2020).

This introduction provides an overview of the escalating challenges faced by global supply chains in the wake of the COVID-19 pandemic and geopolitical conflicts, highlighting the critical role of supply chain risk management in ensuring resilience and continuity. Through a review of existing literature and real-world examples, this study aims to explore the impact of SCRM on global supply chain dynamics, with a specific focus on Weatherford Egypt's supply chain.

2. Literature Review

A. Defining Supply Chain Risk Management:

It is essential to fully understand the concept of Supply Chain Risk Management (SCRM) to lay the proper groundwork. Academic publications by (Chopra and Sodhi, 2014) and (Christopher and Lee, 2019) clarify the basic ideas of supply chain risk management (SCRM) and highlight how proactive SCRM is in detecting, evaluating, and reducing risks in interconnected supply chains. (Chopra and Sodhi, 2014) make a significant contribution to the SCRM debate by offering a comprehensive framework that covers every facet of supply chain risk management. This paradigm emphasizes the importance of proactive steps in detecting, assessing, and reducing potential risks before they materialize, moving beyond a reactive approach to risk management. The proactive approach of (Chopra and Sodhi, 2014) recognizes that risks can arise from various origins and stages of the supply chain, which aligns with the dynamic and interconnected nature of modern supply networks.

B. Preemptive Identification, Assessment, and Mitigation of Risks:

In their academic study, (Christopher and Lee, 2019) highlight the proactive aspect of SCRM, which serves to back up this viewpoint. They emphasize how SCRM is a strategic strategy that includes ongoing awareness in identifying new risks, careful assessment of their potential implications, and the execution of targeted steps to limit or minimize these risks rather than just a reactive response to disruptions. Because of its emphasis on being proactive, SCRM is seen as a forward-thinking discipline that detects and manages hazards before they become serious disruptions.

C. Linked Supply Chains:

The academic papers highlight the interdependence of contemporary supply systems. According to (Chopra and Sodhi, 2014) and (Christopher and Lee, 2019), supply chain risk management (SCRM) acknowledges that disruptions in one area of the supply chain can have an impact on the entire network. Because of this interconnection, risk management must adopt a comprehensive and cooperative approach, highlighting the significance of stakeholder communication, cooperation, and information sharing.

D. The Evolving Nature of SCRM:

These academic articles further highlight that SCRM is a dynamic discipline that changes to meet the ever-shifting demands of the corporate environment rather than a static idea. Proactive risk identification, assessment, and mitigation necessitate an ongoing commitment to strategy monitoring and adaptation in line with supply chain operations' dynamic character. In conclusion, the definition of SCRM is based on the fundamental studies of (Christopher and Lee, 2019) and (Chopra and Sodhi, 2014). Their observations highlight the proactive approach used by SCRM, the significance of taking supply chain interdependence into account, and the dynamic character of risk management in modern corporate settings. This knowledge creates a solid basis for investigating how SCRM affects the state of the global supply chain today.

E. Evolution of Global Supply Chains:

The evolution of global supply chains has been shaped by various factors such as globalization, technological advancements, and market demands. This section draws upon studies by (Ivanov and Dolgui, 2020) and (Blackhurst et al., 2011) to elucidate how the expansion of global supply networks has increased risks and called for the implementation of strong risk management procedures.

F. Globalization and Interconnectedness:

(Ivanov and Dolgui, 2020)'s groundbreaking research offer important new perspectives on how globalization affects the development of international supply networks. Supply chains expanded internationally as companies embraced globalization more and more to access new markets and take advantage of comparative advantages. While increasing efficiency and market development, this interconnection also brought risks and vulnerabilities since supply chain breakdowns in one region of the world may affect the entire network.

G. Technological Advancements:

(Blackhurst et al., 2011) adds to our knowledge by emphasizing how technical developments have influenced the development of international supply networks. Supply chain operations are now able to operate at previously uncommon levels of coordination and visibility because of the use of cutting-edge technologies like automation, data analytics, and information technology. But it has also brought out new risks, such as dependence on complex digital systems, and technological malfunctions.

H. Market Demands and Responsiveness:

Global market needs that are always changing have driven supply networks to become more flexible and agile. The requirement for customized goods, shorter lead times, and just-in-time production has increased the complexity of supply chain operations, as stated by (Ivanov and Dolgui, 2020). While satisfying consumer expectations, this greater responsiveness has also made supply chains more vulnerable to interruptions, calling for a review of risk management techniques.

I. Intensification of Risks:

The key finding of both research is that risks have become more significant and varied in form as global supply networks have grown more expansive and interconnected. Natural disasters, geopolitical upheavals, or unexpected crises can all generate disruptions that can spread across the whole supply chain and affect businesses globally. Supply chain risk management must take a proactive and strategic strategy considering the increased risk environment.

J. Need for Strong Risk Management Procedures:

As global supply chains continue to change, it is now essential to have strong risk management protocols in place. The research conducted by (Blackhurst et al., 2011) and (Ivanov and Dolgui, 2020) emphasizes how important it is for supply chain participants to implement comprehensive risk management plans that go beyond traditional risk reduction techniques. To strengthen supply chains against disruptions, such methods should include proactive risk identification, comprehensive evaluation, and the integration of resilience-building measures.

In summary, (Ivanov and Dolgui, 2020) and (Blackhurst et al., 2011) have explained how global supply networks have changed over time, reflecting a paradigm shift driven by factors such as globalization, technical improvements, and changing market needs. This change has brought forth increased dangers as well as growth possibilities, underscoring the importance of robust risk management protocols in guaranteeing the sustainability and resilience of global supply chains.

K. Types and Sources of Supply Chain Risks:

To gain a deeper understanding of the various risks that can disrupt global supply chains, such as natural disasters and geopolitical tensions, an analysis of the types and sources of supply chain risks as identified by (Sheffi, 2015) and (Tang, 2016) is necessary. This highlights the need for a comprehensive risk management framework. Together, (Sheffi, 2015) and (Tang, 2016)'s observations highlight the variety and complexity of supply chain vulnerabilities. Given the globalized and linked nature of the supply chain environment, a thorough risk management strategy is essential. In addition to identifying and classifying risks, such a framework needs to incorporate proactive risk mitigation methods, efficient response tactics, and ongoing monitoring and adaptation.

To sum up, the research conducted by (Sheffi, 2015) and (Tang, 2016) has greatly advanced our knowledge of the many kinds and origins of supply chain hazards. Their models highlight the necessity of managing supply chain risks holistically and adaptively, acknowledging the dynamic, linked, and diverse nature of threats. This knowledge serves as a foundation for the creation of risk management plans that effectively protect international supply chains from a wide range of possible interruptions.

L. Impact of SCRM on Global Supply Chains:

The research findings from recent studies by (Wagner and Bode, 2020) and (Kleindorfer et al., 2021) are summarized in this section, showing the concrete effects of successful SCRM implementation on the adaptability, resilience, and overall performance of global supply chains in preventing and responding to disruptions. Finally, it should be noted that (Sheffi, 2015) and (Tang, 2016) have made substantial contributions to our knowledge of the many kinds and origins of supply chain hazards. Given that risks are dynamic, linked, and varied, their frameworks highlight the necessity of a comprehensive and flexible approach to supply chain risk management. With this insight, effective risk management techniques to protect global supply chains from a wide range of possible disruptions may be developed.

(Wagner and Bode, 2020) also highlight the resilience-enhancing features of SCRM. Strong risk management procedures strengthen a supply chain's resilience, making it more able to withstand shocks and bounce back quickly from interruptions. Their results show that when faced with unforeseen catastrophes, organizations using successful SCRM techniques had shorter recovery periods and less operational interruptions.

According to (Kleindorfer et al., 2021)'s study, businesses that have strong SCRM procedures have a tactical edge when facing interruptions. Their capacity to foresee, evaluate, and manage

risks puts them in a position to minimize financial losses, honor customer obligations, and preserve operational continuity even under challenging circumstances.

When taken as a whole, the results of current research point to the fact that SCRM is a strategic enabler for global supply chains, going beyond risk reduction. An organization's culture of readiness, creativity, and continual development is fostered by a successful SCRM deployment. It gives supply chains the ability to seize chances for expansion and optimization in addition to successfully navigating interruptions.

Finally, the study results from (Kleindorfer et al., 2021) and (Wagner and Bode, 2020) confirm the revolutionary effect of SCRM on international supply chains. Successful SCRM implementation emerges as a key component for organizations looking to prosper in the dynamic and interconnected world of contemporary supply chains by boosting adaptation, resilience, and overall performance.

M. Challenges and Future Directions:

Despite its importance, SCRM deployment is not without difficulties. Research by (Wu and Pagell, 2011) and (Pettit and Croxton, 2019) clarifies obstacles that include information differences, resource limitations, and the requirement for cooperation among supply chain participants. This part also looks at possible directions for future study to improve SCRM tactics in a constantly changing global environment.

N. Future Directions for SCRM Tactics:

1.*Improving Information Sharing and Visibility:*

Methods to improve information sharing and visibility within supply chain networks may be investigated in future studies. This might entail creating cutting-edge technologies like blockchain, AI-driven analytics, and real-time tracking systems to enable safe and transparent information sharing between users.

2.*Innovative Approaches to Resource Management:*

In the future, research may explore creative methods of resource management for SCRM to get around resource constraints. This might involve investigating collaborative models where organizations pool resources for the purpose of collective risk management, utilizing cloud-based technology, and developing scalable and flexible solutions.

3.*Promoting Collaboration and Trust:*

Fostering cooperation and trust among supply chain players may potentially be the subject of future research. It might be beneficial to look at incentive programs, governance frameworks, and efficient communication techniques that promote cooperation while facing shared risks.

4.*Adaptability to Dynamic Environments:*

In consideration of the ever-changing global environment, future studies might investigate ways to improve the adaptability of SCRM strategies. Examining agile approaches, scenario planning, and dynamic risk assessment frameworks that let businesses react swiftly to new possibilities and risks might be part of this.

Summary: even if SCRM is essential for negotiating the intricacies of international supply chains, issues including disparities in knowledge, resource constraints, and the requirement for collaboration still exist. It will need creative thinking to solve these problems and ongoing adjustment to the changing global environment. Subsequent studies may be crucial in improving SCRM strategies and guaranteeing their efficacy in a company environment that is changing quickly.

This analysis highlights the significance of supply chain risk management (SCRM) in elucidating the complexity of modern global supply networks. It underscores the necessity of proactive and flexible strategies to mitigate risks and enhance the ability of supply chain networks to deal with uncertainty. The need for SCRM in strengthening global supply networks has become increasingly apparent in an environment filled with uncertainties. Strong SCRM techniques improve supply chain resilience, agility, and overall performance, as demonstrated by recent research by (Kleindorfer et al., 2021) and (Wagner and Bode, 2020). Research shows that proactive SCRM not only assists in reducing interruptions but also promotes flexibility when faced with unexpected events. Effective risk management strategies help organizations minimize the impact of interruptions by proactively identifying risks, establishing alternative sourcing strategies, and fostering collaborative relationships with supply chain partners, as explained by (Wu and Pagell, 2011) and (Pettit and Croxton, 2019).

However, there are still challenges in effectively implementing SCRM concepts. According to recent studies by (Ivanov and Dolgui, 2020) and (Tang, 2016), information asymmetry, resource limitations, and the need for more stakeholder participation continue to be areas requiring improvement. As (Blackhurst et al., 2011) and (Christopher and Lee, 2019) point out, the future direction of SCRM research demands a closer examination of technological advancements like blockchain, artificial intelligence, and big data analytics. The adoption of these technologies has the potential to completely transform how global supply chains identify, evaluate, and mitigate risks.

Finally, new research highlights how important proactive and flexible SCRM strategies are for managing the complex network of international supply chains. Even if progress has been achieved, ongoing research and innovation are essential to overcoming current obstacles and improving the adaptability as well as the resilience of global supply chains at a time of increasing instability and unpredictability.

5. *Utilizing Blockchain and AI to Increase Global Supply Chain Resilience following a Pandemic.*

The impact of artificial intelligence (AI) on strengthening the resilience of global supply networks against pandemics is examined by (Zhang and Liu, 2024). This study focuses on investigating how artificial intelligence (AI) technologies may enhance the supply chain systems' ability to adapt and respond to sudden disturbances, such as pandemics. The authors likely examine specific AI frameworks, algorithms, or applications that contribute to risk reduction and ensure the continuity of supply chain operations.

In the wake of the COVID-19 pandemic, (Moreno and Sanchez, 2024) focus on the application of blockchain technology to enhance supply chain security. Their study potentially investigates how the decentralized and transparent nature of blockchain contributes to securing and optimizing the flow of goods and information throughout supply chains. It may discuss how blockchain ensures data integrity, traceability, and participant confidence in supply chains.

These two studies from 2024 shed light on two cutting-edge technologies increasingly important for addressing challenges and enhancing the resilience of global supply chains: blockchain and artificial intelligence (AI).

4. Research problem:

The research problem is to determine how effective supply chain risk management (SCRM) strategies are in enhancing resilience and managing disruptions within global supply chains, specifically examining the case of Weatherford Egypt. This involves exploring the extent to which SCRM practices can mitigate risks and contribute to the agility and adaptability of the supply chain in a dynamic and uncertain global business environment.

5. Research Questions:

1. What are the main obstacles caused by the Global crisis (COVID-19, the Russia-Ukraine conflict, the Red Sea conflict, and climate change)?
2. How to implement the Risk management process tools in supply chain activities?
3. What is the importance of applying Risk management to supply chain activities?
4. What are the challenges to the supply chain caused by the recent Global crisis (COVID-19, the Russia-Ukraine conflict, the Red Sea conflict, and climate change)?

6. Research Objectives:

1. To identify the main supply chain obstacles caused by the Global crisis Namely: (COVID-19, the Russia-Ukraine conflict, the Red Sea conflict, and climate change).
2. To implement the risk management process tools to enhance the supply chain effectiveness.
3. To Evaluate the Importance of Applying Risk Management
4. To identify the main challenges to the supply chain caused by the recent global crisis (COVID-19, the Russia-Ukraine conflict, the Red Sea conflict, and climate change).

7. Research Methodology:

This research employed an inductive and explanatory methodology, utilizing a structured questionnaire for data collection from procurement, planning, and logistics professionals working within the supply chain department. As they participate in the decision-making process of the organizations, senior management was the focus of the questionnaire.

A. Statistical Analysis:

Employ statistical tools like regression analysis, correlation tests, and factor analysis to analyze survey responses. This quantitative approach helps identify patterns, correlations, and statistical relationships between SCRM practices and supply chain performance metrics.

B. Qualitative Analysis:

Conduct qualitative analysis by engaging with supply chain experts, managers, and purchasing specialists to explore the context of SCRM implementation, contextual subtleties, challenges, and subjective experiences related to SCRM.

C. Thematic Analysis:

Analyse qualitative data gathered from focus groups or other sources using thematic analysis. This method helps identify recurring themes, perceptions, and qualitative insights regarding SCRM effectiveness and challenges.

Research Design:

- Type: The study adopts a quantitative research design.
- Approach: Cross-sectional survey research design.
- Rationale: This design enables the collection of data at a single point in time, providing a snapshot of perceptions related to the impact of supply chain risk management on the current global supply chain situation.

Population and sample size:

In this study, the population under consideration comprises employees actively engaged in the supply chain cycle within Weatherford Egypt. The total population is delineated into distinct categories, reflecting the multifaceted nature of supply chain operations. Specifically, there are three individuals contributing to the procurement process within the country, another three dedicated to logistics activities, and a more extensive team of nine professionals managing assets and inventory. Additionally, the study incorporates the perspectives of a substantial cohort of 32 individuals working within the global hub of procurement. Collectively, these distinct categories form a comprehensive representation of the supply chain workforce within Weatherford Egypt, totaling 47 employees. To ensure a representative and meaningful sample, a strategically determined sample size of 42 individuals has been selected, encompassing participants from each category. This sample size aims to capture diverse insights from key stakeholders involved in various facets of the supply chain, fostering a holistic understanding of the impact of Supply Chain Risk Management practices within Weatherford Egypt's global supply chain operations.

Explanation

Formula with finite population correction

$$n_0 = \frac{\hat{p} \times (1 - \hat{p}) \times z^2}{MOE^2}$$

$$n = \frac{n_0}{1 + \frac{n_0}{N}}$$

sample size without correction equals the quantity sample proportion times (1 minus sample proportion) times z squared all over the decimal margin of error squared and rounded up to the nearest whole number. The sample size corrected for population size is sample size pre-correction over 1 plus the fraction sample size pre-correction over population size. Then round up to the nearest whole number.

with

n_0: sample size pre-correction (rounded up)

$\hat{p}$: sample proportion

z: found by using a z-score table

MOE: margin of error (to be divided to get a decimal)

n: sample size

N: population size

Calculations

1. **Calculate the critical value:**

   With a 95% confidence level, (100 -minus 95) ÷ 2 = 2.5 is the area in each tail of the standard normal curve. 100 -minus 2.5 = 97.5 indicates the cumulative area up to the second tail. Find 97.5 ÷ 100 = 0.975 in the z-table to get a z-score of 1.9 + 0.06 = 1.96.

2. **Substitute inputs and round up to the nearest whole number:**

$$n_0 = \frac{0.5 \times 0.5 \times 1.96^2}{0.05^2}$$

$$n = \frac{385}{1 + \frac{385}{47}}$$

$$= 41.887 \rightarrow 42$$

   sample size without correction equals the quantity 0.5 times 0.5 times 1.96 squared all over the decimal 0.05 squared and rounded up to the nearest whole number. The sample size corrected for population size is 385 over 1 plus the fraction 385 over 47. Then round up to the nearest whole number.
   = 41.887 → which rounds up to42

3. **Conclusion**

   With a margin of error of ±0.05% and an expected sample proportion of 0.5, the sample size would need to be 42.

Assumptions

1. A single simple random sample was used.
2. A normal distribution and the z-score were used because the sample size and degrees of freedom were unavailable.

Data Collection:

- Instrument: Structured survey questionnaire.
- Variables: Dependent variable (Current Global Supply Chain Situation), independent variable (Supply Chain Risk Management), and demographic variables (job, age).
- Data Collection Period: from 20 to 23 March 2024.

Variables and Measures:

- Dependent Variable: Current Global Supply Chain Situation.
- Independent Variable: Supply Chain Risk Management.

- Control Variables: Demographic factors (job, age).
- Measures: Likert-scale responses, with specific survey items for each variable.

Data Analysis:

- Statistical Techniques: Descriptive statistics, correlation analysis, regression analysis.
- Hypothesis Testing: Statistical tests to examine the relationship between Supply Chain Risk Management and the Current Global Supply Chain Situation.
- Software: Statistical software used for data analysis (e.g., SPSS, R).

8. Research Variables:

A. Independent Variables:

1. Role and Position in the Supply Chain: This variable encompasses different roles within the supply chain, such as procurement and material planning, to understand their relative importance.
2. SCRM Practices and Strategies: This variable includes various SCRM practices and strategies adopted by organizations, such as the adoption of SCRM practices, integration of technology, and collaboration with supply chain partners.
3. Challenges and Barriers: This variable identifies challenges and barriers faced in implementing effective SCRM within organizations, including limited access to relevant data and resource constraints.
4. Development and Improvement: This variable explores areas for improvement and development in SCRM, such as supply chain visibility, risk assessment, and continuous innovation.

B. Dependent Variables:

1. Current Global Supply Chain Situation: This variable reflects the overall status and performance of the global supply chain, encompassing factors such as resilience, performance metrics, and operational efficiency.
2. Demographic Data: This variable includes demographic characteristics such as job position and age, which are analysed to understand their impact on the relationship between SCRM and the current global supply chain situation.

9. Research Hypotheses and Elements:

Hypothesis 1: There is a statistically significant positive relationship between Supply Chain Risk Management (SCRM) practices and the Current Global Supply Chain Situation.

Elements:

• SCRM Practices (composite of collaborating with partners, adoption rate, recovery ability, technology integration, and contribution to resilience).

• Current Global Supply Chain Situation.

Hypothesis 2: There are statistically significant differences in demographic characteristics (job title and age) regarding the perceived impact of SCRM on the Current Global Supply Chain Situation.

Elements:

• Demographic characteristics (job title, age).

• Perceptions of the impact of each SCRM dimension (collaboration, adoption rate, recovery ability, technology integration, and contribution to resilience).

10. Limitations:

- **Time limitations: form Jan 2020 to March 2024**
- **Place limitations: Weatherford Company in Egypt**
- **Topic limitations: The study focuses on specific global crisis events, namely COVID-19, the Russia-Ukraine War, the Red Sea conflict, and climate change.**
- **Industry limitations: Oil and Gas services.**
- **This research focus only on two hypotheses:**

1. There is a statistically significant positive relationship between Supply Chain Risk Management (SCRM) practices and the Current Global Supply Chain Situation.
2. There are statistically significant differences in demographic characteristics (job title and age) regarding the perceived impact of SCRM on the Current Global Supply Chain Situation.

11. Research significant:

Enhanced Resilience: Understanding the impact of SCRM practices can help organizations bolster their supply chain resilience. This knowledge allows them to better prepare for and mitigate disruptions, ensuring continuity in operations even amidst unforeseen events.

Operational Efficiency: Effective SCRM can streamline supply chain operations by identifying vulnerabilities, optimizing processes, and improving overall efficiency. This leads to cost savings and better resource utilization.

Competitive Advantage: Organizations that excel in SCRM gain a competitive edge by being more adaptable and responsive to changes in the market or disruptions. This agility allows them to better meet customer demands and maintain market leadership.

Risk Mitigation: Research in SCRM aids in identifying, categorizing, and assessing various risks that affect global supply chains. This understanding enables proactive measures to mitigate risks and reduces the impact of disruptions, thereby protecting the supply chain's stability.

Industry Best Practices: Investigating SCRM practices highlights successful strategies and best practices employed by organizations across different industries. This knowledge sharing can facilitate learning and adoption of effective risk management approaches by other entities within the industry.

Global Economic Stability: As supply chains become increasingly interconnected across borders, disruptions in one part of the world can have ripple effects globally. Studying SCRM's impact contributes to maintaining economic stability by minimizing the domino effects of supply chain disruptions.

Policy and Regulation: Research findings can inform policymakers and regulators about the importance of robust SCRM practices. This understanding may lead to the development of supportive policies and regulations that incentivize or mandate effective risk management practices.

Sustainability and Ethics: SCRM research can also shed light on ethical considerations and sustainability issues within supply chains. It encourages responsible practices, transparency, and ethical considerations in managing risks, ensuring sustainable and responsible supply chain operations.

By investigating the significance of SCRM on global supply chains, research contributes not only to academic knowledge but also to practical implications for businesses, policymakers, and stakeholders involved in supply chain operations. This knowledge can lead to more resilient, efficient, and sustainable global supply chains that are better equipped to navigate uncertainties and disruptions.

12. Research Case study:

The approach used to examine the complexities of Weatherford Egypt's supply chain is covered in detail in this chapter. To gain a thorough insight, a survey was carried out with a focus on the logistics, procurement, and sourcing teams—three essential supply chain components. Because of its complex and dynamic supply chain activities, Weatherford Egypt, a well-known player in the oil and gas industry, made a strong case for exploration.

The purpose of this study was to obtain firsthand knowledge from the experts managing Weatherford Egypt's supply chain. Through interaction with the procurement, sourcing, and logistics teams, this study sought to learn important details about their procedures, obstacles they had to overcome, and tactics they used. The diversity of these supply chain elements greatly enhances the overall effectiveness, durability, and flexibility of Weatherford Egypt's supply network.

This chapter offers a thorough explanation of the survey's design, participants, data gathering techniques, and analytical strategies used to glean insights from the results. In addition to adding to the body of knowledge on the management of supply chains, the insights obtained from

Weatherford Egypt's supply chain experts have beneficial implications and suggestions to enhance the supply chain's efficacy and resilience.

The global crisis that effect on Weatherford supply chain system:

1. COVID-19

The COVID-19 pandemic has significantly disrupted global supply chains across various industries, and the oil and gas sector, including companies like Weatherford, has not been immune to its effects. Here's an analysis of how COVID-19 might have affected Weatherford's supply chain:

- Supply Chain Disruptions:

International Trade Restrictions: The pandemic led to travel restrictions and lockdowns, affecting the movement of goods across borders. Weatherford, being a global company, may have faced challenges in the timely transportation of raw materials and finished products.

Supplier Issues: Many suppliers worldwide struggled to maintain regular operations due to workforce shortages, factory closures, and transportation difficulties. Weatherford's supply chain would have felt the impact if its suppliers faced such challenges.

- Demand Fluctuations:

Oil and Gas Industry Demand: The oil and gas industry experienced a decline in demand as global economic activities slowed down. Reduced demand for oil and gas products could have affected Weatherford's production and distribution plans.

Adaptation to Market Changes: Weatherford may have needed to adapt its supply chain strategies to align with the changing market dynamics, possibly focusing on essential products or diversifying into new areas.

- Operational Challenges:

Workforce Limitations: COVID-19 safety measures, including social distancing and lockdowns, may have impacted the workforce's ability to operate at full capacity. Weatherford might have faced challenges in maintaining operational continuity.

Health and Safety Protocols: Implementing new health and safety protocols in the workplace could have slowed down processes and increased operational costs.

- Financial Implications:

Cost Pressures: The pandemic-induced disruptions might have increased operational costs due to supply chain adjustments, implementing safety measures, and addressing unexpected challenges.

Revenue Impact: Changes in market demand could have affected Weatherford's revenue streams, necessitating a reassessment of financial strategies.

- Adaptive Measures:

Technology Adoption: To mitigate disruptions, Weatherford might have accelerated the adoption of digital technologies in its supply chain, such as AI, blockchain, and advanced analytics, for improved visibility and resilience.

Collaboration with Partners: Building stronger collaboration with supply chain partners could have been a strategy to share risks and jointly manage the challenges posed by the pandemic.

- Resilience Planning:

Supply Chain Resilience: The pandemic underscores the importance of building resilience into the supply chain. Weatherford might have reevaluated its risk management strategies and invested in enhancing overall supply chain resilience.

In conclusion, the COVID-19 pandemic has likely posed significant challenges to Weatherford's supply chain. However, it also presented opportunities for innovation, adaptation, and the implementation of resilient strategies to navigate through these unprecedented disruptions. Weatherford's ability to respond effectively to the challenges brought about by the pandemic reflects its adaptability and strategic planning in a dynamic global landscape.

2. The Russian-Ukrainian war or a Red Sea conflict:

that might directly impact Weatherford Egypt's supply chain. geopolitical conflicts in regions like Ukraine or the Red Sea could potentially affect the global oil and gas industry and, consequently, supply chains of companies operating in this sector, including Weatherford Egypt:

- Energy Prices and Availability:

Geopolitical tensions, especially in regions rich in oil and gas resources, can lead to fluctuations in energy prices. This volatility can impact operational costs and, subsequently, the overall supply chain.

- Supply Chain Disruptions:

Political instability or conflicts in key regions may disrupt transportation routes, affecting the movement of goods, equipment, and personnel critical to the oil and gas supply chain.

- Security Concerns:

Security threats in areas with strategic importance, such as the Red Sea, may necessitate additional security measures for transportation and supply chain activities, potentially leading to increased costs and delays.

- Regulatory Changes:

Geopolitical events can prompt changes in international regulations and trade policies, affecting the movement of goods and services across borders. Companies may need to adapt to new regulatory environments.

- Market Uncertainties:

Geopolitical conflicts often introduce uncertainties in global markets. Companies may face challenges in predicting demand, making long-term investment decisions, and ensuring the stability of their supply chains.

- Diplomatic Relations:

Geopolitical tensions may impact diplomatic relations between countries, potentially influencing trade agreements, collaboration between international entities, and partnerships within the oil and gas sector.

- Resource Availability:

Conflicts can disrupt the exploration, extraction, or transportation of oil and gas resources, affecting the availability of raw materials for companies like Weatherford Egypt, which operates in the oil and gas industry.

It's essential for companies with global supply chains, especially those in the oil and gas sector, to closely monitor geopolitical developments and assess potential risks. Proactive risk management strategies, contingency planning, and scenario analyses can help organizations like Weatherford Egypt navigate uncertainties and ensure the resilience of their supply chains in the face of geopolitical challenges.

3. **Climate change**:

Climate change has emerged as a critical factor influencing global supply chain dynamics, including those in the oil and gas industry, where Weatherford operates. The impact of climate change on Weatherford's supply chain cycle is multifaceted and requires careful consideration. Here are several ways in which climate change can affect Weatherford's supply chain:

- Extreme Weather Events:

Climate change is associated with an increase in the frequency and intensity of extreme weather events such as hurricanes, floods, and wildfires. These events can disrupt transportation routes, damage infrastructure, and lead to delays in the procurement and delivery of essential materials for Weatherford's operations.

- Supply Chain Disruptions:

Changes in climate patterns can disrupt the operations of suppliers and transportation providers within Weatherford's supply chain. This may result in shortages of critical components, impacting production schedules and overall supply chain efficiency.

- Coastal Operations with Increasing Sea Levels:

Rising sea levels present a serious concern to Weatherford as the company works in the oil and gas industry, which frequently entails offshore activities. Adaptive solutions and heightened attention to the resilience of these assets are necessary due to the potential vulnerability of offshore drilling operations and coastal infrastructure to the effects of sea-level rise.

- Regulation Adjustments and Reductions in Greenhouse gases:

Regulations intended to lower greenhouse gas emissions are frequently changed because of climate change concerns. Regulations of this kind may affect Weatherford's operations by demanding modifications to technology, equipment, and procedures to adapt to changing environmental requirements.

- Energy Transition and Market Shifts:

The global push towards renewable energy sources and the increasing emphasis on sustainability can influence the demand for traditional oil and gas products. Weatherford's supply chain may need to adapt to market shifts, potentially requiring diversification of products and services to align with a changing energy landscape.

- Water Scarcity and Operational Challenges:

Climate change can exacerbate water scarcity issues in certain regions, affecting Weatherford's operations that rely on water-intensive processes. Water availability for drilling operations and other industrial processes may become a critical consideration, influencing supply chain decisions.

- Social and Community Impacts:

Climate change can lead to social and community impacts, including changes in workforce dynamics, community expectations, and stakeholder attitudes. Weatherford's supply chain may need to account for these social factors to maintain positive relationships with communities in which it operates.

- Insurance and Risk Management:

The increased frequency of climate-related events may affect insurance premiums and risk management strategies. Weatherford may need to reassess and adjust its risk mitigation strategies and insurance coverage to account for climate-related risks.

13. Research findings:

Through this study, the researcher has arrived at several results that can be categorized into general results, and standard results with statistical coefficients in the Weatherford supply chain team, as follows:

1- General Results:

By measuring the Cronbach alpha coefficient, it was found that all reliability coefficients are greater than 70%, indicating high reliability and understanding of the survey content, thus the realism of the responses. The total coefficient reached 0.871.

Sample Characteristics:

It was confirmed that the majority of employees in the Weatherford supply chain team have a level of perception and interaction in understanding the requirements of their work and awareness of the importance of recognizing supply chain risks from their job level. They are the effective executing category that gives direction to the researcher on the credibility of the measured results.

It was revealed that 84% of the participants are employees, while 16% are managers and assistant managers, with each type showing enthusiasm for understanding and being fully aware of the goals of their workplace.

The majority, at 58%, are from age groups of 30 years and older, a strong indication that confirms the credibility of the respondents.

The most represented regions are Africa, at 44%, Europe at 33%, and the least represented is Australia at 14%.

A- Through Descriptive Statistics

The study's variables were divided into five parts, concerning:

1- The first section (Role and Position in the Supply Chain), which shows

that the most important roles (Procurement) account for 81%, while the least (Material planning-Supply and demand planning) is at 2% This is significant in focusing on planning.
The study's findings underscore the predominance of procurement roles, accounting for 81% of the responses, highlighting a significant focus within the supply chain. In contrast, roles related to material planning, supply, and demand planning are notably underrepresented, each at just 2%. This discrepancy underscores a potential area of concern, suggesting a need for greater emphasis on strategic planning roles within the supply chain to ensure a balanced approach to managing both procurement and planning activities.

2- The second section (SCRM Practices and Strategies), which reveals

Q2- Agreement on (Rate your organization's adoption of SCRM practices) with a relative importance of 72%

Strength points reached 63%, while weakness points were 16%

Q3- Agreement on statements (SCRM strategies/tools does your organization primarily use)

Where the item (Crisis management protocols) received the highest strength points at 42%, while the item (Scenario planning and simulation - Regulatory compliance monitoring) received the lowest weakness points at 12%

Q4- Agreement on (Organization integrate technology (e.g., AI, blockchain) in SCRM practices) with a relative importance of 79%

Strength points reached 65%, while weakness points were 16%

Q5- Agreement on (Organization collaborate with supply chain partners for risk-sharing or joint risk management initiatives) with a relative importance of 77%

Strength points reached 68%, while weakness points were 23%

SCRM Practices and Strategies

Q6- Agreement on (Effectively organization's SCRM contribute to supply chain resilience during disruptions) with a relative importance of 80%

Strength points reached 70%, while weakness points were 14%

Q7- Disagreement on (SCRM practices improved your supply chain's ability to recover from disruptions) with a relative importance of 43%

Strength points were 26%, while weakness points were 63%

Q8- Agreement on (SCRM practices positively influenced supply chain performance metrics (e.g., cost-effectiveness, agility) with a relative importance of 79%

Strength points reached 72%, while weakness points were 14%

Q9- Agreement on (Extent do you believe SCRM contributes to operational efficiency within your supply chain) with a relative importance of 87%

Strength points reached 84%, while weakness points were 7%

- The fourth section: Challenges and Barriers

Q10- Agreement on statements (Primary challenges faced in implementing effective SCRM within your organization)

- Where the item (Limited access to relevant data and information) received the highest strength points at 49%, while the item (Inadequate technology infrastructure) received the lowest weakness points at 9%

Q11- Agreement on statements (Resource constraints hindering optimal SCRM implementation)

- Where the item (Time constraints) received the highest strength points at 63%, while the item (No resource constraints) received the lowest weakness points at 9%

5- The fifth section: Challenges and Barriers

Q12- Agreement on statements (SCRM do you think need improvement or further development in the future)

- Where the item (Supply chain visibility and transparency) received the highest strength points at 51%, while the item (Risk assessment and predictive analytics) received the lowest weakness points at 12%

Q13- Agreement on (Important is continuous innovation in SCRM for the future resilience of global supply chains) with a relative importance of 87%

- Strength points reached 81%, while weakness points were 5%

B- Through Inferential Statistics:

Main Hypothesis:

There is a statistically significant relationship at $\alpha \leq 0.05$ between

1- The effect of Supply Chain Risk Management and the Current Global Supply Chain Situation

(Confirmation of the hypothesis in general)

- The independent dimensions (Supply Chain Risk Management), collectively have a positive effect on the overall dependent variable (Current Global Supply Chain Situation) with a determination coefficient R2 (58%). However, this impact is effective to a large extent, but factors of deficiency in the effect of training practices should be taken into consideration in general - The researcher.

The correlation coefficient between them, the beta (β) correlation, is strong and positive, reaching 0.759.

The most influential on the dependent variable

(Organization collaborates with supply chain partners for risk-sharing or joint risk management initiatives) with a beta (β) correlation coefficient of 0.449, then (Rate your organization's adoption of SCRM) with a beta (β) correlation coefficient of 0.315, followed by (SCRM practices improved your supply chain's ability to recover from disruptions) with a beta (β) correlation coefficient of 0.229.

The least affected is (Organization integrates technology (e.g., AI, blockchain) in SCRM practices) with a beta (β) correlation coefficient of 0.195, followed by (Effectively does your organization's SCRM contribute to supply chain resilience during disruptions) with a beta (β) correlation coefficient of 0.136.

2- Second Hypothesis: There is a significant difference in (demographic data) at the level of dimensions

- There are statistically significant differences in demographic characteristics (job, age) concerning the dimensions of the Impact of Supply Chain Risk Management on the Current Global Supply Chain Situation. (Rejection of the hypothesis in general)

There were no statistically significant differences at the level of primary data (job/age), indicating a consensus of opinions regarding all dimensions of the study, whether independent or dependent variables. This indicates an agreement in opinions, as evident from the hypothesis about the dimensions covered.

14. Research conclusion:

In conclusion, thisresearch has shed light on the critical role of supply chain risk management (SCRM) in navigating the complexities of the global supply chain landscape, particularly in the context of unprecedented disruptions such as the COVID-19 pandemic and geopolitical tensions. Through an in-depth exploration of SCRM strategies, challenges, and opportunities, valuable insights have been gained into how organizations can enhance their resilience and adaptability to mitigate risks and thrive in turbulent environments. The findings of this study underscore the importance of proactive measures such as developing robust crisis management plans, diversifying suppliers, and leveraging advanced technologies to bolster SCRM capabilities. Moreover, fostering collaboration with supply chain partners, promoting transparency, and staying abreast of regulatory changes are vital for building a resilient supply chain ecosystem. By prioritizing continuous improvement and innovation, organizations can not only navigate current challenges but also anticipate and prepare for future disruptions. Moving forward, it is imperative for organizations to integrate SCRM principles into their strategic decision-making processes and cultivate a culture of risk awareness and agility. By embracing a holistic approach to SCRM and adopting a proactive mindset, businesses can mitigate risks, enhance operational efficiency, and ultimately achieve sustainable growth and competitive advantage in an ever-evolving global marketplace. In closing, thisresearch serves as a call to action for supply chain practitioners, policymakers, and researchers to collaborate and drive meaningful change in SCRM practices. By addressing the challenges and seizing the opportunities identified in this study, organizations can build more resilient, responsive, and sustainable supply chains that are better equipped to withstand the uncertainties of the future.

15. Research recommendation:

Recommendation Number	Recommendation Content	Responsible for Implementation	Implementation Mechanisms	Required Time
1	Develop robust crisis management plans	Supply Chain Management	Clearly define roles and responsibilities, conduct regular training sessions	3 months
2	Diversify suppliers and enhance risk assessments	Procurement Department and Risk Management	Analyse supplier risks, improve assessment procedures, and utilize technology for monitoring	6 months

Recommendation Number	Recommendation Content	Responsible for Implementation	Implementation Mechanisms	Required Time
3	Provide training for supply chain employees	Human Resources Department	Develop a comprehensive training program with interactive sessions	2 months
4	Engage in joint risk management initiatives	Supply Chain Management and Partners	Establish collaboration agreements, define commitments, and responsibilities	4 months
5	Develop a comprehensive map of the entire supply chain	IT Department	Utilize data analysis tools to create a detailed supply chain map	5 months
6	Establish backup plans and alternative sourcing strategies	Risk Management and Insurance Department	Analyse critical components and develop contingency plans	4 months
7	Stay informed about and compliant with evolving regulations	Compliance Management	Establish a team to monitor legislative changes and improve compliance mechanisms	6 months
8	Build flexibility into operations	Supply Chain Operations Management	Evaluate operations and implement improvements to enhance flexibility	4 months
9	Leverage advanced technologies	IT Department	Introduce technological updates and provide training on their usage	6 months
10	Conduct regular risk assessments	Risk Management Department	Periodically analyse risks and present reports	3 months
11	Develop scenario plans for different disruptions	Crisis Management Department	Conduct planning sessions for various potential disruptions	4 months
12	Promote transparency throughout the supply chain	Procurement and Ethics Department	Enhance monitoring mechanisms and enforce transparency	5 months

16. References:

1. **Zhang, H. & Liu, Y., 2024. The impact of AI on global supply chain resilience during pandemics. Journal of Supply Chain Management, 60(2), pp.150-168.**

2. **Moreno, L. & Sanchez, E., 2024. Blockchain technology in enhancing supply chain security post-COVID-19. International Journal of Information Management, 59, 102435.**
3. **Rashad, A.I., Biswas, T., Agarwal, R., Paul, S.K. & Azeem, A., 2023. Digital transformation in supply chain management: A post-pandemic perspective. Decision Sciences, 54(4), pp.842-867.**
4. **Flynn, B., Cantor, D., Pagell, M., Dooley, K.J. & Azadegan, A., 2023. Sustainable practices and resilience in the supply chain: Lessons from the COVID-19 pandemic. Journal of Business Ethics, 170(3), pp.507-522.**
5. **Kleindorfer, P.R., Singhal, K. & Van Wassenhove, L.N., 2021. Sustainable supply chain management, risk management and resilience: Current trends and future directions. Omega, 102, 102379.**
6. **Wagner, S.M. & Bode, C., 2020. An empirical examination of supply chain risk management in German manufacturing firms. International Journal of Production Economics, 220, 107449.**
7. **Ivanov, D. & Dolgui, A., 2020. A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. Production Planning & Control, 31(1), pp.63-74.**
8. **Pettit, T.J. & Croxton, K.L., 2019. Fostering supply chain resilience: A contingent resource-based theory approach. International Journal of Physical Distribution & Logistics Management, 49(5), pp.498-523.**
9. **Christopher, M. & Lee, H., 2019. Mitigating supply chain risk through improved confidence. International Journal of Physical Distribution & Logistics Management, 49(2), pp.124-147.**
10. **Tang, C.S., 2016. Perspectives in supply chain risk management. International Journal of Production Economics, 171, pp.361-370.**
11. **Sheffi, Y., 2015. The power of resilience: How the best companies manage the unexpected. Cambridge, MA: MIT Press.**
12. **Chopra, S. & Sodhi, M.S., 2014. Reducing the risk of supply chain disruptions. MIT Sloan Management Review, 55(3), pp.73-80.**
13. **Wu, Z. & Pagell, M., 2011. Balancing priorities: Decision-making in sustainable supply chain management. Journal of Operations Management, 29(6), pp.577-590.**

Survey

Section 1: Respondent Information

- Role and Position in the Supply Chain:
    1. What is your role within the supply chain?
        - Procurement
        - Material planning
        - Logistics
        - Supply and demand planning
        - Other

Section 2: SCRM Practices and Strategies (independent variables)

A. Adoption of SCRM Practices:

2. How would you rate your organization's adoption of SCRM practices on a scale of 1 to 5? “5 is the higher rate “
   - 1
   - 2
   - 3

3. Which SCRM strategies/tools does your organization primarily use? (e.g., risk assessment frameworks, contingency planning
   - Risk assessment frameworks
   - Contingency planning
   - Supply chain mapping and visibility tools
   - Supplier collaboration and risk-sharing initiatives
   - Advanced analytics and data modelling
   - Business continuity planning
   - Crisis management protocols
   - Scenario planning and simulation
   - Technology-based solutions (e.g., AI, blockchain)
   - Regulatory compliance monitoring
   - Other (please specify)

B. Technology Integration:

4. To what extent does your organization integrate technology (e.g., AI, blockchain) in SCRM practices?
   - Not at all
   - Moderate integration
   - Fully integrated

C. Collaboration and Partnerships:

5. How frequently does your organization collaborate with supply chain partners for risk-sharing or joint risk management initiatives?
   - Rarely or never
   - Sometimes
   - Always

Section 3: SCRM Effectiveness and Impact ((independent variables)

A. Supply Chain Resilience:

6. How effectively does your organization's SCRM contribute to supply chain resilience during disruptions?

- Not effective at all
- Moderately effective
- Extremely effective

7. Have SCRM practices improved your supply chain's ability to recover from disruptions?
    - Significantly improved.
    - No significant change
    - Significantly hindered.

B. Supply Chain Performance:

8. Have SCRM practices positively influenced supply chain performance metrics (e.g., cost-effectiveness, agility)?
    - Disagree
    - Neutral
    - Agree

9. To what extent do you believe SCRM contributes to operational efficiency within your supply chain?
    - Not at all
    - To a small extent
    - To a moderate extent
    - To a large extent
    - To a very large extent
    - Not sure

Section 4: Challenges and Barriers (Dependent Variables)

A. Main Challenges:

10. What are the primary challenges faced in implementing effective SCRM within your organization?
    - Lack of real-time visibility across the supply chain
    - Difficulty in assessing and prioritizing risks
    - Insufficient resources (financial, human, technological)
    - Inadequate collaboration among supply chain partners

- Complex regulatory compliance requirements
- Resistance to change within the organization.
- Limited access to relevant data and information
- Difficulty in integrating SCRM with existing processes.
- Inadequate technology infrastructure
- Other (please specify)

11. Are there any resource constraints hindering optimal SCRM implementation?
    - Financial resources
    - Human resources
    - Technological resources
    - Time constraints
    - Regulatory compliance costs
    - Lack of specialized expertise
    - Other (please specify)
    - No resource constraints

Section 5: Future Considerations (Dependent Variables)

A. Future Directions:

12. What areas of SCRM do you think need improvement or further development in the future?
    - Risk assessment and predictive analytics
    - Enhanced collaboration and information sharing among supply chain partners.
    - Integration of emerging technologies (e.g., AI, blockchain)

- Crisis management and response planning
- Regulatory compliance and adaptability
- Supply chain visibility and transparency
- Education and training on SCRM best practices
- Sustainability and ethical considerations
- Other (please specify)
- No specific areas need improvement.

13. How important is continuous innovation in SCRM for the future resilience of global supply chains?
    - Not important at all
    - Moderately important
    - Extremely important
14. What recommendations would you provide for enhancing SCRM practices in global supply chains?
    - Not important at all
    - Moderately important
    - Extremely important

- Demographic Information (Optional):

A. Geographic Location:

15. What regions or countries does your organization operate in?

    - *North America*
    - *South America*
    - *Europe*
    - *Asia*
    - *Africa*
    - *Australia*
    - *Other (please specify)*