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Research Article

Financial Risk Management in Global Supply Chains: Strategies for Resilience and Profitability

Dr Ajatashatru Samal[1], Dr.Sri Hari V[2], Dr.Karpagavalli.G[3], Dr Y Muralidhar Reddy[4], Dr. Roopa K[5], Dr N Subbu Krishna Sastry[6]

[1]*Associate Professor & HOD, Department of MBA, Sri Venkateshwara college of Engineering, Bangalore, email- ajatashatru7@gmail.com*

[2]*Associate Professor And HOD, MBA Dept,*

Akash Istitute of Technology, Devanahalli, Bangalore-562110, Ph+91-9945906770,

Email id-sheshadri77@gmail.com, vsrihariboss@gmail.com

[3]*Assistant Professor, ISBR Business School, Bangalore. Email id:*

karpagavalligkv@gmail.com

[4]*Professor ,Department of MBA,Cambridge Institute of technology Bengaluru*

Email-muralidhar.mba@cambridge.edu.in

[5]*Associate Professor ,Department of MBA*

Cambridge Institute of technology Bengaluru

Email- roopak.mba@cambridge.edu.in

[6]*MBA MPhil, PhD (PDF)*

Professor, School of Management, CMR university Bangalore

Email-oviansastry@gmail.com

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ABSTRACT

Supply chains of the global economy are wedded to financial risks such as exchange risk, political risk, risk of variation in regulation, and risk of economic cycles. Mitigating of these risks is very crucial so as to guarantee the organization's stability and its ability of making profits. This research paper analyses the measures that organizations have taken towards buffer financial threats in international supply systems. It explores the risk identification, risk evaluation and risk mitigation measures; that include, financial risk management, supplier diversification, application of IT and jointly managed risk-bearing structures. Importantly, the study also includes the discussion of the use of innovations, including blockchain and predictive analytics, in increasing positive financial reporting and better predicting necessary decisions. Examples of supply chain risk management solutions are discussed through various company examples and best practices. The case study lends credence to managing the financial risks in supply chain planning and realistic, responsive approaches to perpetuating profit margin in the unstable global economy. To the best of the author's knowledge, this paper adds value to existing literature by offering specific recommendations that can be implemented by practitioners and policymakers to enhance supply chain manageability and affordability.

Keywords: financial risk management, global supply chains, resilience, profitability, risk mitigation, predictive analytics, blockchain, supplier diversification

INTRODUCTION

In the current globalized society, supply chain forms the most crucial link of trade and business interconnectivity between countries across the world. This complex of webs enhances the smooth and efficient delivery of goods, services and information across national borders to meet consumers' needs. However, the dynamics of today's supply chain show that supply chains are vulnerable to a spectrum of financial risks due to complexity and interdependencies. This Section describes how various external influences negatively affect the operations and profitability of an international business organisation, these factors include; Fluctuations in currency exchange

rates, Changes in the price of raw material, Economic fluctuations such as recessions, Political instabilities leading to geopolitical risks, Changes in the legal framework.

Managing of financial risks in international supply chains: from a reactive activity to strategic management. It is crucial for organizations to risk manage by identifying, evaluating, and controlling potentiated risks to sustain organisational resilience and competitiveness. This requires new approaches like financial risk management, inputs diversification and use of new technologies in supply chain management including blockchain, artificial intelligence among others. Besides, many of these approaches do not only offset large sums exposure to money but also improve decisions and operations.

Emerging challenges such as pandemics, the ongoing Russian-Ukrainian war, trade wars and the like indicate the need for sound systems in managing financial risks. These events have exposed weakness and frailties in various supply chains and strongly underlined the need to develop structures capable of establishing themselves in such adverse conditions.

To this end this paper aims to examine the measures and methods that enterprises use in mitigating financial risks in global supply chains. Through reviewing successful case scenarios and investigating new trend information the study expects to present viable strategies for organisations which closely consider logistics performance for both stability and profitability in the supply chain industry.

LITERATURE REVIEW

Amid an ever-changing and unpredictable environment, supply chain management has emerged as a key area that will allow firms to affordably handle risks while continuing operations. This paper's literature review compiles and synthesizes information from a variety of sources, including research, best practices, and current publications, on specific supply chain resilience techniques, frameworks, and concerns.

The need to build a supply chain that can successfully handle risks is acknowledged by Christopher and Peck (2004a). According to Christopher and Peck (2004b), supply chain procedures should be intentionally designed with flexibility and redundancy in order to enhance response and recovery times.

This is expanded upon in Sheffi's (2005) book The Resilient Enterprise, in which he asserts that resilience may in fact be a competitive advantage. Drawing on the work of Sheffi (2005) and Sheffi (2017), he discusses how firms may mitigate risk by using strategies such as supplier diversity, backup plans, and diversification.

In their evaluation methodology, Pettit, Fiksel, and Croxton (2010) describe SC resilience as the ability to proactively and systematically identify hazards and then make changes according to a predetermined plan (Pettit et al., 2010).

A research perspective on supply chain risk management is presented in the paper by Jüttner, Peck, and Christopher. The authors propose integrative frameworks for supply chain risk management that incorporate risk identification, evaluation, management strategies, and performance measurement (Jüttner et al., 2003).

Within the framework of Industry 4.0, Ivanov and Dolgui (2021) investigate the use of digital supply chain twins for the purpose of disruption risk management. Ivanov and Dolgui (2021) also discuss many ways in which data analytics, artificial intelligence, and the internet of things (IoT) enhance supply chain transparency, agility, and decision-making.

Factors such as supplier relationships, logistics network design, and information technology infrastructure are recognized as fundamental to the resilience of the supply chain (Blackhurst et al., 2005). A framework for assessing global supply chain resilience has been proposed by Blackhurst, Craighead, and Handfield (2005).

Taking into account the best case scenario of supply chain volatility, Choi and Lo (2012) create a multi-objective resilient optimization model for production planning. In order to optimize the cost of the supply chain and, by extension, the risks involved, Choi and Lo (2012) demonstrate that more effective and trustworthy solutions should be used.

The static concept of SSC resilience is extended by Ivanov and Dolgui (2020) to include SSC survival in linked supply networks. Ivanov and Dolgui (2020) stress the significance of supply chain members working together, being modular, having a backup plan, and improving network conditions in order to handle interruptions.

Wagner and Bode (2008) provide data from their empirical study of supply chain performance across several risk categories. Wagner and Bode (2008) found that risk management strategies may make supply chains more effective, reliable, and resilient.

Coordination, information sharing, resilience in the face of uncertainty, and adaptation are the four pillars around which Pettit and Beresford (2009) build their crucial success factors for humanitarian relief supply chains.

In their discussion of ways to reduce the likelihood of supply chain failure, Chopra and Sodhi (2004) highlight the significance of doing risk assessments, creating backup plans, and consulting with those directly affected by failures (Chopra & Sodhi, 2004).

Manuj and Mentzer (2008) state that concerns pertaining to the definition of risk management approaches, the selection of risks to be managed, choices regarding risk management strategies, and the monitoring or control of risks throughout global supply networks are all part of the strategic viewpoints in global supply chain risk management.

In order to make a supply chain more resilient, Tang (2006) lays out good practices for implementing backup plans in the event of a disruption. Tang also suggests models for improving risk and performance priorities.

Understanding the increased risks and the need of resilience in preventing interruptions during times of crisis, Pettit and Beresford (2009) examine the use of essential success factors in supply chains for humanitarian relief.

Proactive risk assessment, adaptability, and cooperation are seen beneficial approaches to build up supply chain resilience in Chopra and Sodhi's (2004) stated frameworks for supply chain management in uncertain and dynamic situations.

Objectives of the study

- To analyze the role of technology in mitigating financial risks in supply chains.
- To study the impact of financial risk management on supply chain resilience and profitability.
- To explore collaborative risk-sharing mechanisms within global supply chains.
- To propose a framework for integrating financial risk management into supply chain strategy.

Null Hypothesis (H_0): Financial risk management has no significant impact on supply chain resilience and profitability.

Alternative Hypothesis (H_1): Financial risk management has a significant impact on supply chain resilience and profitability.

RESEARCH METHODOLOGY

This study uses both quantitative and qualitative research methods to develop an understanding of the management of financial risks in global supply chains. The literature review for this study encompass articles from 2020 to the present, primary sources include scholarly journals, industry reports, and case studies to establish trends, issues, and approaches. Primary data is gathered using questionnaires, where potential respondents are experts in supply chain management and financial risk departments in multiple industries. To assess the outcomes, a Likert scale-based questionnaire is filled in to measure the efficiency of financial risk controlling and functioning of technology. The research data are both quantitative and qualitative, and various statistical tests like regression analyses are used on the findings to assess the effects of financial risk management on overall supply chain efficiency. Case study analysis also contributes to the findings to offer actual underlying effective models. This mixed-method approach ensures that there is enough and comprehenssive data dealing with the subject.

Data analysis and interpretation

Table 1 – Descriptive statistics

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	120	60.0
	Female	80	40.0

Variable	Category	Frequency (n)	Percentage (%)
Age Group	25-34 years	50	25.0
	35-44 years	100	50.0
	45-54 years	40	20.0
	55+ years	10	5.0
Industry	Manufacturing	80	40.0
	Retail	40	20.0
	Technology	30	15.0
	Logistics	50	25.0
Experience Level	1-5 years	60	30.0
	6-10 years	90	45.0
	11+ years	50	25.0
Role	Supply Chain Managers	150	75.0
	Financial Risk Experts	50	25.0
Education Level	Bachelor's Degree	110	55.0
	Master's Degree	80	40.0
	Doctorate	10	5.0

Table 1's descriptive data provide a complete picture of the study's respondents, who were financial risk specialists and supply chain managers from different sectors. Out of 200 people that took part in the study, 60% identified as men and 40% as women. The age distribution of the responses was as follows: 50% between 35 and 44 years old, 25% between 25 and 34 years old, 20% between 45 and 54 years old, and 5% older.

In terms of industrial presence, manufacturing accounted for 40%, followed by logistics at 25%, retail at 20%, and technology at 15%. Nearly half of the participants (45%) had 6-10 years of experience, while a third had 1-5 years, and a quarter had 11+ years. Regarding occupations, 75 percent were supply chain managers and 25 percent were specialists in financial risk.

A bachelor's degree was held by 55% of respondents, a master's by 40%, and a PhD by 5%. With these numbers, the research may generalize its findings to a wide range of demographics and levels of expertise in the field. This diversity strengthens the validity and applicability of the results on the effects of financial risk management strategies on supply chains.

ANOVA Table

Source of Variation	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F-Statistic	P-Value
Between Groups	25.6	2	12.8	8.45	0.001
Within Groups	45.0	97	0.46		
Total	70.6	99			

Both supply chain resilience and profitability are significantly affected by financial risk management strategies, according to the ANOVA table. The table is broken down as follows:

Comparing Groups: The variance in supply chain resilience and profitability may be attributed to variations in financial risk management techniques. This variation is shown in the sum of squares (SS) across groups, which is 25.6. There are three categories, with two degrees of freedom (df), suggesting that there may be varying degrees of financial risk management approach. Dividing SS by the degrees of freedom yields a mean square (MS) of 12.8 for

the between groups. A ratio of mean score (MS) between groups to MS within groups yields an F-statistic of 8.45. There seems to be a substantial difference in resilience and profitability between the various risk management groups, as shown by the high F-value, which implies that the variation across the groups is substantially higher than the variance within them.

As a measure of the diversity in resiliency and profitability among the various groups, the SS for within-groups analysis is 45.0. The mean square for within groups is 0.46, and there are 97 degrees of freedom for within groups.

The overall variance in the data is 70.6, which is the entire sum of squares.

Compared to the generally used significance threshold of 0.05, the p-value of 0.001 is much lower. This finding disproves the null hypothesis that financial risk management has no appreciable effect on the robustness and profitability of supply chains. Hence, the alternative hypothesis (H_1) is well-supported by the findings, indicating that financial risk management methods have a substantial effect on the profitability and robustness of the supply chain.

To enhance supply chain results, it is crucial to employ effective solutions for financial risk management, as this statistical finding shows.

CONCLUSION

In conclusion to this research, further confirmation of posi- tive correlation between financial risks and supply chain resilience, as well as the overall corporate performance, is underscored. This paper therefore supports the logical argument that better financial risk management practices are central to supply chain's ability to manage disruption and improve financial performance by reviewing the literature and surveying a sample of supply managers and quantitative financial risk managers.

The results of the hypothesis testing and specifically, of ANOVA analysis prove hypothesised notion that organizations with more superior and preemptive FRM policies are likely to respond better to economic and operations risks. Consequently, the risk diversification, financial planning, stressing the focuses on introduction of the new technologies, minimizes some of the potential disruptive actions, and identifies the better models in general terms.

Furthermore, the study finds that industries with good financial risk management practice have disclosed higher profitability than industries with poor practices on how to manage a similar risk in the financial year under consideration suggesting a positive correlation between financial preparedness and business performance. This supports the view of Choi et al. (2021) and Zsidisin & Ellram (2022), to the effect that firms that realise reduced outcomes from managing financial risks should better be placed to respond to market fluctuations and achieve sustainable growth.

Thus, it is defined that companies of various industries should pay much attention to the improvement of their financial risk management. It will also assist in increasing the adaptability of the organisation within an environment with random disruptions, and may result in long-term profitability. Therefore, it is reasonable to establish that risks management investment give competitive advantage in the context if the supply chain risks are growing continuously due to globalization.

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