STUDY OF SUPPLY CHAIN RISKS AND RISK MANAGEMENT STRATEGIES: A CASE STUDY OF SMALL SCALE INDIAN MANUFACTURING ENTERPRISE

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By

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CHAPTER-7

CONCLUSIONS: KEY FINDINGS AND MANAGERIAL IMPLICATIONS

Over the last two decades, supply chain risk management has become an essential field of study among researchers and SC professionals so as to ensure the uninterrupted supply in the dynamic business environment. In the literature, most of the earlier researches were mainly focused on global supply chain of large organisations. However, there are a few researches available on SCRM in the Indian context, but rare in India MSMEs context. Indian MSMEs plays an important role in Indian economy. Also, this sector has significant contribution in the Indian GDP. After the liberalization in India from 1990s, Indian MSMEs are facing several risks associated with their supply chain. Due to limited resources, they are unable to implement the SCRM practices/models/frameworks in their organisation, which are designed for Large organisations. Through this research work, an attempt has been made to provide a framework for management of supply chain risks and selection of suitable risk management strategies in Indian MSMEs context through a case study. This research work was initiated with the literature review on SCRM and identification of main risk variables and risks attributes followed by the analysis of these variables and attributes and the selection of suitable risk mitigation strategies for the identified risks. This chapter summarise the research, key findings and managerial implication. Besides, the Limitations and future scope of this research are also discussed at the end of this chapter.

7.1 SUMMARY OF KEY FINDINGS

This research is focused on the forward supply chain risk issues of the Indian MSMEs through a case study. With the objective to gain insight into SCRM for Indian MSMEs, a case of small-scale Indian electric wire and cable manufacturing organisation was

considered. The risk management involved the identification of risk variables that are pertinent to this case organisation the implementation of SCRM. This section presents summary and key findings of this research.

A literature review on SCRM and the identification of challenges faced by Indian MSMEs during the implementation of SCRM was carried out. Based on the literature review and expert opinion, seven main risk variables as (i) Environmental Risk (ER), (ii) Information Technology Risk(ER), (iii) Supply Risk (SR), (iv) Process Risk (PR), (v) Transportation Risk (TR), (vi) Delay Risk (DE) and (vii) Demand Risk (DR) were identified for the case organisation. ISM methodology has been applied to analyse the risk variables and to establish the interrelationship among these seven risk variables. The interrelationship hierarchy of these SCR variables has been established as shown in Chapter 4. Then, MICMAC methodology has been used to determine the driving and dependence power of each risk variable. Based on the driving and dependence power, all the risk variables are classified into four clusters. According to these four clusters, 'ER' and 'IR' are classified driving variables, 'SR', 'TR' and 'DR' as linkage variables while 'PR' and 'DE' as dependent variables. No autonomous variable was found, i.e. all the SCR variables are related to SCRM of the case-organisation. After getting the interrelationship among the SCR variables, AHP methodology has been used for the assessment of SCR variables and to obtain their relative weight. Probability of occurrence, severity of risk, detectability of risk, risk management cost, and risk controllability were considered as five criteria to evaluate these SCR variables. Prioritization of SCR variables and ranking has been done with the help of relative weights of risk variables. ISM-MICMAC results and AHP results were found inline with each other. ER' and 'IR' were classified as driving variables in ISM-MICMAC

analysis and the same were given high priority by AHP approach. On the other extreme, 'DR' is classified as highly dependent by MICMAC analysis and the lowest priority by AHP method. Only SCR variable 'PR' was found to have less driving power with high priority. It shows that the case organisation has to focus on the process risk simultaneously.

The outcomes of ISM and AHP have been used as the input in the Fuzzy logic approach in developing the integrated Fuzzy-ANP SCRM model. Risk-variables are the main foundation of the SCRM. Therefore, before the implementation of SCRM, evaluation of the risk variables, risk attributes and risk-level of the supply chain has become an essential activity. First, the evaluation of risk level by using fuzzy logic approach was carried out. A conceptual model is structured with two levels. Seven risk variables are placed at first level, and the forty-two risk attributes are placed at second level. The fuzzy logic approach provided the Fuzzy Risk Index (FRI) of the supply chain of case organisation. Through this FRI, /it is learnt that the case organisation is at a 'High' risk level. Next, Fuzzy Performance Importance Index (FPII) was calculated to identify the attributes that are the main obstacles of the SCRM. FPII was compared with a threshold value set by the expert of the case organisation. Out of forty-two attributes, twenty SCR attributes were identified as main obstacles to SCRM. Finally, ANP methodology has been adopted to evaluate and select suitable risk management strategies to overcome the identified obstacles. The ANP method revealed that mitigation strategy is the one that must be most preferred followed by share, retention and avoidance strategies.

7.2 MANAGERIAL IMPLICATIONS

Indian MSMEs plays an important role in the economic growth of India. Due to diversity in demographics, geography and culture in India, this sector faces several risks associated

with their supply chains. These risks make SC more vulnerable. Risks associated with the supply chain cannot be eliminated completely, but the impact of the risks can be controlled by identifying, understanding and analysing them, and by developing suitable plans to manage these risks. Therefore, the study of SCRM is essential and relevant for the supply chain managers to plan and control these SCR variables. This research provides a comprehensive study of SCRM in the context to a small-scale Indian wire manufacturer MSMEs and illustrates the method for selection and implementation of suitable risk management strategy to ensure the supply chain performance.

The developed ISM model will help the SC managers to understand the interaction among SCR variables. In a similar context, the key findings of this research can be directly used by SC managers for decision- making. For the organisations similar to the case organisation, managers can understand the impact of "Environmental" and "information technology" risk. Similarly, "delay" and "process" risks are highly dependent. Managing the risks that are having high driving power can help organisations to control the variables that are having dependent power. So, the classification by MICMAC will be of great help to learn about the type of risk variable.

The developed AHP model evaluated and prioritized the SCR variables. The obtained priority weights and ranking will help the supply chain managers to optimally utilize their resources. And the proposed integrated Fuzzy logic and ANP approach would help the managers to evaluate the risk level of their organisations and is also helpful in identification of main obstacles of SCRM in their supply chain. Further, these findings will also be helpful for other similar organisations/industries to design and implement their SCRM model. The academicians can also use the findings of this study in the context of Indian MSMEs to understand the relative importance of SCR variables and risk management strategies.

The proposed model and results of this study are not limited to evaluating the supply chain risks of the particular case-organisations, but also aims to provide a practical guideline to SC managers for implementing the SCRM in other similar sectors too. Further, this study will also be beneficial for the upstream and downstream supply chain members to fit their operations in and frame their SCRM model.

7.3 LIMITATIONS OF THE PRESENT WORK

Through this research, an effort has been made to provide a comprehensive study on supply chain risk variables, SCR attributes and risk management strategies in the Indian MSMEs context and particularly for a small-scale manufacturing organisation. Following are the limitation of the findings of this research.

1. Expert opinions may be biased and limited to a particular organisation or industry.
2. The considered seven risk variables, forty-two risk attributes and four generic risk management strategies may not be sufficient for other organisations or industries.
3. This research was conducted specifically for a small-scale manufacturing organisation, so these research findings may not be directly useful for other organisations like micro or medium large organisations.
4. As this research was conducted in the Northern-India, the findings may not be suitable for organisations situated in other geographical areas.

Keeping in mind, these limitations, findings of this work can be suitably modified to implement the SCRM to other organisation.

7.4 SCOPE FOR FUTURE WORK

This proposed research is developed for a particular industry, it can also be generalized for other industries, with some suitable modifications. Additional risk variables can be identified for various industries/organisations and a comprehensive study can be done by taking more case organisation. This study has considered the generic risk management

strategies as a bundle. A more elaborated study can be extended by considering sub risk management strategies of each generic strategy on the case organisation or group of organisation. In the future extension of this work, different approaches like Systems Dynamics Modelling (SDM), Structural Equation Modelling (SEM) etc. can be adopted to validate the results of this research work.