

STUDY OF SELECT ISSUES OF RESILIENT SUPPLY CHAINS

*A Thesis submitted
in partial fulfilment for the Degree of*

Doctor of Philosophy

by

RAJESH R.



**Department of Humanities
INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
Thiruvananthapuram - 695 547**

November 2017

ABSTRACT

Supply chain risk management and supply chain resilience are getting reasonable attention during the recent past. The research was conducted to address some of the critical problems in the domain of supply chain risk management and supply chain resilience. The related issues were considered in an Indian context by taking representative case studies. *Five* problems were addressed in this research and suitable methodologies were developed for addressing the same. *First* problem was to effectively quantify supply chain risk management strategies based on their net influences. A methodology using a combination of grey theory and digraph- matrix methodologies were employed to address the same. The results of the study and the managerial implications were remarked.

Second and *third* problems are complementary problems of interest to practitioners. These problems were addressed to fill the gap from the effective implementation of supply chain risk management practices towards achieving supply chain resilience. In effect, there are critical entangled cause- effect relations existing among the drivers of risks as well as among the enablers of risk mitigation. These cause- effect relations were quantified to identify the critical causal driver of supply chain risk as well as to identify the most influential enablers of risk mitigation. A representative case evaluation was conducted and the solutions were obtained using a combined methodology using grey theory and DEMATEL methodologies. The results and related discussions of the paired research problems of interest are elaborated and the implications in practice were stated.

Fourth problem is in consideration of the upstream supply chain as most of the critical disruptions in past are supply related. A resilient supply chain selection problem was formulated and solved for a representative case supply chain. Also, the results and the managerial implications related to this are presented and discussed. *Fifth* problem is to study the strategic level objectives of supply chains and the periodical shifts in their focus. Major objective is to identify the sequence of evolution of supply chains and to devise the exact location of positioning of partition line in a network to achieve complementary strategic objectives in the same supply network. A concept of sustainable-resilient supply network is proposed and the positioning of partition line to achieve sustainability and resilience together in a network was studied. A model case analysis was conducted and the results were also discussed.