

PREFACE

The contemporary manufacturing organizations face continuous and unpredictable changes due to business situations such as uncertainty, global competition and complexity in a business environment. Success and survival of organizations are becoming more and more difficult in such type of situations. The concept of agility originates from this in order to respond within specific time and to the unique need of customers and markets. Therefore, to address uncertainty, global competition and complexity in a business environment, it is essential to understand the issues related to agility of a supply chain. Supply Chain Agility (SCA) is a key determinant of competitiveness in today's dynamic and turbulent business environment. Therefore, companies have realized that agility in their supply chain is quite essential for the competitiveness and survival. Supply chain agility is the ability of organization to quickly respond to unexpected market changes and convert these changes to business opportunities. Supply chain agility further helps in providing the right quantity of the product, at the right time, to the right consumer; which is its main objective. Agility of the organisation depends upon large number of variables. These variables can be called as agile supply chain (ASC) enablers. ASC enablers are the concerned technologies and methodologies which are very much significant to achieve agility.

The present research highlights decision-making problems which involve deriving interrelationship amongst agility enablers, evaluation of agility in supply chain and finally developing decision aid to maximize the agility of supply chain.

The first problem provides an in-depth understanding on hierarchical interrelationship amongst various agility enablers required to assess organizational as well as supply chain agility. Seven agility enablers are identified with the help of literature survey and expert opinion. These seven agility enablers are Virtual Enterprises, Collaborative Relationship,

Use of Information Technology, Market Sensitivity, Customer Satisfaction, Adaptability and Flexibility. Further, Interpretive Structural Modelling (ISM) is used to analyse the enablers, establish inter-relationship among enablers and form hierarchy of importance of enablers. A hierarchy of enablers is developed that would help to impart agility in supply chains of manufacturing units in India. A supply chain can be robust and profitable if these enablers are incorporated properly.

In the second problem the pre-selected seven agility enablers were used to develop the conceptual model to evaluate agility in supply chain. The concept of generalized triangular fuzzy theory is tactfully utilized to facilitate agility evaluation and related decision-making. The conceptual model is divided into three levels namely; enablers, attributes and sub-attributes. Attributes and sub-attributes are some important components and sub-components of agility enablers. In addition to agility evaluation, ill-performing areas called agile barriers of an agile supply chain are also identified. To identify these barriers, the Fuzzy Performance Importance Index (FPII) is calculated. With the help of identified barriers, supply chain managers can improve the weaker areas of the supply chain.

Finally in the third problem, a decision aid is developed which allows the decision maker to maximize the agility of supply chain by deploying the input resources. The proposed decision aid is hybrid AHP-GP model, which include Analytical Hierarchy Process (AHP) results to link the agility index of enablers and the real world resource limitations such as operating budget, management hour, and employee hour. AHP provides the local and global weights of decision variables (which are nothing but seven agility enablers) whereas Goal Programming (GP) incorporates the AHP weights into the model and restrict the value of these enablers in order to optimize agility as well as other input resources. The combined AHP-GP model can save input resources of the case-organization by restricting the resources. The Proposed hybrid model offers the supply chain managers with a

systematic and easy-to-use approach to identify the degree of focus of each enabler in their manufacturing organisations.

The empirical research is validated after conducting a case study in a North India-based manufacturing organization. This research has encompassed various kinds of studies done on supply chain agility such as modelling of the enablers, agility assessment and agility maximization which provides a managerial guide with companies to improve the implementation of agility strategies in supply chains.