# Ecosystem-Aware Global Supply Chain Management

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# Preface

This book is about supply chain network (SCN) and its ecosystem, which comprises of elements that affect, control and create competitive advantage for the network. During the last two decades, the subject of supply chains has grown enormously both in terms of theory and applications. Several textbooks were written, research papers and case studies have been published, and new applications and innovations have resulted in blockbuster product and service industries. Outsourcing to low-cost countries has resulted in globalization, which resulted in creating emerging markets and a burgeoning middle-class. Several companies such as component suppliers, contract manufacturers, third party and fourth party logistics providers have emerged, and new state-of-the-art sea ports, airports, container freight stations, and special economic zones have been built. Companies such as SAP, Oracle, and IBM have built software packages for optimizing supply chain strategies and operations. Streamlining the business processes for automation using packaged software and the Internet is very common. The players in the supply chain are highly connected *logistically*, *informationally* and *financially*. In fact, it is often heard that it is not the manufacturing that matters; rather, it is the supply chain that provides the competitive advantage.

However, recent events have demonstrated that the efficiency contributors of SCNs can turn into risk creators. This is evident from the aftermath of the 2008 financial crisis and decline in trade threatening de-globalization, and also the March 11, 2011 earthquake, tsunami, nuclear crisis and the resultant plant shutdowns in Japan that slowed down the supplies of semiconductors to car parts to the globe. There were also lots of government interventions in the production matters in the form of protectionist regulations and preferences to local firms in government procurements. Thus, we see that the supply chains are indeed affected by exogenous factors such as the political and economic climate in the locations of the partners, delivery infrastructure in those locations, availability of the resources, and a host of other factors. It is not B2B and B2C that we need to study anymore; rather, we should concentrate on the ecosystem, which includes the entire supply chain, institutions covered by the supply chain partners, resources, and delivery mechanisms. Indeed, it is the ecosystem that creates competitive advantage for

the companies, products, and partners. This creates a tremendous need for supply chain redesign. This book is probably the first step in that direction. After reading the book, we hope that one would find several directions for further research and possible approaches for solving real-world problems.

In this book, we develop the supply chain ecosystem framework for the management of global supply chain networks. In our view, the supply chain ecosystem is a composition of networks of companies, countries and their governments, other industrial, social and political organizations, infrastructure, logistics and information technology services that connect the companies and the countries to the external economic and social environment and resources including natural, financial and human resources with talent, connections, knowledge of the industrial environment, interacting together with the landscape (space or domain) and climate. We develop a comprehensive analysis and design of the global supply chain networks, focusing on the location, planning, performance, risk, governance and innovation involving all the ecosystem players. We also discuss the application to green supply chain design.

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## How to Use This Book

This book can be used for teaching courses on Global Operations or Supply Chain Networks in MBA classes by supplementing with the Harvard cases mentioned in the book. Such a course provides the students with tools and frameworks to manage globally dispersed manufacturing and service network operations and also effectively deal with multiple strategic and operational issues such as outsourcing, green regulations, tensions with the network partners, increased transportation costs and regionalization. The book can also be used in engineering schools supplementing with topics such as Social Networks and Supply Chains, Orchestrator model for governance of SMEs, Location Selection based on Investment Climate, Tax-Integrated Global Supply Chains, Game Theory and Supply Chain Coordination.

*N. Viswanadham*
*S. Kameshwaran*

# Acknowledgments

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This book has come out of a course on *Global Operations Management* that the first author taught at Indian School of Business (ISB) during 2006–2011. Executive education programs were also given from this book. We would like to thank Kutti Krishnan (ISB) for his help and comments in running the course. Several researchers from the Center of Global Logistics and Manufacturing Strategies (GLAMS) — Usha Mohan, Abhijit Kumar, Ramakrishna Devarakonda, Shilpa Dixit, Prachi, Vinit Kumar, Sai Sailaja, Vikas Garg, Srivastava, Somya Sexena, and Sowmya Vedula — have worked on related logistics and supply chain problems. Some of these contributions appeared in the book released by the Prime Minister of India in 2006. The GLAMS Center of Excellence was financed in part by Hero Honda and TAFE. IBM has instituted a *Collaboractory on Service Science* (COSS) at ISB and several researchers from IBM — Gyana Parija, Vinayaka Pandit, Sameep Mehta, Munish Goyal, Krishna Kummamuru, and Nitya Rajamani — participated on joint research efforts. We have benefited immensely from these high-networth individuals and organizations and would like to thank them for collaborating with us. We greatly appreciate the support extended to us at ISB from Ajit Rangnekar (Dean, ISB), The Munjal Family (Hero Corp), and Mallika Srinivasan (TAFE Motors and Tractors Ltd.). In particular, we would like to thank the students of ISB who took the course and carried out the term projects applying the popularly called PERC framework. The first author (NV) would also like to thank the Indian National Academy of Engineering for the financial support as a distinguished professor from August 2011 to date.

We would like to thank our alma mater Indian Institute of Science for what we are today. The first author (NV) thanks IISc for providing him with students, grandstudents (the second author is one of them) and great-grandstudents for collaborating on research projects, writing books and thought leadership papers. We would like to thank Professor Narahari for his help at the Department of Computer Science and Automation, Professor M. R. Rao for his help at ISB and Roshan Gaonkar for his comments and help in the initial stages of this book.

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