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Global Value Chains, Flexibility and Sustainability

 Springer

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Preface

Global economies are increasingly being structured through global value chains (GVCs) which account for increased international trade, global GDP, and employment (Gereffi and Stark 2016, p. 6). As Kaplinsky and Morris (2016, p. 2) point out, value chain analysis goes beyond just the firm-specific analysis that is the focus of much of the innovation literature, concentrating on inter-linkages, which allows for scrutiny of the dynamic flows between economic, organizational, and other activities. The evolution of GVCs across diverse sectors has a number of implications which have resulted in a growing literature on the topic. The implications include GVC governance, corporate social responsibility, job creation, and flexibility. The nature of GVCs means that they also have multiple relationships with small and medium-sized enterprises (SMEs) that may be associated with industrial clusters. Clusters have been defined as ‘...geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate’ (Porter 2000, p. 15). Cortright (2006) identifies four key areas that characterize clusters: industrial connections—buyer–supplier relationships and the value chain, geographic extent, cluster life cycles, and inter-firm relationships. Flexibility is an important factor in relation to all of the four areas, as firms and the related GVCs need to be agile and responsive as discussed in several chapters in this book.

The chapters in this book are selected from papers presented at the GLOGIFT 16 (Sixteenth Global Conference on Flexible Systems Management) held at the UTS Business School, University of Technology Sydney, Australia, during December 4–6, 2016. Nearly 100 research papers were presented at the conference by academicians as well as practitioners from various countries. The participating authors were from various parts of India, the USA, Singapore, Australia, Hungary, Latvia, and Japan. The objective of the conference was to provide a knowledge-sharing platform for the dissemination of both academic and practical findings emerging from empirical studies, qualitative modeling, case studies, new concepts, and state-of-the-art studies. The selected papers presented at the conference were subsequently reviewed and then organized in the form of an edited volume. This

volume is intended to serve as valuable reference material in the area of global value chains, flexibility, and sustainability.

The selected chapters cover a variety of issues concerning the theme of Global Value Chains, Flexibility, and Sustainability and are organized into the following three parts:

- I Global Value Chains
- II Strategy and Flexibility
- III Sustainability

Part I on the topic of Global Value Chains incorporates seven chapters. Chapter 1 is by Sushil and is titled the *Valuation of Flexibility Initiatives Along the Value Chain*. As the chapter is conceptual/exploratory, the flexibility initiatives outlined here are based on the relevant literature and insights from practice. Sushil points out that value chains comprise value-adding activities which may contribute to customer value both directly and indirectly, and he identifies various types of flexibility concerning both types. The chapter discusses the valuation of selected flexibility initiatives along the value chain with case examples. The chapter also includes a proposal for types of modeling that can be conducted for the valuation and comparison of flexibility initiatives using the interpretive ranking process (IRP). Chapter 2 in this part, *Exploiting Locational Resources in a World of Global Value Chains: Strategic Considerations for Clustered Firms and Cluster Managers*, is by Rhode, Royer, and Burgess. The aim of the chapter is to bring together a strategic firm perspective with cluster management activities. In order to do this, the authors analyze the locational resources of cluster firms that may be embedded in global value chains. They maintain that, through global value chains, while regions can be vulnerable to exclusion and job loss, they also have opportunities to develop value-adding and job-generation activities that can be integrated into global value chains. The authors bring together the findings of cluster research from a resource-oriented perspective, thus contributing to a better understanding of how firms can exploit the resources that they have access to locally. In addition, the process assists cluster managers toward upgrading those locational resources and/or embedding them in global value chains. Chapter 3 in this part also focuses on the topic of clusters. Written by Shrotriya and Dhir, *MSME Competitiveness for the Global Value Chain—A TRIZ-Based Approach*—moves the focus to India. The chapter's focus is the micro, small, and medium enterprise (MSME) sector in India. The authors claim that MSMEs can play a crucial role in employment, globalization, and in relation to global value chains (GVCs) owing to their entrepreneurial- and innovation-driven growth. In such a dynamically changing environment, it is important to develop an effective growth and consolidation plan through structured research. Thus, the authors propose that TRIZ can fill such a gap as it is an analytical approach for innovative problem-solving which has been applied in a variety of spheres related to management and technology. TRIZ is an abbreviation which stands for 'Theoria Resheneyva Isobretatelshehuh Zadach' in Russian relating to a 'Theory of Inventive Problem Solving.' This chapter focuses on deriving the factors and solutions which are significant for strengthening the MSME

electronic goods clusters in India, although the authors also suggest that this approach can be tailored to focus on other sectors. Chapter 4 in this part, *Do Mergers Destroy Value in India?*, is by Rani, Yadav, and Jain. The chapter deals with the announcement of 150 mergers in India during the period 2013 to 2016. Specifically, it examines the short-term abnormal returns that were made through absorption using event study methodology. The results indicate the presence of high event-induced variance in abnormal returns. Chapter 5 in this part is authored by Sobel-Read and MacKenzie. Titled *Law and the Operation of Global Value Chains: Challenges at the Intersection of Systematisation and Flexibility*, it concerns how GVC integration processes can have potentially unforeseen consequences on the ability of firms to enter into flexible relationships. The authors purport that economic, operational, and social factors are steadily causing supply chains—in the form of global value chains—to become more systemically integrated. However, flexibility and chain integration are said to be mutually exclusive, with tensions existing between them. Two particular aspects identified in relation to these tensions are control and liability which are explored in this chapter, as well as the factors that are driving this shift toward greater liability and the key practical consequences of these actions. Chapter 6 in this part, *Technology Transfer and Innovation in Global International Joint Ventures—Emerging Markets’ Perspective*, is by Parameswar and Dhir. The chapter explores the effect of two important factors, i.e., the type of international joint ventures (IJVs) and the interdependence between the parent firms on learning, technology transfer, and innovation by emerging market firms abroad. It uses case study methodology and finds that learning, technology transfer, and innovation are facilitated in global IJVs. Chapter 7 in this part is authored by Betaraya, Nasim, and Mukhopadhyay titled *Modelling Subsidiary Innovation Factors for Semiconductor Design Industry in India*. The chapter utilizes total interpretive structural modeling (TISM) to develop hierarchical structures of macro factors for R&D subsidiary innovation in the Indian semiconductor design subsidiaries so as to better understand the interplay of these factors.

Part II of the book on Strategy and Flexibility comprises seven chapters. Chapter 8 *Innovative Inventory Management for Flexible Adaptation* authored by Fekete and Hartványi focuses on the structural and functional differentiating properties of a material sub-network which oscillates between plastic and rigid modes. Based on old viable networks that are well known for their adaptability and robustness, the authors propose an innovative inventory management solution for creating symmetrical weak–weak links and nested plasticity and degeneracy in the organization’s material sub-network. As most supply chains are predominantly rigid, this chapter details the methods of determining different inventory management modes and inventory elements corresponding to the behavioral archetypes of the nodes in the network, thus provisioning the missing adaptive nested plasticity for connectedness in disruptive settings. Chapter 9 *Flexible Benchmarking Approach of Talent Management: A Case Study of MIDHANI* is authored by Likhi, Sabita, and Rao. This chapter highlights the flexible approach of talent management in one such Indian company, a Defense Public Sector Enterprise. Further, the chapter attempts to detail the various HR initiatives and schemes of the

organization, so as to benchmark itself in the turbulent global era, following the case study method. The elements of integrated talent management as identified by the company are workforce planning, attracting talent, recruitment, compensation, performance management scheme, leadership development/ professional development, employee engagement, employee retention, reward and recognition program, and succession planning. Chapter 10 titled *Strategy Alignment of Critical Continuity Forces w.r.t. Technology Strategy and Business Strategy and Their Hierarchical Relationship Using TISM* is authored by Kedia and Sushil. This chapter presents four critical continuity forces each w.r.t. technology strategy and business strategy which are found to be essential for a dynamic and turbulent business environment. Organizations are known to adopt a flexible technology strategy and business strategy, but maintaining their alignment can be a challenge for leaders. The literature suggests that continuity forces hold back an organization from change by creating inertia in the organization. In Chap. 10, critical continuity forces w.r.t. technology strategy and business strategy are analyzed using an articulated mental model referred to as total interpretive structural modeling (TISM), with the core competency being the most dependent force among all the critical continuity forces. Kume and Fujiwara in Chap. 11 titled *Manufacturing Flexibility Under Uncertain Demand by a Real Options Approach* propose a decision-making method for the optimal investment in soft drink plant expansion by addressing the uncertainty of potential demand. The authors examine two methods based on option theory. The first is the Bermudan call options to flexibly coordinate the number of part-time workers to allow for increases in recruitment in summer and simultaneously a decrease in winter, while the second method is the American call option. This option is used to expand equipment capacity to meet not only summer demand, but also long-term upside demand even at a high sunk cost. A comparison of these options through a Monte Carlo simulation provides insights into how the dividend-like effects of seasonal demand variation on the exercise of American call options exist. It also shows some signaling threshold demand levels can be a trigger criterion for flexible investment decision-making if enough lead times are given. Chapter 12 *Resistance to Integrate Information Systems in Healthcare Service: A Study on Developing Country* is authored by Umme and Chowdhury. The authors claim that although information systems are vital for meeting the service expectations of customers and stakeholders, the integration of information systems in health services is inhibited. This inhibition they argue is due to numerous 'resistance' factors that need to be addressed to ensure a quality healthcare service. Focusing on the healthcare sector in Bangladesh, they relate the resistance factors to two domains: (i) factors contributing to resistance to health information systems (HIS) in developing country contexts and (ii) strategies to mitigate the resistance. To address these gaps, the chapter proposes a methodology using an analytic hierarchy process (AHP) and an integrated quality function deployment (QFD) approach. Although the chapter uses the Bangladesh healthcare sector as a case study, the authors propose that the findings and implications have significance for the healthcare services of other developing countries. The next chapter (Chap. 13) *Towards an Effective Agricultural e-Trading System in India*

authored by Suri analyzes the electronic National Agriculture Market (e-NAM) and AGMARKNET project. It identifies situation-, actor-, and process-related gaps in AGMARKNET for its improvement and integration with e-NAM. Chapter 14, the final chapter in this part, is entitled the *Impact of Behavioral Flexibility on Flexible HR System and Organizational Role Stress* and is authored by Jaiswal. In this chapter, behavioral flexibility is manifested in the different actions that employees use to handle non-routine actions as well as in the HR systems of an organization. This chapter has attempted to establish a link between the three constructs—organizational role stress, employees' behavioral flexibility in the workplace, and flexible HR systems. A questionnaire with standard scales was used as an instrument for data collection from management employees of various sectors, the regression results were inferred to hypotheses testing, and all hypotheses were accepted. It is intended that this chapter will thus help both employees and organizations by enabling firms to have more efficient HR systems and consider behavioral components in relation to employee recruitment.

Part III of the book, Sustainability, comprises seven chapters. Chapter 15 *Organizational Sustainability—Why the Need for Green HRM?* is authored by Kirsch and Connell. This chapter is intended to examine the impact of change on the implementation of sustainability programs and presents the survey-based study of a large Asia-Pacific-based professional services company. It emphasizes that if senior management introduces sustainability initiatives without any attempt to embed them within company practice/client relationships, reward systems, and more, they are likely to fail. As a result, it is suggested that a circular economy needs to be accompanied by 'Green HRM' policies and practices. Chapter 16 *Sustainability in Conformity Assessment: Flexibility of Technical Harmonization* is authored by Liepiņa, Lapiņa, and Mazais. This chapter focuses on the assessment of historic technical harmonization approaches in line with the development of manufacturing and technologies, changes in management strategies, and development of global value chains (GVCs) where different stages of the production process are located across different countries. The authors have proposed a new technical harmonization approach, which encompasses all elements essential for product quality assurance and conformity assessment to facilitate product global supply and distribution across GVCs. The development of this new methodological approach would facilitate the work of manufacturers and stakeholders and would promote sustainable development of entrepreneurship. Further, there is a high potential for further improvement of technical harmonization approach and sustainability of conformity assessment that would facilitate global trade participation in GVCs. In Chap. 17, titled *Evaluation of Market Surveillance Implementation and Sustainability*, Mjakuškina and Lapiņa analyze approaches to market surveillance through different product groups, in order to evaluate the differences between the sectors and countries. They describe how intermediate inputs are an important part of world trade, particularly as they are increasingly being sourced through imports rather than domestic production and are a key component of the establishment of global value chains. The nature of internal markets when sourcing inputs, combined with the effects of the global supply chain, makes it an essential

ingredient—especially one that requires changes in the approach to market surveillance. For example, the authors find that different countries have been developing their own standardization arrangements and are starting to produce more products that only conform to their own safety standards rather than global standards. Chapter 18, *A Glimpse of Sustainable Electronics Manufacturing for India: A Study Using PEST-SWOT Analysis*, is authored by Singh, Kumar, Gupta, and Madaan. The authors point out that high-technology manufacturing industries require the best of technical solutions which are chiefly driven by the government policies enacted. The electronics manufacturing industry (EMI) in India is crucial to the country's economy, and this chapter interrogates the government factors influencing its growth. Although 'Make in India' initiatives and recently announced policies have provided some impetus, weak labor laws and difficult exit policies are obstructing sustainable growth. Cheap manufacturing in foreign and WTO treaties mellow the opportunities offered. Consequently, connected clusters are proposed by the authors so as to gain substantial advantages in terms of coordination and input. To map the growth of the sector, a set of indicators are chosen to serve as standards, and a conceptual framework was developed to assist sustainable growth. Chapter 19 *Selection of Sustainable Suppliers* is authored by Kumar and Singh. A sustainable supply chain demands sustainable supplier selection (SSS), and this chapter serves to add to the existing literature on this topic. The environmental dimension was prioritized over the other two, which were social and economic dimensions. After reviewing the criteria derived from the relevant literature, broad criteria are considered by the authors. The study illustrated the method of analysis using a case on auto component suppliers. It concludes by ranking the sustainability of suppliers on certain measures such as cost, quality, flexibility, services, market share, and green performance. Green performance has been measured in relation to factors concerning green process and product design, the selection of green raw materials, carbon emissions, energy consumptions, etc. The integrated tool used has been proposed to be of benefit to managers in purposes other than supplier selection, such as project selection, facility location, the hiring of people, the selection of sources of energy, and the study has scope to include more factors. Chapter 20 *Flexible Waste Management Practices in Service Sector: A Case Study* is authored by Singh and Sushil. Hotels consume a large amount of durable and non-durable goods as part of their catering and hospitality services, but there is no generic model of waste management identified in the literature for the hotel industry. This chapter studied a five-star hotel chain as a case study. It divided hotel waste into three categories—energy waste, effluent discharge, and solid waste. In order to calculate its environmental impact and provide a waste management model for the service sector, specifically, it presents a basic hierarchy of waste management. A cross-interaction matrix is developed that demonstrates an effect on situational elements. Government directive is found to be the main dominating actor in waste management situations. The framework has served to improve waste management policy in the hotel industry. Chapter 21, the last chapter in this part, *Shifts Between Technology Push and Market Pull Strategies for Sustainable Development in Manufacturing Industries* is authored by Sethi, Ahuja, and Singla. Prevalent

research is available on technology push (TP) and market pull (MP) or demand pull (DP). While earlier studies emphasized MP to shape technology development, this chapter has focused on the shifting focus of the literature to TP orientation. A tabular representation represents prior work conducted in TP and MP domains, and six primary objective dimensions of sustainable development are also identified. The chapter concludes by developing certain questions for TP-DP practitioners. It is proposed to evaluate the multiple responses to these queries by a flexible system methodology, and ultimately, to develop a management process which can balance both TP and MP strategies.

In summary, the various chapters in this book illustrate the concept of flexibility in the context of global value chains. As many of the authors point out, in an environment of greater global competition, advancing technological change and increasing customer expectations, flexibility provides a mechanism that can help to cope with uncertainty, as it can facilitate fast and adaptable responses (Zhang et al. 2010). Such responses are considered in detail in the chapters included here. In the first part of the book ‘Global Value Chains,’ various authors discuss how to improve the efficiency and effectiveness of global value chains through various types of analysis. Some focus on cluster management, mergers and joint ventures, and in one case, the legal aspects of control and liability concerning the integration of value chains. The second part includes chapters concerning ‘Strategy and Flexibility.’ Strategies concern topics such as inventory management, talent management, strategic alignment, decision-making, behavioral change, and HR systems. The third and final part of the volume concerns the topic of ‘Sustainability.’ Here, the chapters focus on various initiatives intended to promote sustainability across respective value chains bearing in mind the concept of flexibility.

Given the range of topics, contexts, and methods used to analyze the integration of flexibility across global value chains, it is expected that this volume will be a useful addition to the literature on the topic as well as a practical resource for practitioners. In general, it is anticipated that this edited volume on Global Value Chains, Flexibility, and Sustainability will provide a useful resource for a variety of audiences such as management students and researchers, practicing business managers, consultants, and professional institutions.

Finally, we would like to thank all of the authors and reviewers who helped to bring this volume to fruition. In particular, we would like to thank Rejani Raghu who so effectively communicated with the authors and reviewers as well as helped to format the final manuscript.

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References

- Cortright, J. (2006). *Making sense of clusters: regional competitiveness and economic development*. Washington, DC: Brookings Institution Metropolitan Policy Program.
- Gereffi, G., & Fernandez-Stark, K. (2016). *Global value chain analysis: a primer* (2nd ed.), Duke Center on Globalization, Governance and Competitiveness at the Social Science Research Institute.
- Kaplinsky, R., & Morris, M. (2016). Handbook for value chain research. <https://www.ids.ac.uk/ids/global/pdfs/VchNov01.pdf>. Accessed 02 December 2017.
- Porter, M. E. (2000). Location, competition, and economic development: local clusters in a global economy. *Economic Development Quarterly*, 14(1), 15–34.
- Zhang, Q., Vonderembse, M., Lim, J. (2010). Value chain flexibility: a dichotomy of competence and capability. *International Journal of Production Research*, 40(3), 561–583.

Contents

Part I Global Value Chains

- 1 **Valuation of Flexibility Initiatives Along the Value Chain** 3
Sushil
- 2 **Exploiting Locational Resources in a World of Global Value Chains: Strategic Considerations for Clustered Firms and Cluster Managers** 15
Stephan Rohde, Susanne Royer and John Burgess
- 3 **MSME Competitiveness for the Global Value Chain—A TRIZ-Based Approach** 33
Shishir Shrotriya and Sanjay Dhir
- 4 **Do Mergers Destroy Value in India?** 47
Neelam Rani, Surendra S. Yadav and P. K. Jain
- 5 **Law and the Operation of Global Value Chains: Challenges at the Intersection of Systematisation and Flexibility** 63
Kevin Sobel-Read and Madeleine MacKenzie
- 6 **Technology Transfer and Innovation in Global International Joint Ventures—Emerging Markets’ Perspective** 77
Nakul Parameswar and Sanjay Dhir
- 7 **Modelling Subsidiary Innovation Factors for Semiconductor Design Industry in India** 89
Dixit Manjunatha Betaraya, Saboohi Nasim and Joy Mukhopadhyay

Part II Strategy and Flexibility

- 8 **Innovative Inventory Management for Flexible Adaptation** 119
István Fekete and Tamás Hartványi

9	Flexible Benchmarking Approach of Talent Management: A Case Study of MIDHANI	133
	D. K. Likhi, C. Sabita and Akanksha Rao	
10	Strategy Alignment of Critical Continuity Forces w.r.t. Technology Strategy and Business Strategy and Their Hierarchical Relationship Using TISM	145
	Prakash Kumar Kedia and Sushil	
11	Manufacturing Flexibility Under Uncertain Demand by a Real Options Approach	161
	Katsunori Kume and Takao Fujiwara	
12	Resistance to Integrate Information Systems in Healthcare Service: A Study on Developing Country	173
	Nusrat Jusy Umme and Md. Maruf Hossan Chowdhury	
13	Towards an Effective Agricultural e-Trading System in India	187
	P. K. Suri	
14	Impact of Behavioral Flexibility on Flexible HR System and Organizational Role Stress	205
	Priyanka Jaiswal	
Part III Sustainability		
15	Organizational Sustainability—Why the Need for Green HRM?	223
	Christina Kirsch and Julia Connell	
16	Sustainability in Conformity Assessment: Flexibility of Technical Harmonization	241
	Raimonda Liepiņa, Inga Lapiņa and Jānis Mazais	
17	Evaluation of Market Surveillance Implementation and Sustainability	257
	Svetlana Mjakuškina and Inga Lapiņa	
18	A Glimpse of Sustainable Electronics Manufacturing for India: A Study Using PEST-SWOT Analysis	271
	Manoj Kumar Singh, Harish Kumar, M. P. Gupta and J. Madaan	
19	Selection of Sustainable Suppliers	283
	Pravin Kumar and Rajesh Kumar Singh	

**20 Flexible Waste Management Practices in Service Sector:
A Case Study** 301
Aarti Singh and Sushil

**21 Shifts Between Technology Push and Market Pull Strategies
for Sustainable Development in Manufacturing Industries** 319
A. P. S. Sethi, I. P. S. Ahuja and Anuj Singla

Index 333

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Renu Agarwal is an Associate Professor, Operations and Supply Chain Management in the Management Discipline Group within the UTS Business School, Sydney, Australia. As Director of Supply Chain Management programs, she provides leadership in service value networks, supply chain management, service innovation and dynamic capability building, management practices, and innovation and productivity. She has been instrumental in securing funding and managing both federal and state government grants on management practices for Australia and New Zealand in collaboration with LSE, McKinsey, and Stanford. More recently, she has been instrumental in the development of the Australian Management Capability Survey in collaboration with Stanford University and funded by DIIS, and launched by the Australian Bureau of Statistics to 15000 Australian businesses to assess the impact of sustainable supply chain management, digital business and innovation management practices on innovation and productivity. She is also the Research

Director, Future of Innovation and Innovative Systems at the Centre for Business and Social Innovation, UTS Business. She has published in several top-tier journals, including *Decision Sciences*, *International Journal of Production Economics*, *International Journal of Production Research*, *International Journal of Operations and Production Management*, and is the Editor of 'The Handbook of Service Innovation' published by Springer. Currently, she is the Editor of the upcoming 'Routledge Companion to Global Value Chains: Reinterpreting and Reimagining Mega Trends in the World Economy' and Guest Editor of the special issue of the *Global Journal of Flexible Systems Management* (Springer) titled 'The Future of Manufacturing Global Value Chains, Smart Specialization and Flexibility'.

Sushil is Abdulaziz Alsagar Chair Professor (professor of strategic, flexible systems, and technology management) and Chair of the Strategic Management Group at the Department of Management Studies, Indian Institute of Technology (IIT) Delhi. He has served as a Visiting Professor and delivered seminars in numerous leading universities, including Kyoto University; University of Minnesota; Stevens Institute of Technology, NJ; University of Lethbridge; and Université Paris 1 Panthéon-Sorbonne. He is an active researcher and has supervised more than 60 doctoral dissertations. He has written 20 books in the areas of flexibility, strategy, systems thinking, and technology management and published over 300 papers in various refereed journals and conferences. He has pioneered the area of 'flexible systems management' and made original contributions to the field of knowledge in the form of interpretive approaches in management. He is the Founder–Editor-in-Chief of the *Global Journal of Flexible Systems Management* and serves on the editorial boards of leading international journals. He is the founder–president of the professional body, *Global Institute of Flexible Systems Management*. He has acted as a consultant to both governmental and industrial organizations and has served as an independent director on the boards of RINL and HSCC.

Sanjay Dhir is an Assistant Professor of Strategic Management at the Department of Management Studies, IIT Delhi. He is also the Coordinator for the Executive MBA (Technology Management) at DMS, IIT Delhi, and Director, GIFT School of Strategic Alliances Management. He is a Fellow (Ph.D.) of the Indian Institute of Management (IIM), Lucknow. He worked at Mahindra and Mahindra Ltd (Automotive), R&D Department, Nasik, for 3 years. He has published several research papers in leading international journals, including case studies at Richard Ivey School of Business, Western Ontario, jointly distributed by Ivey, and Harvard Business School. His research papers have been presented and published as conference proceedings at several prestigious academic conferences such as Academy of Management (AoM), Academy of International Business (AIB), Strategic Management Society (SMS), Southern Management Association (SMA), International Simulation Conference of India (ISCI, IIT Mumbai), and Strategic Management Forum (SMF, IIM Lucknow). His major areas of interest are strategic management, joint ventures, innovation management, management of change and

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