
Editorial

Tomás Seosamh Harrington*

Centre for International Manufacturing,
Department of Engineering,
School of Technology,
Institute for Manufacturing,
University of Cambridge,
Cambridge CB3 0FS, UK
Email: tsh32@cam.ac.uk
*Corresponding author

Yufeng Zhang

Department of Procurement and Operations Management,
Birmingham Business School,
University of Birmingham,
Birmingham B15 2TY, UK
Email: y.zhang.6@bham.ac.uk

Biographical notes: Tomás Seosamh Harrington is a Senior Research Associate at the University of Cambridge. Before joining the Centre for International Manufacturing in 2009, he held senior product design and engineering roles in industry. His primary research interests are business transformation and the evolution of complex industrial systems. In terms of practice, he is significantly involved in major consultancy projects with leading multinational companies, and in the development of management tools. A member of EurOMA, POMS and ISA, he is currently an Associate Editor of the *International Journal of Manufacturing Technology and Management*, and the *International Journal of Healthcare Technology and Management*.

Yufeng Zhang is a Senior Lecturer in Operations Management at the University of Birmingham. His research focuses on network collaboration issues for high value engineering, advanced manufacturing and innovation. His early industrial career included responsibilities for project management and new business development. He continues to work very closely with industry, and has researched and published in the broad areas of network operations, engineering management and international manufacturing. He is a fellow of the Higher Education Academy, Director of Business Programmes with Engineering and Sciences, and the Academic Coordinator of EU FP7 Europe-China High Value Engineering Network (EC-HVEN).

The study of emerging industries has recently captured the interest of academics, industrialists, and government policy makers as a means to providing new sources of 'value' creation. In recent years, research in this area has typically focused on product R&D technologies, coupled with their particular technology commercialisation challenges. However, the industrial ecosystem is much more complex, and cannot be readily described by a single viewpoint. It is now widely recognised that manufacturing

value chains (including subsequent stages of design for manufacture, engineering, production ramp-up, route-to-market, and in-use activities) are critical to transforming new technologies and ideas into innovative products and services. However, the design, setup and operation of enabling supply networks, in the context of emerging industries, is poorly understood. One key challenge is there is no defined strategy that a firm can follow due to lack of certainty in the business ecosystem and on end-consumer requirements. This often forces entrepreneurs to experiment with multiple supply chain strategies. This process can be very time consuming – leading to increased time to market and making it difficult to maintain critical ‘first mover advantage’. This increasing focus on emerging industries, with these inherent uncertainties, is also compounded with changes in the industrial landscape for mature sectors – with the impact of globalisation and the dissolution of vertically integrated value chains – raising the importance of supply networks as an enabling element of emerging industrial development.

This special issue focuses on ‘Supply network evolution in emerging industries’, drawing on examples of ‘industrial innovation’ spanning technology-based product innovation, new production or supply chain replenishment models (e.g., new routes to market) and/or novel business models. The research presented here offers new insights into the design and operation of supply networks and their links to other parts of the broader industrial ecosystem. We hope that, as well as showcasing some important new research, this special issue will serve as a starting point for a growing community of supply network designers, technology developers, manufacturers and service providers to develop the next generation of flexible, agile, adaptive and efficient supply networks.

The first three papers focus on framework development and application in the design of nascent and emerging supply networks to support technology commercialisation. Models classifying generic ‘stages’ of supply network evolution are tested and refined using a series of emerging technology/industry contexts – plastic electronics (Harrington and Srai) and e-mobility (Parlings and Klingebiel). This is an area of growing importance, given the argument that a supply network never reaches true ‘maturity’. One reason for this is the increasing dynamism with which today’s ‘industrial enterprise’ is engaging with recent advances in technology [e.g., the internet of things (IoT), cloud services, and digitalisation]. Here, a set of dynamic technology enabling capabilities are proposed that organisations, and by extension their supply networks, should consider in building competitive advantage (McLaughlin).

Extending these ideas, the next series of papers specifically look at mapping emerging industry structure and dynamics, in order to understand the effects of emerging technologies within complex industrial networks, and to capture interactions between various stages of the manufacturing value chain. Using a the UK industrial biotechnology case example, a four-step industrial ecosystem mapping framework is developed that captures the characteristics of supply structure and dynamics in an emerging industry context (Srai). This mapping approach is also utilised, as the basis of understanding environmental sustainability dynamics in the case of the emerging medical technology sector in the UK (Kumar et al.).

Specific supply chain reconfiguration and emerging sector studies are also presented in this special issue. Building on the transaction cost economics, three models (market-ally-maker) to inform supply chain configuration are proposed, based on cases involving seven start-up companies in the emerging wave-and-tidal energy industry (Bjørgum and Netland). The effect the emergence of digital technology has had on the recorded music supply network is next analysed, where it is argued to have had a twofold

effect (Nakano and Fleury). Initially applied to the production process, it was only when applied to the distribution process, that impacts were fully deployed, allowing the entry of new types of actors who adopted new business models and challenged the model of governance. In a study of industrial clusters (Halse), a conceptual model is proposed that describes emergence and transformation over time. The case of the maritime cluster in North West Norway is used to demonstrate the applicability of the approach, with particular emphasis again on governance as an exponent and agent for change. The final paper in this section explores development and policy requirements in the emerging medicinal and aromatic plants (MAP) sector in Portugal, providing insights on network structure, roles and success factors, in addition to virtual organisation incubation/formation in nascent and emerging industry contexts (da Silva and de Almeida).

With the majority of supply chain risk research having been focused in the large and mature industry domain, this special issue also includes two papers examining risk in the context of emerging supply chains and industry evolution. A generalised framework of supply chain risk, incorporating the complexities of emerging industries and large-scale system engineering projects, is presented which looks to categorise those critical dimensions that must be addressed by organisations and their supply networks (Burns). The final paper examines risk mitigation, in a supply network context, using a specific case narrative involving machine parts supply from Shanghai to the maritime (shipbuilding and maintenance) industry in Norway (Engelseth).

Finally, special mention to the Chief Editor of *IJMTM* for his continued support, patience and encouragement in making this special issue possible. We are also grateful to the Journal Office team for their valuable assistance in the production of this special issue, and to the many authors who responded to this call in a timely manner. A very special thank you to the reviewers who made a substantial contribution, in particular, Antonio Abreu, Leila Alinaghian, Arild Aspelund, Oli-Pekka Hilmola, Maneesh Kumar, Yonglin Li, Harri Lorentz, Mark Phillips, Gyan Prakash, Ettore Settanni, Dmitrij Slepnirov, Elizabeth Williamson and Ming Yan. We would never have completed this special issue without their insightful comments and suggestions, time and generosity. To conclude, we are also grateful to the following research programmes – the EPSRC Centre for Innovative Manufacturing in Continuous Manufacturing and Crystallisation (CMAC) research strand on manufacturing operations and supply chain management, the Advanced Manufacturing Supply Chain Initiative (AMSCI) project *ReMediES*, and the Seventh Framework Programme of the European Union under Marie Curie Actions on Europe-China High Value Engineering Networks (EC-HVEN) – which afforded the editors the time to concentrate on this work, and complete this special issue, dedicated to exploring the area of supply chain evolution in emerging industries.