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Introduction and Overview

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Over the last couple of decades, the whole domain and discipline of logistics and supply chain has developed quite significantly. If one reflects back to the early 1990s, logistics had its roots firmly within the context of inbound and outbound transport and warehousing. The whole sector was fragmented, unorganised and run by a number of small operators, and the concept of third party logistics did not exist. In fact, the term “logistics” was often labelled as “sheds and lorries”. On the other hand, there was a realisation of the importance of getting the right goods to the right place at the right time and at the right quality.

In parallel, during the early 1990s, there was huge debate surrounding the so-called new environment of intensified global competition, the removal of national barriers and the emergence of regional trading blocks such as the Single Market in Europe, the Pacific Rim, Continental America and the opening up of Eastern Europe and the Russian subcontinent. All of this was creating new challenges and opportunities for businesses and, indeed, for expanding and professionalising logistical operations. Thus, many organisations sought to focus their attention on managing logistics more efficiently.

Similarly, professional bodies like institutes and societies were focused on production planning, materials management, purchasing and production management, etc., and the term “logistics” was still not used extensively until mid-1990s. Equally, there was a lack of attention to logistics within various courses at universities and higher educational institutes. Logistics was considered to be part of materials and production management courses with a few odd exceptions where logistics was taught as a module within a course on production or operations management.

In early 1992, a proposal was made to the United Kingdom's Operations Management Association (OMA), which subsequently expanded as the European Operations Management Association (EurOMA), to provide support for the launch of the inaugural International Symposium on Logistics (ISL) in Nottingham, UK, in July 1993. The launch of ISL came about from the growing realisation that a common forum to bring together and stimulate the exchange of ideas between academic research and industrial practice did not exist. Previous similar events had tended to be rather focused in the area of operations, materials or inventory management, and there was a need to bridge this gap. After the success of 1993, subsequent ISL events were held in Nottingham in 1995, Padua in 1997 and Florence in 1999. There was a huge interest from the Japanese academic community to organise ISL 2000 in Iwate, which proved to be an even bigger success. This also led to the concept of alternating ISL between Europe and outside Europe on an annual basis. To date, this event has been held in Salzburg (2001), Melbourne (2002), Seville (2003), Bangalore (2004), Lisbon (2005), Beijing (2006), Budapest (2007), Bangkok (2008), Istanbul (2009), Kuala Lumpur (2010), Berlin (2011), Cape Town (2012), Vienna (2013) and Ho Chi Minh City (2014), with the 20th ISL being planned in Bologna in July 2015.

The papers in this book have been carefully selected from the 19 proceedings of ISL to celebrate this 20th anniversary. It has become a regular, well-established and premier international event in the field of Logistics and Supply Chain Management. To date, over 1700 papers have been published in the conference proceedings; hence, making it a very difficult and challenging task to select the papers to be included in this book. The title "Developments in Logistics and Supply Chain: Past, Present and Future" has been chosen to reflect a collection of the most influential contributions from the last two decades. These contributions also reflect wider research activity being undertaken within the logistics and supply chain community.

Content overview

The 1990s

The 1990s saw the discovery of "lean production" (see Womack et al., 1990; Womack and Jones, 1996), and it is not surprising that the lean paradigm influenced much research and debate in the academic community as well as making an impact on practice.

Learning from good industrial practice was a common theme, especially if the learning came from Japan and the Toyota Production System.

One such knowledge transfer opportunity was the role of suppliers in ensuring the successful operation of an automotive supply chain and how the model of “supplier associations”, or *kyoryoku kai*, is transferred into a non-Japanese context (Hines, 1997).

The role of suppliers in the chain is endorsed by Ghobadian et al. (1993). They articulate a computer based architecture for aiding purchasing and sourcing decision makers when selecting suppliers utilising multiple qualitative and quantitative criteria. Interestingly, following the law of unintended consequences as has happened with Forza et al. (1993), Ghobadian et al. (1993) is often cited for its claim that raw materials account for much as 70 per cent of the total production costs rather than the supplier rating system that it promotes.

The lean thinking community also sought various forms of continuous improvement tools and techniques. An often cited paper for the use of a process mapping approach is that by Forza et al. (1993) who undertook research on the application of information and communication technologies (ICT) to enable a quick response in the textile apparel industry.

Christopher et al. (1999) provide an example of the discourse that prevails to the present day – what are the tenets and the differentiators of lean and agile production/supply chains? The need to develop resilient supply chains able to respond to and recover from endogenous and exogenous disturbances, and yet maintain costs as low as possible, means that there is still considerable interest in the characteristics of lean and agile strategies and how they may be combined.

Bringing together two themes of ICT and supplier development, Barratt (1999) determines the extent to which ICT enables information transparency along the supply chain. The biggest challenge is the lack of trust and the lack of awareness of the benefits that may result if there is a free exchange of information.

Related to the lean thinking paradigm is Flapper’s (1995) advocacy of what we would now call the “circular economy”. With the need to minimise waste, a business model that may reuse end-of-life products has particular advantages but also logistical challenges. The latter includes the unpredictability of the availability of end-of-life components and the utilisation of resources to recover and process them into sufficient quality for their reuse.

The 2000s

The 2000s continued to see an interest in lean, efficient supply. However, the focus also moved from the factory to consider logistics as well. Potter

et al. (2003) examine Factory Gate Pricing (FGP) as a further evolution of the grocery supply chain. FGP provides a mechanism for retailers to take control of their supply chain upstream of distribution centres and realise efficiencies. The inefficiencies often come from less than truck-load consignments, and Katayama and Yurimoto (2002) provide an analytical approach for consolidating these to minimise costs for a given service level. Finally, Holweg and Bicheno (2000) develop the reverse amplification effect, where deliveries to customers are further distorted in comparison to the orders placed.

However, reflecting the work of Christopher et al. (1999), researchers have developed the concept of agile, responsive supply chains. Avittathur and Shah (2004) design an allocation model for retailers in deciding how much to stock of customised versions of a generic product. They identify that the fixed costs of retailing can play a crucial role in this decision. Meanwhile, Tang and Tomlin (2007), Pearson et al. (2008) and Colicchia et al. (2009) all consider the risks inherent in agile supply chains. The first of these three articles considers the role of flexibility in mitigating risks while the other two contribute simulation based decision support systems to evaluate risks in global supply chains.

Risks are not just present in agile supply chains, and Vlajic et al. (2009) develop a framework to evaluate these risks more generally. They conclude by proposing a number of redesign strategies to mitigate these. As well as flexibility, they also suggest greater levels of integration and effective use of ICT. Potential business models for integration are proposed by Holmström et al. (2003), including vendor managed inventory and collaborative planning, forecasting and replenishment. By contrast, van der Vaart and van Donk (2005) critically review survey research on integration and highlight the wide range of factors and constructs used to measure integration. They also show that the level of integration is dependent upon the buying firm.

The use of ICT is examined by Timm et al. (2001) and Takeno et al. (2006). Timm et al. (2001) propose a multi-agent system to enable a network of SMEs to achieve mass customisation. They establish an architecture for such a system as well as consider aspects such as confidentiality and robustness. Takeno et al. (2006) also develop a prototype system, this time for traceability in the seafood supply chain. The system not only informs the operations of the supply chain but also enables quality risks to be identified quickly.

Finally, the papers published during the 2000s have demonstrated the academic impact of the ISL conference. Two of the conference papers (Holmström et al., 2003, and van der Vaart and van Donk, 2005) have

been extended into journal format and subsequently received several hundred citations. Such use by the wider academic community highlights the value of conference papers as a stepping stone on the way to journal publication.

The 2010s

By 2010, there was an assumption of global reach for many organisations in terms of utilising suppliers and fulfilling customer requirements across the world. As such, effective management of freight logistics had become a central aspect of competitiveness. How freight transport options are evaluated and selected is examined by Lirn and Wong (2010), who use the grain industry as the focus of their case study on freight choice. They found that the four most important service dimensions influencing freight transport choice selection were grain market value, inventory holding cost, transport cost and the in-transit inventory cost. A key contribution of this paper is that an understanding of the level of importance attached to service attributes can provide insights into ways to improve carrier performance, increase shippers' and importers' patronage and improve containers' flow imbalances. Somewhat related to this theme, owing to increased customer and governmental awareness of the importance of the "carbon footprint" as a performance measure, is the issue of carbon emissions arising from logistics operations. In his 2012 contribution, McKinnon (2012) proposes six principles for defining carbon emission targets and discusses their potential corresponding implications.

Supply chain integration continued to be seen as a key way to become and remain competitive in the global environment. This issue is addressed by Schadel et al. (2011) who focus on the rising role of China in the automotive industry. More specifically, using an inductive approach, they investigate the important concept of readiness of the supply chain partners for collaboration and integration. At the point in time when the article was written, integration of the automotive industry suppliers was found to be "low to very low".

Performance measurement is a recurring theme throughout the years and is looked at in many different supply chain contexts. By investigating food supply chains, Bourlakis et al. (2013) examine the issue of sustainable performance. They found small firms to be the best performers, particularly in terms of flexibility and responsiveness across their supply chains. This research has implications for the development of sustainability-related benchmarks in the food sector and beyond. Another important recurring theme that has occupied supply chain researchers

in a variety of settings is that of Business Process Measurement (BPM). Tying in with some of the issues raised in Schadel et al.'s 2011 paper, Pradabwong et al. (2014) take four cases in Thailand as a setting for examining how internal and external BPM influence the degree of supply chain collaboration. Their findings indicate there is a strong connection between the two, in that together they can be used to drive collaborative advantage and hence firm performance.

As individual consumers and organisations have adapted their buying behaviour, with online purchasing becoming a major business force, increasing research attention was paid to the corresponding supply chain implications. This is captured well by the Hjort et al. (2012) paper that examines the online returns process in the fashion industry. In the fast moving world of e-commerce, customer returns are a valuable service parameter, whereby the costs are often under estimated. In particular, the cost and time involved to re-enter returned goods into the supply chain are not transparent within many organisations.

Future trends

Looking beyond 2015, there are numerous challenges and opportunities for innovations in logistics and supply chains. Solutions will be underpinned by ever growing technological development whether they are in processes, products or information and communication based technology. These technologies on the one hand are offering solutions to specific problems yet their overall integration and impact within the extended logistics and supply chain remains an open issue for researchers to explore. Similarly, the data generated from the deployment of these technologies in the form of so-called "big data" equally poses huge opportunities for researchers and analysts to support decision making processes. The recent explosion in social media related technologies is imposing greater demands from users and consumers for personalised and customised products and services. This in turn will necessitate the development of robust systems and processes which are based on theoretical underpinned and applied models, tools, techniques and methodologies for the provision of risk averse, resilient, cost effective, environmentally friendly practices. The increasing trend towards online shopping and the mode of "last mile" deliveries, especially the use of drones and driverless vehicles, is changing the landscape for decision makers and the academic community alike.

In parallel, for the efficient and timely deliveries of goods and services the development of flexible yet resilient network of suppliers and vendors is desirable, based upon open, transparent and trustworthy relationships. This also imposes an important challenge and

responsibility on the educators, professional societies and institutes to train, develop and professionalise the entire logistics and supply chain community around the world and instil a customer oriented culture and ethos. Finally, an entrepreneurial and innovative culture which promotes disruptive behaviour amongst users and service providers will lead to the development of creative solutions such as the “Uberisation” of shipping containers and lorries for better use of capacities and capabilities.

In addressing these future research challenges, the support of the academic community remains essential. The International Symposium on Logistics, and other similar conferences, will continue to provide a platform for developing these challenges and encouraging researchers from many disciplines to work together in finding novel solutions.

References

- Avittathur, B, and Shah J (2004) *The Retailer's SKU Allocation Problem*, Proceedings of the 9th International Symposium on Logistics, Bangalore, India.
- Barratt, M (1999) *Exploring Supply Chain Relationships and Information Exchange in UK Grocery Supply Chains: Some Preliminary Findings*, Proceedings of the 4th International Symposium on Logistics, Florence, Italy.
- Bourlakis, M G, Maglaras, E, Aktas, D, Gallear and Fotopoulos C (2013) *Does Firm Size Influence Sustainable Performance in Food Supply Chains? an Empirical Analysis of Greek SMEs*, Proceedings of the 18th International Symposium on Logistics, Vienna, Austria.
- Christopher, M, Harrison, A and van Hoek R (1999) *Creating the Agile Supply Chain: Issues and Challenges*, Proceedings of the 4th International Symposium on Logistics, Florence, Italy.
- Colicchia, F Dallari and Melacini M (2009) *Managing Risk in International Inbound Supply Chains*, Proceedings of the 14th International Symposium on Logistics, Istanbul, Turkey.
- Flapper SDP (1995) *On the Operational Logistic Aspects of Reuse*, Proceedings of the 2nd International Symposium on Logistics, Nottingham, UK.
- Forza, C, Vinelli, A and Filippini R (1993) *Telecommunication Services for Quick Response in the Textile-Apparel Industry*, Proceedings of the 1st international symposium on logistics, Nottingham, UK.
- Ghobadian, A, Stainer, A and Kiss T (1993) *A Computerized Vendor Rating System*, Proceedings of the 1st International Symposium on Logistics, Nottingham, UK.
- Hines, P (1997) *Toyota Supplier System in Japan and the UK*, Proceedings of the 3rd International Symposium on Logistics, Padua, Italy.
- Hjort, K, Lantz, B, Ericsson, D and Gattorna J (2012) *Customer Segmentation Based on Buying and Returning Behaviour: Supporting Differentiated Service Delivery in Fashion E-Commerce*, Proceedings of the 17th International Symposium on Logistics, Cape Town, South Africa.
- Holmström, J, Småros J, Disney SM and Towill DR (2003) *Collaborative Supply Chain Configurations: The Implications For Supplier Performance In Production And Inventory Control*, Proceedings of the 8th International Symposium on Logistics, Seville, Spain.

- Holweg M, and Bicheno J (2000) *the Reverse Amplification Effect in Supply Chains, Proceedings of the 6th International Symposium on Logistics*, Salzburg, Austria.
- Katayama, N and Yurimoto S (2002) *The Load Planning Problem For Less-Than-Truckload Motor Carriers And A Solution Approach, Proceedings of the 7th International Symposium on Logistics*, Melbourne, Australia.
- Lirn, T. C. and Wong RD(2010) *Determinants of Grain Shippers and Importers Freight Transport Choice Behaviour, Proceedings of the 15th International Symposium on Logistics*, Kuala Lumpur, Malaysia.
- McKinnon A (2012) *Setting Targets for Reducing Carbon Emissions from Logistics Operations: Principles and Practice, Proceedings of the 16th International Symposium on Logistics*, Cape Town, South Africa.
- Pearson, M, Masson R and Swain A (2008) *Process Control in Agile Supply Chain Networks, Proceedings of the 13th International Symposium on Logistics*, Bangkok, Thailand.
- Potter, A, Lalwani C, Disney, SM and Velho H (2003) *Modelling the Impact of Factory Gate Pricing on Transport and Logistics, Proceedings of the 8th International Symposium on Logistics*, Seville, Spain.
- Pradabwong, J, Braziotis, C and Pawar KS (2014) *Business Process Management and Supply Chain Collaboration: Critical Comparison of Four Thai Case Studies, Proceedings of the 19th International Symposium on Logistics*, Ho Chi Minh City, Vietnam.
- Schadel, J, Lockstrom, M, Moser R and Harrison N (2011) *Readiness for Supply Chain Collaboration & Supplier Integration – Findings from the Chinese Automotive Industry, Proceedings of the 16th International Symposium on Logistics*, Berlin, Germany.
- Takeno, T, Okamoto A, Horikawa M, Uetake T, Sugawara M and Ohba M (2006) *Traceability Information Management System for Composite Production Process, Proceedings of the 11th International Symposium on Logistics*, Beijing, China.
- Tang, C and Tomlin B (2007) *The Power of Flexibility for Mitigating Supply Chain Risks, Proceedings of the 12th International Symposium on Logistics*, Budapest, Hungary.
- Timm, IJ, Woelk PO, Knirsch P and Tönshoff HK (2001) *Flexible Mass Customisation: Managing Its Information Logistics Using Adaptive Cooperative Multi Agent Systems, Proceedings of the 6th International Symposium on Logistics*, Salzburg, Austria.
- van der Vaart, T and DP van Donk (2005) *A Critical Review of Survey-Based Research in Supply Chain Integration, Proceedings of the 10th International Symposium on Logistics*, Lisbon, Portugal.
- Vlajic, JV, van der Vorst JGA and Haijema R (2009) *Framework for Designing Robust Supply Chains, Proceedings of the 14th International Symposium on Logistics*, Istanbul, Turkey.
- Womack, James P, Daniel T. Jones and Daniel Roos (1990) *The Machine That Changed the World*, Rawson Associates, New York.
- Womack, James P and Daniel T. Jones (1996) *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, Simon & Schuster, New York.