Editorial

Rajesh Srivastava and Elias T. Kirche

Department of CIS and Decision Sciences,
Lutgert College of Business,
Florida Gulf Coast University,
Ft. Myers, FL 33965, USA
E-mail: rsrivast@fgcu.edu
E-mail: ekirche@fgcu.edu

Biographical notes: Rajesh Srivastava obtained his PhD Degree in Operations Management from The Ohio State University. He is currently on the Faculty of the Department of CIS and Decision Sciences in the Lutgert College of Business at Florida Gulf Coast University. His work has been published in leading academic journals such as *European Journal of Operational Research, Journal of Operations Management, Decision Sciences, International Journal of Production Research*, and several other journals. His current research interests are in supply chain management, sustainable operations, manufacturing planning and control systems, and healthcare operations.

Elias T. Kirche obtained his PhD Degree in Operations Management from the Department of Decision and Information Systems, University of Houston, in 2002. He is currently an Associate Professor of the Department of Computer Information Systems and Decision Sciences, Lutgert College of Business, at Florida Gulf Coast University. His current research interests include application of planning models that synchronise operational and financial measures, quality measurement, and theory testing.

An organisation does not function by itself in the market place but is part of a network of firms, often with conflicting priorities; and it must continuously search for competitive advantages so that it can effectively create value for its customers. Increasingly, organisations are discovering that suppliers can be used as a strategic source that gives them a true competitive advantage in a new global economy in which the traditional view of the supplier as one of many, and at arm's length, can no longer be sustained.

This special issue of IJMTM focuses on new developments in the integration of the supplier into the supply chain. Current challenges are being brought by, among other issues, traditional ones such as inventory control and delivery time; and newer issues such as the increased need to maintain the integrity of the supply, especially in sensitive areas such as food and other products that may expose safety risks to consumer. These are current issues that have exposed the weaknesses in the supply chain, and the complexity of today's supply chain. These issues have also renewed the emphasis on the supplier as a key link in the supply chain in not only maintaining low costs and fast delivery times, but in determining the quality of the product.

Another important issue concerning partners in the supply chain has been the need for tighter integration due to current threats to global peace, and natural disasters which cannot only cause direct harm to individuals and damage to organisations, but also greatly affect the organisation's ability to recover and re-establish presence in the market place. As a consequence, over the past two decades, supply chain management has become increasingly important in the efforts of firms to address those concerns and remain competitive. To this end, firms are recognising the importance of collaboration among partners and a great deal of attention is placed on the role of the supplier in the supply chain. If we take into account that approximately 50% or more of the corporate budget is expended on suppliers, then we can grasp how supplier management represents an enormous potential for creating value, and competitive advantage for the organisation. Furthermore, as firms increasingly outsource their non-core activities, suppliers assume a greater role in the organisation's ability to meets its market goals, and a seamless integration, albeit difficult to achieve, becomes a critical issue for the firm.

A supplier base is defined as the portion of the supply chain that is actively managed by a buying company through contracts to purchase materials and services. Areas such as information technology, supplier capacity reservation commitments, advanced planning systems to enable coordination and collaborative efforts, integration of financial accounting processes, and the role of supplier in product development, are among many relevant topics that are crucial to management that can potentially impact the supplier base and its performance as a partner in the supply chain. Along these lines, a set of papers are presented in this issue of the IJMTM which address some of these various issues. These papers fill existing gaps in literature and should prove to be relevant for professionals involved in supply decisions, as well as in strategic supply chain issues. We discuss the papers and their contribution in this issue.

'Supply chain coordination using EDI with performance implications', by Craig A. Hill and Gary D. Scudder. Technology choice and integration are essential if firms want to improved collaborative efforts along the supply chain. The right technology enables effective information sharing in learning organisations, decreases transaction costs, and allows faster response to market conditions. This research specifically investigates how firms utilise their coordinating activities to improve the degree of coordination with supply chain partners, and the performance derived from the use of Electronic Data Interchange (EDI). Principal components Analysis is used to develop sets of coordination variables, one for customers and one for suppliers, from survey data. It is shown that firms approach the use of coordination activities differently, depending on whether the supply chain member is a supplier or a customer. This research indicates that the most significant improvements that come from the use of EDI occur in companies that have a supply chain emphasis on partnerships with suppliers and a systems and information technology focus with customers. When the focus is only on accommodating the desires of the supply chain partner or customer partnerships, no correlation with performance improvements is observed.

'Evaluating the role and integration of contract manufacturing strategy in supply chain management: an empirical study', by Liang-Chieh (Victor) Cheng. Current globalisation and technology developments are forcing traditional Original Equipment Manufacturers (OEMs) to increase their degree of customisation and efficiency levels, and Contract Manufacturers (CMs) have played an important role to help OEMs remain competitive. Consequently, jointly managing supply chains with CM partners has become an essential criterion for OEMs to pursue strategic advantages. While sporadic case

studies have investigated the cost reduction potentials, empirical analyses examining outsourcing financial and operational performance are lacking in the operations management literature. This paper investigates the trends and impacts of outsourcing in the US manufacturing sectors. The theoretical framework hypothesises that a higher level of outsourcing is associated with higher industry-level financial and operational performance. The 1997 and 2002 Economic Census of the US Census Bureau encompasses a total of 473 manufacturing industries and serves as the main data source. Regression runs suggest that outsourcing is positively associated with ROA and ROI but is negatively associated with product specialisation. The findings offer critical insights to the potentials of outsourcing strategies for researchers, practitioners, and policy makers.

'Supplier selected relationships: choosing friends, over family', by Michael D.J. Clements, David L. Dean and David A. Cohen. Organisations rely on their core competencies to gain competitive capabilities over competitors. These capabilities are often dependent upon the strength of relationship and collaborative effort with their partners in the supply chain. The collaborative effort in a two way cooperative buyer/seller relationship combines the firms' individual strengths and unique resources, allowing them to compete more effectively through their supply chain rather than as individual entities. This paper establishes and tests a framework which enables suppliers to measure the worth of the relationships with buyers-partners in the supply chain. This non-conventional supply chain perspective invites the reader to consider the supplier's perspective in how relationships are valued. Given the constraints on suppliers who limit distribution of their product by participating in relationships geared to benefit the buyer at the expense of the supplier; this study tests food manufacturers in New Zealand. Literature suggests that a key driver for buyer/supplier integration is mutual benefit. Therefore, it is argued that by understanding which relationship values distinguish between relationship levels for the supplier, both the buyer and supplier are better able to develop appropriate relationships which enhance supply chain integration.

'Scheduling to minimise penalties for a non-dedicated supplier in integrated supply chains', by Anurag Agarwal and Vaidyanathan Jayaraman. An important element of a supplier-manufacturer relationship is the adherence to a contractual delivery schedule since any delay adversely affects the manufacturers' production plans. The manufacturer may want frequent deliveries of small batches to enable better resource utilisation and maintain minimum inventory levels. However, for the supplier, this arrangement increases the complexity of scheduling production resources and deliveries, especially for non-dedicated supplier having to fulfill orders from multiple customers. In this paper, the authors consider the scheduling problem for a supplier who is in an integrated supply-chain relationship with two or more customers. Each customer demands multiple lots of products to be delivered during the day. Both quantity and timing for delivery of lots of products varies from day to day. For late deliveries there are penalties, both explicit and implicit. The supplier has limited and fixed resources and the supplier's problem is to schedule the production plan for the day so as to minimise the penalties imposed by the customers for missing the deadlines. It is assumed that products are being manufactured in a flow-shop environment and switching the production to a different product incurs a setup cost. Three heuristics are proposed – a delivery time based heuristic called Earliest Delivery Time Next (EDT), a loading time based heuristic called Earliest Loading Time Next (ELT) and a Penalty-Based Improvement (PBI) heuristic. Computational experiments show that the penalty based heuristic performs significantly

better than the other two heuristics, saving as much as 53% of penalties imposed due to the EDT heuristic. The paper thus makes a contribution in the integrated supply chain literature with a focus on supplier scheduling.

'The role of integrative capabilities in involving suppliers in New Product Development: a knowledge integration perspective', by Sarah J. Wu and Gary L. Ragatz. Outsourcing as much production as possible is a frequent strategy by Original Equipment Manufacturers (OEMs) to remain competitive. However, this practice may weaken the OEMs' expertise in specific components, and result in greater dependence on suppliers for design. Involving suppliers in the early stage of new product development process is an inter-firm collaboration practice, aiming to facilitate product development success and therefore create competitive advantage for the purchasing firm. Unfortunately, empirical results are inconsistent in verifying the linkage between early supplier involvement and new product development success. To solve this paradox, this paper views early supplier involvement as a knowledge integration process. Particularly, it examines the role of the purchasing firm's integrative capabilities, drawing on the resource-based view. Two competing models are proposed and tested on a survey dataset, emphasising different roles of integrative capabilities. The results demonstrate that new product design success depends not only on the supplier's technological capability, but also on the purchasing firm's integrative capabilities to absorb knowledge and increase efficiency of knowledge integration. Both paths are pivotal, which provides valuable managerial implication for firms implementing this practice.

'A conceptual model for integrating strategic supply management into the supply chain', by Eva Ponce-Cueto, Álvaro García-Sánchez and Miguel Ortega-Mier. Supply chain management involves integration, coordination and collaboration across organisations. However, integrating a supplier into the supply chain has proven difficult to execute and has not achieved the same level of integration across industries. Therefore, characteristics of supplier management models that are particular to specific industries play an important role in these partnerships, and in the varied degrees of collaboration. In this paper, a model for integration of the supplier into the supply chain is developed and presented. It is based on the comparative case study of two relevant industries – automotive and aircraft – and may be suitable for other industries. The survey and the subsequent analysis of these industries have confirmed the strategic importance of supplies and the need for an integrated approach of supply management, both in terms of internal processes and of external suppliers. Additionally, the study has proved that there is not a unique model for supply management valid for all industries, given the current environment. The study has revealed that companies employ different practices in order to adapt to the particularities that the environment and the industry they operate in impose upon them.

'Real-time order management with supplier capacity reservation', by Elias T. Kirche and Rajesh Srivastava. An effective demand management system would require synchronisation between customer orders specifications with corresponding processes upstream the supply chain. However, uncertainty and constraints in the supply side can adversely affect production scheduling, inventory levels, and the organisation's service levels and profits. In response, many organisations develop strategic partnerships to minimise the risks associated with supply shortages without building costly inventory. In this study a specific form of collaboration between buyer and supplier is studied in the context of a build-to-order environment. Specifically, a mechanism of reserving supplier

capacity is examined as a method of integrating the supply chain with order management of customers. Profitability of the firm impacted by order management decisions is examined in real time using a Profitable-to-Promise (PTP) model. The model is solved using a non-linear Mixed-Integer Programming (MIP) approach using an Advanced Planning and Scheduling (APS) module from a major ERP vendor. It is shown that there is an optimal level of capacity to reserve with a preferred supplier in order to maximise profitability. The level of capacity to reserve in order to maximise customer service levels is also examined.

'Analysis of two different automated purchase order systems in telecom electronics manufacturing unit', by Lauri Rantala and Olli-Pekka Hilmola. Advances in Information Technology (IT) have allowed companies to automate their administration procedures to remain competitive through cost efficiency, inventory reduction and market responsiveness. Specifically in the electronic industry, automated purchasing plays an important role since product variety is high and demand can have wide fluctuation requiring high levels of system integration to maintain production efficiency. Furthermore, outsourcing is being used not only in the soldering, placement of components and assembly work, but in wafer fabrication of integrated circuits. Manufacturing Resource Planning (MRP) systems were implemented three decades ago to schedule production, increase efficiency in intra-organisational perspective, and mostly improvements were intended to be gained from purchasing, since net requirements calculations could produce purchase orders automatically for further manual processing. The situation has not dramatically changed, as ERP systems were introduced during the 1990s; mostly interfaces between organisations (e.g., customer vs. supplier) should be integrated in order to achieve the 'once typed data' objective (integration). In this research work, we analyse how automated purchase order systems, implemented either in an 'entire perspective' (supplier receives a file, which is automatically processed in their systems) or 'semi-automated perspective' (supplier receives order electronically, but these are typed into the system thereafter and enable negotiations between parties), have produced results in inventory turns perspective. Our longitudinal analysis of 4.5 years reveals that an entirely automated purchase order system improves inventory turns, and variation in performance between different ordered components decreases (performance is rather uniform). On the contrary, a semi-automated system does not bring such clear results, since inventory turns remain at the previous level, or only improve slightly. Interestingly, at the end of the observation period, both systems show a similar level of absolute inventory turn performance. Regression analysis also reveals that, due to the discrete demand nature of ERP, the decreased order quantities do not directly result in improved inventory turns. Our research also reports that MRP/ERP nervousness and component buffering services represent caveats for future APO implementations and use.