Investigating Supply Chain Performance and Supply Chain Integration Linkage in Jordanian Manufacturing Firms

Vikas Kumar, Jack Zeidan, Archana Kumari

Bristol Business School University of the West of England Bristol, BS16 1QY, UK Vikas.Kumar@uwe.ac.uk, zeidanjack@gmail.com, Archana.Kumari@uwe.ac.uk

> Jose Arturo Garza-Reyes Centre for Supply Chain Improvement University of Derby Derby, DE22 1GB, UK J.Reyes@derby.ac.uk

Jiri Tupa Faculty of Electrical Engineering University of West Bohemia Pilsen, Czech Republic tupa@ket.zcu.cz

Abstract

Supply chain integration plays a major role in the success of any organisation. As a result in last over a decade it has drawn a significant interest from the research community and practitioners alike. Though researchers have aimed to address various aspects of supply chain integration, research addressing its linkage with overall performance of organisation is limited. The purpose of this research is to investigate the relationship between supply chain integration and supply chain performance as well as the relationship between logistics systems and supply chain performance. A survey was developed and sent to 40 manufacturing companies operating in Jordan. The results show that supply chain integration has a positive impact on the performance of the supply chain as a whole. Moreover, when a high degree of supply chain integration takes place, it reduces inbound, outbound, warehousing and inventory holding costs. The study also investigates the impact of implementing logistics systems to act as an intermediate between supply chain performance. The result of the investigation shows a positive correlation between logistics management and supply chain performance. The study provides valuable contribution to theory and practice by adding to our limited understanding of supply chain integration in developing country context.

Keywords

Supply chain integration, supply chain performance, Jordan, empirical study, survey

1. Introduction

Over the past decade, there has been large emphasis on implementing supply chain practices to act as a vehicle in gaining organisation and supply chain competitive advantage (Ngo et al. 2016). A large number of examples show how companies invested in SCM in the late 1990s to differentiate their companies by reorganizing and integrating their supply chain activities in order to increase customer satisfaction and internal productivity (Christopher, 1998). As a result of this integration, it is not individual organisations that are competing against each other but the rival supply chains. The goal for this integration is to offer customer's the greatest satisfaction by adding the most value to their product or service with minimal cost (Christopher, 2000).

Literature about SCM contains many descriptions of it, as there is no explicit definition of SCM (New, 1997). For example (Mentzer, 2001) defines supply chain management as "a set of three or more entities (organisations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer". In his article, the author describes three sets of SCM; the first one is direct supply chain, which consists of the focal firm, a customer and a supplier. The second set is called extended supply chain, which includes supplier's suppliers and customer's customers' relationship. The third is called the ultimate supply chain which includes all parties involved e.g.: financial, logistics and management providers. Supply chain practices involves the planning and control of three dimensions; the first one involves the internal and external planning and control of manufacturing, purchasing and distribution activities to enable resource acquisition. The second dimension is the tactical control and planning to allocate and refine these resources. The third dimension deals with the control and planning of business execution (Jeremy, 2001). This study will therefore research the internal, external and customer integration of the supply chain as well as logistics as an intermediate between supply chain partners.

1.1 Supply chain integration benefits and drivers

The lack of the required planning between supply chain partners can create uncertainty and randomness which results in a chaotic distribution system. Supply chain management supports demand and manufacturing planning as a result of the business to business fast and accurate communication (Tarn et al. 2002). It is argued by Fawcett et al. (2008) that the driving forces of SCM start from two forces: external pressures and strategic supply chain alignment. Force field theory (Lewin, 1951) shows and explains the drivers and how supply chains can create value through supply chain integration. This theory implies that "the driving forces (external threats combined with internal benefits) must exceed the resisting forces (e.g. culture, structure, perceptions of how things should be done) so that any organizational entity – in this case a company within a supply chain – can change and survive in changing environments". These two forces are also backed up by (Glenn et al. 2009) who explain them as internal and environmental factors.

1.2. Internal Drivers (benefits) of supply chain integration

Literature argues that SCM as a management prospective seeks the synchronization and unification of inter and intra firm operational and strategic capabilities to result in a unified marketplace force. For the purpose of creating a superior and continuously improving performance, firms desire to improve their performance through the development of efficient and effective trade relationships with their suppliers and customers; this can be a critical driver to implement supply chain integration.

Although the term supply chain integration has been around for years and managers have realised the importance and benefits of implementing it, many companies still did not accurately adopt the integration. In reality, many companies still did not map through their supply chain to know who their supplier's suppliers and customer's customers' are. This lack of awareness makes companies lose a critical number of opportunities they can benefit from. When firms truly understand the meaning of SCM, it is more likely that they will adopt an SCM strategy (Glenn et al 2009). As shown by Daugherty et al. (2005) and Attaran (2005), the most demanded benefits of having an integrated supply chain is "to increase inventory turnover; increased revenue and thus cost reduction". This is implemented by the collaboration between supply chain partners to allow fast inventory cycle with customers. These factors result in an increased revenue and decreased cost that can be shared across the chain. Other fundamental benefits include decreased order cycle times and greater product availability (Glenn et al. 2009).

The availability of the product in the right time and place enables firms to win commitment and loyalty. The integration between supply chain members allows new and specialised orders to take place in exceptional times of high demand which helps in satisfying the relationship with customers (Fawcett et al. 2008). Other benefits are market responsiveness, added economic value, capital utilization, decreased product time to market and logistics cost reduction Lee (2002). The increased revenue numbers, with the improved responsiveness at lower prices results in an excellent performance; thus creates value for all chain members. However, to attain this kind of performance, firms face barriers and risks that make them resist implementing and integrating the supply chains (Linh et al. 2016).

1.3. External pressures of supply chain integration

In the present market, customers are demanding products to be delivered faster and more reliably. This fast changing market demand has led companies to integrate supply chain processes in order to be more responsive. Moreover, the short product life cycles forced firms to integrate their internal and external processes in order to fasten their overall supply chain processes. In order to attain a competitive advantage in the highly competitive marketplace, SCM integration can play a huge role in the fast, effective and efficient allocation of firm's resources (Williams, 1994); this can be a critical driver for implementing SC integration strategies. Studies have shown the positive integration between supply chain integration and firm's performance (Kumar et al. 2017; Glenn et al., 2009).

External pressures (threats) are the advances of technology, the increased demand of global products, maintaining low cost while meeting these customers' needs and the strengthened competition using relationships among vertically aligned firms (Fawcett et al 2008). Moreover, the emergence and the great acceptance of higher corporate inter-organizational relationships can also be considered as a driver (Klemenčič, 2006). These factors have shifted the focus of individual organizations to start and work in a collaborated and unified supply chain; thus creating a market where supply chains compete against each other.

1.4. Barriers to supply chain integration

After knowing the benefits of implementing and integrating an SCM strategy, now it is time to know what is separating companies from doing it to attain competitive success in the changing and competitive environment. Several theories and paradigms have appeared in the last decade to explain why some companies succeeded in implementing SCM while others could not. Some common theories in the literature claims that this is due to the management abilities that could not effectively adapt and align to the changing demands of the external environment (Linh et al. 2016; Thompson, 1967). It is suggested by Stonebraker (2004), Funk (1995), Hammer (1993) and Fawcett et al. (2008) that the contingency model is driven by the innovation in the technological field, management skills across departments and organizational functions and the integration vertically and horizontally across the industry. While these drivers support the integration of supply chain, barriers resists this kind of collaboration. These barriers include insufficient use of technology, lack of support from members of the chain and from within the firm, the culture of the firm, the inability or unwillingness to share information, risks and rewards between the SC partners, lack of trust between SC partners, inflexible processes within the organisation and the resistance to change. These barriers can be overtaken by implementing support activities to collaborate the chain like people empowerment, alliance design, cross functional processes change and information integration (Lewin, 1951).

The forces of resistance that act on SCM integration can be classified under two headings; inter-firm rivalry and managerial complexity. Inter-firm rivalry comes from the misalignment between SC partners that makes them compete instead of willingly cooperate. This eagerness to compete prevents the supply chain from benefitting from the collaboration. Some barriers that fall under this categorisation are the lack of trust and poor collaboration between SC partners. The second category, managerial complexity, can be explained as the misalignment between the allying firm's culture, processes and structures (Park, 2001). Some resistance forces that fall under the umbrella of this category can be the misalignment of information technology, insufficient measurement systems and differences in culture (Linh et al., 2016; Park, 2001; Tyndall, 1998).

1.5. Internal Integration and Knowledge Management

Interdepartmental integration can increase the performance of companies by increasing the level of interaction and collaboration. As shown by Kahn (1996) interaction is the structural nature of cross- departmental activities. Examples of these activities are meetings, committees, telephone calls, electronic mail, reports, fax and standard mail. Collaboration represents the unstructured nature of interdepartmental relationships. Collaboration can be achieved by connecting departments to have mutual understanding, collective goals, informal activities, shared resources and common vision (Kahn, 1996).

Interdepartmental integration is the increased interaction and collaboration between various departments within a firm that works toward a common goal. In other words, it is the increased information flows between R&D, marketing and manufacturing (Kahn, 1996). A study done by (Kahn, 1996) investigates the impact of interaction and collaboration of departments on product development performance and product management performance. It was claimed that the increased collaboration and interaction will yield to an improved performance of product

development and product management. The results of the survey conducted by Kahn (1996) indicated that collaboration had a strong positive effect on the performance for both variables (product development and product management), while interaction showed a negative response for both cases. The study concluded that a certain level of interaction is necessary at the level of product development, but it is not sufficient for an improved performance; collaboration is necessary to increase the performance.

As argued by Grant (1996a), the essence of organizational capability lies in knowledge integration. This was also echoed in the work of Tsoukas (1996) who also asserted that knowledge integration leads to increases the value of the organisation as well as its capabilities. In another form, the knowledge carried by individuals (tacit knowledge) should be transformed into a more useful form of knowledge (explicit knowledge), hence the important point that organisations should focus on is knowledge integration rather than knowledge development. Systematic knowledge process is expressed as both a product and a process. As a product, it is the knowledge on how we think, and if it is expressed as a process, "it is the process of knowing how we know" (Maturana et al., 1998). Thus, systematic knowledge can be viewed from different perceptions depending on the perspective of the person holding the knowledge. Organizations knowledge creation takes place at three levels; individuals, groups and organizational. From this it was deduced that there are two forms of interaction, tacit and explicit, which interact between the individual and the organization to bring together the four major processes which constitutes knowledge creation

1.6. External Integration

Power (2005) described supply chain integration as, the elevation of linkages between the components of the chain and to; facilitate better decision making and to efficiently improve the interactions between all elements of the chain and thus, creating supply chain visibility and identifying bottlenecks. Supply chain integration also involves coordinating the forward physical flow of deliveries and the backward coordination of information technology (Frohlich et al. 2001; Leuschner et al., 2013). Handfield and Nicholas (1999) described the main drivers for supply chain integration as; information systems (management of information and financial flows), inventory management (management of material flows and products) and management of relationships between trading partners (as cited in (Power, 2005)). The work of Akkermans, et al., (1999) and Power (2005) summarised the basis of integration as being an essential shift from managing as an individual to managing as an integrated chain of processes, sharing technology, trust and partnership. They also added that integration can start from product design level to reach all levels leading to an ultimate product. Rudolf et al. (2013) used a Meta-analysis for supply chain integration and showed thirteen dimensions for implementing SCI which are: Information Integration, Coordinating and resource sharing, Organizational and relationship linkages, Strategic, Operational, Technological, Practices, Attitude, Patterns, Strategic, Systems, Operational and Financial.

Many studies indicated that supply chain integration has a positive effect on firms' performance and plays a vital role in creating competitive advantage (Ngo et al. 2016; Stevens, 1989). Baharanchi (2008) investigated the role of supply chain integration in improving product quality performance and in improving product innovation performance, and concluded that the integration will directly improve both measures. Kumar et al. (2017) explored the role that e-business enabled enterprise systems play in achieving supply chain integration. This study aims to continue the investigation and measure the impact supply chain integration has on the overall performance of the firm and cost containment. Moreover, this study will examine the impact logistics management has on the overall firm's performance. The fundamental drivers for supply chain integration that this paper is aims to examine are information flow; partnership, alliances and cooperation; inventory management; customer participation; enterprise resource planning; logistics; innovation and innovation.

As mentioned earlier, Fawcett et al. (2008) claimed that supply chain integration has crucial benefits on the firm's performance as it creates better asset management, faster research and development, unique product and service and increased cash to cash velocity and forth. Moreover, Tan et al. (1999) studied the impact that supplier's performance has on the individual firm's performance. This was also supported in the work of Kumar et al. (2017). Therefore, this study will examine the impact that integration between all members of the supplier chain has on the performance of the individual firm. Consequently, the following hypotheses were established:

Hypothesis 1a: A strong supplier integration enhances supply chain overall performance. Hypothesis 1b: A strong customer integration enhances supply chain overall performance. Hypothesis 1c: A strong internal integration enhances supply chain overall performance.

Many studies like Fawcett et al. (2008) claimed that with higher supply chain integration, firms are more likely to minimise non-value added costs and gain cost competitive advantage. The work by Won Lee et al. (2007) studied the relationship between supply chain performance and degree of linkage among supplier, internal integration, and customers. They included cost containment as a characteristic to evaluate the overall performance of the firm. Therefore, this study will examine the impact that integration between all members of the supplier chain has on the cost containment of an individual firm.

Hypothesis 2a: Strong supplier integration enhances supply chain performance in cost containment. Hypothesis 2b: Strong customer integration enhances supply chain performance in cost containment. Hypothesis 2c: Strong internal integration enhances supply chain performance in cost containment.

The use of logistics as a coordination factor in supply chain integration enables major cost reductions to take place, which in turn allows the increase in competitive advantage either by price reduction to consumers or increase in profit (Blythe, 2009). Thus, logistics management has a vital role in integrating the supply chain and its impact on the overall firm performance should be examined. Therefore, the following hypothesis was established.

Hypotheses 3: Strong logistics management enhances overall supply chain performance.

The conceptual framework is shown in figure 1 below.



2. Methodology

Quantitative data was used in this research to test the hypotheses concluded from the literature review. The main reason for choosing a quantitative data collection method rather than a qualitative method; is because the data required for the analysis should be taken from a large number of respondents to allow higher accuracy of the results. This also helps in increasing the generalizability of the findings. A research questionnaire was designed based on the constructs of the conceptual model. Respondents were asked to evaluate their relationship with their suppliers, customers and their internal integration. Moreover, respondents were asked about their logistics systems. Respondents were further asked to evaluate the impact of supply chain integration on their overall performance and logistics performance. Participants were also asked to evaluate the impact of supply chain integration on decreasing inbound, inventory holding and warehousing costs. Empirical data was collected by sending the questionnaire to more than 100 manufacturing companies operating in Jordan. Each company was asked to let their

purchasing manager, supply manager and senior manager to answer the questionnaire. The study received 66 responses from 40 companies. Table 1 and 2 shows the measures that were used to evaluate the variables studied in this research.

Table 1: Factors for suppliers' integration, customers' integration, internal integration and logistics management					
Suppliers Integration	ppliers Integration Customers Integration		Logistics Management		
degree of strategic linkages	use of information technology	communication between different departments	implementation of an IT system to track goods		
planning stage of production and inventory management	degree of the communication	use of information system to integrate internal departments	use of vehicle tracking systems to monitor shipments		
practicality of the ordering system	exchange in inventory status	use of an integrated database for production, logistics, distribution and vendor information	calculation of costs before and after shipments		
use of Information Technology	degree of information shared	accessibility of the integrated database	planning and design of the shipment route		
degree of information shared	use of IT in taking orders	The use of computer based planning between marketing and production	accessibility of the logistics communication systems with supply chain partners		
long term period of the relationship	long term period of the relationship	real time accessibility of inventory status	-		

Table 2: Factors for overall performance, cost containment and logistics performance						
Overall Performance		Cost Containment	Logistics Performance			
Quality of products		Inbound costs	cost containment			
Effectiveness of supp	ly chain	Outbound costs	Effectiveness of logistics			
integration			system			
		Warehousing costs				
		Inventory holding costs				

3. Findings

The data collected were analysed using correlation analysis to show whether the dependent variable is correlated to the independent variables. The finding of the correlation analysis aimed at testing hypothesis 1 (a, b, and c) is shown in Table 3.

Table 3: Correlations Analysis testing hypotheses H1a, H1b and H1c						
	Supplier Integration		Customer Integration		Internal Integration	
Overall Performance	R	Р	r	Р	r	Р
	.464	.000	.398	.001	.497	.000

It is evident from the Table 3 that the P value is less than 0.01 for all indicators, forming very strong evidence against the null hypothesis thus the results of correlation can be considered significant. The correlation test formed a medium positive correlation for all variables; this proves that the presented hypotheses (1a, 1b and 1c) are viable. It is worth noting that internal integration showed the highest value of correlation while customer integration showed the lowest value.

As shown in Table 4, the P value for internal and supplier integration when analysed with the firm's cost containment resulted in a value of less than 0.01, forming very strong evidence against the null hypothesis thus the results of correlation can be considered significant. The correlation test formed a medium positive correlation for the two variables; this proves that hypotheses 2a and 2b are viable. However, the correlation for customer integration was not found to be significant. This does not necessarily mean that customer integration has no effect on cost containment but our study cannot provide evidence for this relationship. The analysis between supply chain integration and cost containment is considered significant, as the P-value is less than 0.01. The correlation test showed the highest degree of connection when compared with the three independent variables. This may indicate that when the firm is integrated with suppliers, customers and internally the effect on cost containment is higher.

Table 4: Correlation analysis testing hypothesis H2a, H2b, and H2c						
	Supplier	Integration	Custome	er Integration	Internal	Integration
Cost Containment	r	Р	r	Р	r	Р
	.366	.003	.171	.17	.351	.004

Table 5 shows the correlation analysis findings for the logistics management and firm performance. The resulted p-value is less than 0.01, which means that the null hypothesis can be rejected; thus the results can be considered significant. Logistics management showed a medium positive correlation with firm performance. This shows that when logistics management systems are implemented within an organisation it increases the performance on two attributes; decreasing costs and acting as an effective intermediate between supply chain partners.

Table 5: Correlation analysis testing hypothesis H3					
Logistics Management					
	r	Р			
Overall Performance	.557	0.00			

From the analysis it is evident that hypotheses 1, showed a positive correlation between supply chain integration and the overall performance of the chain, with internal integration showing the highest impact degree and customer integration showing the lowest. The analysis also indicates that the overall performance of firms increases when firm is integrated with suppliers, customers and internally. The analysis of hypotheses 2, showed a positive medium correlation between suppliers and internal integration with cost containment in the company, with supplier integration showing the highest degree of impact. The test between customer integration and cost containment was rejected, as the P-value was more than 0.05; thus the results could not be considered significant. The findings indicate that cost containment within firms increases when firm is integrated with suppliers, customers and internally. Logistics' test on the overall performance of the organisation showed a strong positive correlation, indicating the importance of applying logistics systems on the firm's performance. Moreover, the findings also indicate that the implementation of logistics systems can enhance the integration between supply chain partners.

4. Conclusions

This paper investigated the use of supply chain practices in Jordanian manufacturing companies, and investigated the impact of SCI on the overall performance and cost containment of the company. Moreover, paper also investigated the use of logistics systems as an intermediate between supply chain partners to decrease non adding value costs and the effect of implementing logistics systems on the overall performance of organisations. Supply chain integration can take place from three dimensions; suppliers, customers and internal integration. The result of the investigation showed that internal integration had the most effect on increasing the performance of companies. Following is supplier's integration.

This paper discussed the benefits that come from the integration of suppliers and customers, these benefits come from the use of information flow systems, partnerships and corporations, ERP application, customer participation and inventory management. Information management proved to decrease the occurrence of the bullwhip effect

resulting in an increased competitive advantage. Moreover, the use of information systems can also increase competitive advantage by improving inventory management and decreasing the practice of forward buying. Information system's use has been eased lately after the emergence of e-mails and XML format applications.

Partnerships and alliances have proved to attain competitive advantage for the whole supply chain, as partners are meeting to share information, technology and planning efforts thus increasing control and reducing uncertainty. Moreover, partnerships can enable solving mutual problems thus improving their organisations and sharing success. Not only inventory management can maximise profits, but it also enables the customisation of products and allows the fast movement of goods thus reducing cycle times. Customer integration can lead to lowering labour costs thus increasing profits. Moreover, when customers integrate in the processes, it becomes easier for organisations to have adequate information on the demands of customers by implementing feedback schemes. Forming partnerships and alliances with customers can enables the sharing of information, technology and planning efforts thus decreasing uncertainty and increasing control.

The management of logistics between supply chain partners can play an important role in the integration, as transport and warehousing acts as the intermediate between supply chain partners. The use of logistics systems for the coordination of the supply chain enables major cost reductions thus increases competitive advantage; this coordination can happen by focusing on making transparent data communication between partners and applying set of rules to which each member of the supply chain subscribes.

The study provides valuable contribution towards the understanding of supply chain integration and performance relationship in a developing country context. The findings of the study are valuable for organisations and supply chain practitioners operating in developing countries seeking to improve the performance of their organisation. As is the case with most studies this research also has some limitation. The findings are based on a very limited set of survey responses, the generalisability could be improved with a larger sample size. The sample selection may also have some faults, as not all participants may have understood the actual meaning of phrases used in the research as they are used more by academics rather than practitioners. The findings are based on quantitative analysis hence it doesn't provide participants the opportunity to discuss their opinion in the matter. A large amount of data can be lost in that manner, as participants attain the knowledge needed through experience and cannot share due to the way data was collected. Hence future research studies should aim to adopt a combination of qualitative and quantitative methods, i.e., mixed methods. Supply chain integration is an area that has emerged in the last decade however studies so far fail to address all of its attributes. Therefore, further studies on the impact of supply chain integration approach on other attributes like quality of products, costs of products, innovation, competitive advantage and organizational performance can be investigated. Furthermore, future research can be done on individual supply chains before and after attaining integration practices. This will open a door to realising more benefits, obstacles or disadvantages.

References

- Kumar, V., Chibuzo, E. N., Garza-Reyes, J. A., Kumari, A., Roch-Lona, L. and Lopez-Torres, G. C. 2017, The Impact of Supply Chain Integration on Performance: Evidence from the UK Food Sector, *Procedia Manufacturing*, vol. 11, 814-821.
- Ngo, H. V., Kumar, V. Kumari, A., Garza-Reyes, J. A., Akkaranggoon, S. 2016, The Role of Supply Chain Integration in achieving competitive advantage: A study of UK Automobile Manufacturers, *International Conference on Flexible Automation & Intelligent Manufacturing (FAIM 2016)*, June 27-30, Seoul, Republic of Korea
- Linh, N. T. D., Kumar, V., Ruan, X., Loonam, J., and Thu, H. G. 2016, Barriers to supply chain integration: The case of Vietnamese textile and apparel enterprises, *British Academy of Management (BAM 2016) Conference*, 06 - 08 September 2016, Newcastle University, UK
- Kumar, V., Loonam, J., Garza-Reyes, J.A., Kumari, A., and Ngo, H.V. Achieving Supply Chain Integration through eBusiness enabled Enterprise Systems: The case of the UK Automobile Sector, *In E-Business and Supply Chain Integration (Eds: Ozlem Bak)*, Chapter – 08, pp. 160-180, Kogan Page Publishers, London, 2017.

Christopher, M., Logistics and Supply Chain Management, London: Pitman Publishing, 1998.

Christopher, M., 2000, The agile supply chain – competing in volatile markets, *Industrial Marketing Management*, vol. 29, no. 1, pp. 37-44.

- New, S., 1997, The scope of supply chain management research, Supply Chain Management: An International Journal, vol. 1, no. 2, pp. 15-22.
- Mentzer, J., Supply Chain Management. 1ST ed. London: Sage Publications, 2001.
- Jeremy, S., 2001, Beyond supply chain optimization to enterprise optimization, Enterprise Optimization, pp. 1-5.
- Tarn, J. M., Yen, D. C., & Beaumont, M. 2002, Exploring the rationales for ERP and SCM integration, *Industrial Management & Data Systems*, vol. 102, no. 1, pp. 26-34.
- Fawcett, S. E., Magnan, G. M., & McCarter, M. W. 2008, Benefits, barriers, and bridges to effective supply chain management, *Supply Chain Management: An International Journal*, vol. 13, no. 1, pp. 35-48.
- Lewin, K., Field Theory in Social Science, 1st ed. Harper & Row, London, 1951.
- Glenn Richey Jr, R., Chen, H., Upreti, R., Fawcett, S. E., & Adams, F. G. 2009, The moderating role of barriers on the relationship between drivers to supply chain integration and firm performance, *International Journal of Physical Distribution & Logistics Management*, vol. 39, no. 10, pp. 826-840.
- Daugherty, P. J., Richey, R. G., Genchev, S. E., & Chen, H. 2005, Reverse logistics: superior performance through focused resource commitments to information technology, *Transportation Research Part E: Logistics and Transportation Review*, vol. 41, no. 2, pp. 77-92.
- Attaran, M. 2004, Nurturing the Supply Chain, Industrial Management, vol. 46, no. 5, pp. 16-20.
- Lee, H. L. 2002, Aligning supply chain strategies with product uncertainties. *California Management Review*, vol. 44, no. 3, pp. 105-119.
- Williams, L. R. 1994, Understanding distribution channels: An interorganizational, *Journal of Business Logistics*, vol. 15, no. 2, pp. 173.
- Klemenčič, E., 2006, Management of the supply chain: Case of Danfos District Heating Business Area, Master's Degree thesis, Ljubljana University.
- Thompson, J., Organizations in Action, New York,: McGrawHill, 1967.
- Stonebraker, P. W., & Afifi, R. 2004, Toward a contingency theory of supply chains, *Management Decision*, vol. 42, no. 9, pp. 1131-1144.
- Hammer, M. a. C. J., Reengineering the Corporation. NY ed. Harper Business, New York, 1993
- Funk, J., 1995, Just-in-time manufacturing and logistical complexity: a contingency model, International Journal of Operations & Production Management, vol. 15, no. 5, pp. 60-71.
- Park, S. a. U. G., 2001, Inter-firm rivalry and managerial complexity: a conceptual framework of alliance failure, *Organization Science*, vol. 12, no. 1, pp. 37-53.
- Tyndall, G., Gopal C., Partsch W., and Kamauff J., 1998, Supercharging Supply Chains, John Wiley & Sons Inc., New York
- Kahn, K. B. 1996, Interdepartmental integration: a definition with implications for product development performance, Journal of product innovation management, vol. 13, no. 2, pp. 137-151.
- Grant, R., 1996a, Prospering in dynamically-competitive environments: organizational, *Organization Science*, vol. 7, no. 4, pp. 375-87.
- Tsoukas, H. 1996, The firm as a distributed knowledge system: a constructionist approach, *Strategic Management Journal*, vol. 17, no. S2, pp. 11-25.
- Maturana, H.R. and Varela, F.J., The Tree of Knowledge, New science Library, London, 1998.
- Power, D. 2005, Supply chain management integration and implementation: a literature review, *Supply chain* management: an International journal, vol. 10, no. 4, pp. 252-263.
- Leuschner, R., Rogers, D. S., & Charvet, F. F. 2013, A meta-analysis of supply chain integration and firm performance, *Journal of Supply Chain Management*, vol. 49, no. 2, pp. 34-57
- Frohlich, M. T., & Westbrook, R, 2001, Arcs of integration: An international study of supply chain strategies. Journal of Operations Management, vol. 19, no. 2, pp. 185–200.
- Handfield, R. B., and Nicholas, E. I., Introduction to Supply Chain Management, Englewood Cliffs, Prentice-Hall, NJ, 1999.
- Akkermans, H., Bogerd, P. and Vos, B., 1999, Virtuous and vicious cycles on the road towards international supply chain management, *International Journal of Operations & Production Management*, vol. 19, no. 5/6, pp. 565-581.
- Stevens, G., 1989, Integrating the supply chain, International Journal of Physical Distribution and Material Management, vol. 19, no. 8, pp. 3-8.
- Fawcett, S. E., Magnan, G. M., & McCarter, M. W. 2008, Benefits, barriers, and bridges to effective supply chain management, *Supply Chain Management: An International Journal*, vol. 13, no. 1, pp. 35-48.
- Baharanchi, S. H., 2008, Investigation of the Impact of Supply Chain Integration on Product Innovation and Quality, *Transaction E: Industrial Engineering*, vol. 16, no. 1, pp. 81-89.

Won Lee, C., Kwon, I. W. G., & Severance, D. 2007, Relationship between supply chain performance and degree of linkage among supplier, internal integration, and customer, *Supply chain management: an International journal*, vol. 12, no. 6, pp. 444-452.

Blythe, J., Logistics. London, United Kingdom: Sage UK, 2009.

Biographies

Vikas Kumar is a Professor of Operations and Supply Chain Management at Bristol Business School, University of the West of England, UK. He holds a PhD degree in Management Studies from Exeter Business School, UK and a Bachelor of Technology degree in engineering from Ranchi University, India. He has published more than 170 articles in leading International journals and international conferences. He is Co-Founder and Editor of the Int. J. of Supply Chain and Operations Resilience (Inderscience) and serves on the editorial board of several international journals. His current research interests include sustainability, short food supply chains, and operational excellence. He has secured research funding from various research agencies and generated income in excess of £1 million.

Jack Zeidan was a Masters student studying MSc in International Management at Bristol Business School, University of the West of England, UK. His research interests are in supply chain integration and international business.

Archana Kumari is a PhD student at Bristol Business School, University of the West of England, UK. She is an active researcher and has published in a number of journals and international conferences. Her research interests are in econometric modelling, general supply chain management, and business economics.

Jose Arturo Garza-Reyes is a Professor of Operations Management and Head of the Centre for Supply Chain Improvement at the University of Derby, UK. He is actively involved in industrial projects where he combines his knowledge, expertise and industrial experience in operations management to help organisations achieve excellence in their internal functions and supply chains. He has also led and managed international research projects funded by the European Union, British Academy, British Council and Mexico's National Council of Science and Technology (CONACYT). As a leading academic, he has published over 100 articles in leading scientific journals, international conferences and four books in the areas of operations management and innovation, manufacturing performance measurement and quality management systems. Areas of expertise and interest for Professor Garza-Reyes include general aspects of operations and manufacturing management, business excellence, quality improvement, and performance measurement. He is a Chartered Engineer (CEng), a certified Six Sigma-Green Belt, and has over eight years of industrial experience working as Production Manager, Production Engineer and Operations Manager for several international and local companies in both the UK and Mexico. He is also a fellow member of the Higher Education Academy (FHEA) and a member of the Institution of Engineering Technology (MIET).

Jiri Tupa is a Vice-dean of faculty and Senior Lecturer at Department of Technologies and Measurement. Dr. Tupa is member of executive management at Regional Innovation Centre for Electrical Engineering of the Faculty of Electrical Engineering at the University of West Bohemia in Pilsen. He is also PhD supervisor, reviewer of journal and conference publications and co-organizer of conferences. His research interests include Business Process Management, Quality Management, Risk and Performance Management in Electrical Engineering Industry, Industrial Engineering, Electronics Manufacturing and Diagnostics, Financial and Project Management, Copyrights and patents law, information law and transfer of IPR. Jiri Tupa is responsible for several international research and development projects with industrial and University partners.