Changing supply chains in the era of volatility - a multiple case study

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Abstract
In this multiple case study, supply chain management and operations management in the Finnish industry during the 2010s were studied. The objective was to resolve what kind of capabilities are being required from a company to succeed globally and how they see the winning criteria's in this era of volatility.

Keywords: Supply chain strategy, performance development, metrics

INTRODUCTION

The operational environment in international trade and structures are in a continuous change. The new network technology and the new world economic order of globalization have brought new meaning to operations and supply chain management. In business environment there are fundamental continuous changing factors, like rapid and rough changes in the world economy, unpredictable price fluctuations in raw-material prices, inconsistency in the exchange market, which makes operations management turbulent (Christopher and Holweg, 2011). This has also created both the opportunity and the need to consolidate and rationalize business structures and operational processes. The latest changes in the world economy like the protracted recession, especially in Europe, have forced companies to change in all aspects of their operations – structure, strategies, practices used, processes used and overall control. As a result of climate change, constant draining of natural resources and massive population growth, we are stepping into a new era, which brings us a great deal of challenges. On the other hand, possibilities in global supply chains are a positive aspect (Beamon, 2008). Therefore, companies have to react faster to changes. Presently, it is said that companies are not competing with each other, yet their supply chains are in contention.

The aim of this multiple chase study was to find out what kind of supply chain philosophy and strategy is implemented in Finnish industrial companies in the 2010s, so that the company can use its performance factors to remain a market leader in its field, or to become one. The research also clarified companies' performance indicators and the direction they would take in the future. This study was executed with finish industrial companies from two fields, electrical and electronics and process industry.

The empirical part of this multiple case study is based on the migratory supply chain model which was presented by Christopher and Towill (2001) and updated by Potter, Towill and Christopher (2015). The articles demonstrate different ways of uniting lean and agile philosophies for accomplish competitiveness in supply chains. Supply chains, which could be managed today's unstable and cost awareness business environment. Furthermore, the articles also reveal important differences between

lean and agile views and how enterprises are able to achieve benefits by connecting these two philosophies to leagile.

The difference between lean and agile has been studied by several scholars (Hallgren and Olhager, 2009, Stavrulaki and Davis, 2010, Naim and Gosling, 2010, Kisperska-Moron and de Haan, 2011, Gligor et al. 2014). According to Potter et al. (2015), the starting point is the strategy, whether product, market or customer driven. Terms from industrial management, "order qualifier" and "order winner" have been brought to supply chain context as "market qualifier" and "market winner", and further connected to lean and agile concepts. Traditionally, lean has been connected to cost efficiency and agile to service improvement and customer added value. According to the 2001 article in agile supply chains those factors, "market winners" and "market qualifiers", are quality, cost and lead time (in this order). On the contrary, in lean they are, quality, lead time and level of service (in this order). The essential difference between lean and agile is when it comes to added value provided to the customer. In agile, the most important factor is level of service (availability) and in lean costs and selling price is emphasized. While the concept is well designed, organized and managed, an enterprise could utilize lean and agile together (leagile). This concept (Table 1) was upgraded and presented as "migratory supply chain model" in the arcticle: “Evolution of migratory model" (Potter et al. 2015).

Table 1, The migratory supply chain model (Potter, Towill and Christopher, 2015)

Supply chain evolution Phase	I Until the 1990s	II 1990s	III 2000s	IV Early 2010s	V Late 2010s
Supply chain philosophy	Product driven	Market oriented	Market driven	Customer driven	Customer centric
Supply chain type	Lean functional silos	Lean supply chain	Leagile supply chain	Customised leagile Supply chain	Multiple leagile supply chains
Order Winner	Quality	Cost	Availability	Lead time	Lead time
Market Qualifiers	Cost Availability Lead time Sustainability	Availability Lead time Sustainability Quality	Lead time Sustainability Quality Cost	Sustainability quality Cost Availability	Sustainability quality Cost Availability
Performance metrics	Stock turns Production cost	Throughput time Physical cost	Market share Total cost	Customer satisfaction Value added	Technological capacity Level of servitisation

In this study the content of the qualitative themed interviews where created base on the migratory model concept. The purpose was to use that as a framework to our research and study how two different industries electrical and electronic and process industry match to the migratory model. The key research questions were:

What are the leading Supply Chain philosophies?
What are the leading Supply Chain types?
What are the winning factors for Market Winners?
What are the leading Market Qualifiers?
What are the directional performance metrics in Supply Chains?

The paper is organized as follows: Section 2 is literary review, which discusses the key elements of developing supply chain performance. Section 3 describes the study and research design. The results are given in section 4, followed by conclusions and discussions in section 5.

LITERARY REVIEW

Basis in operations management is mission, vision and strategy. Wheelwright (1984) argued that effective strategies are characterized by synergies across key decision areas, especially those affecting

manufacturing strategy and business strategy, other functional strategies, and the competitive environment, respectively. Similarily, Ketokivi et al. (2004) argued that because company performance is multidimensional we must incorporate both the multidimensionality of performance as well as the strategic goals into the analysis. In order to get the maximum effect to operational work, the performance management system has to be valid, accurate, and reliable and build a balanced view of the operations. Only in this particular way it has a true effect on the company's decisions. Galbraith (2002) described these multidimensional classifying practices in five dimensions; strategy, structure, processes, people and rewards. He stated that, while vision changes, also strategy, underlying processes and practices must change. Waterman et al. (1980) defined in six dimensions; strategy, style, structure, systems, staff and skills. Kaplan and Norton announced their four perspective Balanced Scorecard (BSC) in 1992. Together with their Strategy Maps (Kaplan and Norton, 2003), Balanced Scorecard or its applications are widely used in company level performance management. This could also be strongly seen in this study. Management practices, either strategic or manufacturing strategy, are ways to implement strategic goals to operations management activities. Performance or success of these practices are measured how well these goals are communicated to employees (Ketokivi et al. 2004), how strong the organizational culture is (Deshpandé et al. 2004) or the implementation of manufacturing strategy (Swink et al. 2005).

Strategy and key sub-strategies form the right structure of the organisation (Hitt et.al. 2015). These have be on the line, with the operational functions and practices to achieve the strategic goals (Swink et.al. 2013). Theoretical approach and perspective to performance management depends on what needs a company has in performance development. It could be micro level approach, single process or manufacturing site level which is measured with system practices or strategic, company or entire supply chain level approach. Standpoint to performance management could purely be based on strategy. Continuous development of manufacturing and supply chain networking capabilities is crucial. These capabilities should play an important role in how firms compete in product markets, and that firms must continually develop these capabilities (Hayes and Wheelwright, 1984; Hayes 1985, Hayes and Pisano, 1996). Voss reviewed in his papers (1995, 2006) the history and development of manufacturing paradigms over the last decades, finding three major phases: Competing through manufacturing, Strategic choices in manufacturing, and Best Practices (system practices). Organizations have to understand their key competences and be capable to utilize them to business operations. According to Voss in many cases best practices boil down to the concept of "World Class Manufacturing". They usually comprise items such as continuous improvement, JIT, Lean, TQM, benchmarking, ABC, CE, BPR (Laugen, 2005).

For choosing the right and efficient supply chain strategy the philosophy behind the strategy could be either product, market or customer driven (Christopher and Towill, 2001, Potter et al. 2015). Like Fisher (1997) found, starting point is to understand and define aspects of demand in the market. What is the life cycle of the products and predictability of the demand? How broad is the product portfolio and the customer expectations for delivery. Based on this, products are divided in two categories, functional or innovative. This is the basis for operational choices in supply chain management.

On the other hand the starting point for strategy could be on market focus, where supply chains are divided in certain sectors, where performance is observed in relationship with competition. Correspondingly, companies have succeeded to maintain their competitiveness with a good design and management of supply chain, thus creating lower cost to customers, faster deliveries and improved quality. However, in the future this will not be enough. While the business environment is in a continuous change, the target of supply chain management is to develop and maintain competitiveness with various operational factors. Supply chains are changing from price/cost driven to value-added driven. In supply chains, Melnyk et al. (2010) argued, supply chain must deliver varying degrees of six

outcomes: Traditional, cost-related benefit plus responsiveness, security, sustainability, resilience and innovation. Another example is the SCOR framework, developed by Supply Chain Council, which provides a solid foundation for measuring performance in reliability, responsiveness, agility, cost, assets and identifying priorities.

Customer expectations are in continuous change and companies have to adjust as well. According to Lee (2004), companies and initiatives persistently aimed at a greater speed and cost-effectiveness in supply chains, which makes them vulnerable to changes in customer demands or market changes. The successful companies in the future will build their supply chains to react on sudden and unexpected changes more easily and cost-effectively. This could be made by developing; Firstly agility, companies has to respond to short-term changes in demand or supply quickly by handling external disruptions smoothly. Secondly adaptability, companies has to adjust their supply chain's design to meet structural shifts in markets. They have to modify supply network to strategies, products, and technologies. Lastly, alignment, companies has to create incentives for better performance internally or to cooperate in complex networks.

Our changing environment is constantly in need of new ideas. Scholars have also tried to create new innovations for supply chain management. Several frameworks have been created for supply chain management in order to facilitate the performance management system into organizations. Because of multiformity of different supply chains by evaluating former academic discussion Shepherd and Gunter (2006) provided a taxonomy of measures, a critical review of metrics and measurement systems used to evaluate supply chain performance, and possible avenues for future research. Gunasekaran et.al. (2004) presented a framework where performance measures and metrics consist of four major supply chain processes; plan, source, make/assemble, and deliver. These metrics were classified at strategic, tactical and operational to clarify the appropriate level of management authority and responsibility for performance (Gunasekaran et. al. 2004). Chia et.al. (2009) studied how to apply BSC in supply chain performance management. Their conclusion was that their respondents focused primarily on measuring financially-related performance indicators. Importance of on-time delivery and customers satisfaction were secondary, although in terms of importance of measures, on-time delivery was considered to be the most important. BSC has been proposed to use framework for supply chain by other scholars. Thakkar et al. (2007) suggested to use BSC in an integrated approach of interpretive structural modeling and analytic network process. Thakkar et al. (2009) presented a framework where BSC and SCOR-model were integrated. A framework, which was based on four factors; strategy, leadership, culture and capability. Lin and Li (2010) stated that the integrated framework has several advantages over traditional ones. The framework can determine the overall performance of each dimension of a supply chain and cascade down to the internal processes. This simplifies the comparisons from single process to the entire supply chain. Sillanpää (2015) defined the key elements for the measurement framework as time, profitability, order book analysis and managerial analysis.

RESEARCH METHODOLOGY

Principles and methods in this multiple case study follows the ideas of case study research as research strategy that aims at understanding the internal dynamic of case's particularly within case analysis and multiple case replication logic, which are unique to the inductive case-oriented process defined by (Eisenhardt, 1989). A multiple case study enables the researcher to explore differences within and between cases. The goal is to replicate findings across cases (Yin, 2003). Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases, or predict contrasting results based on a theory (Yin, 2003)

The qualitative themed interview is a semi-structured interview method. In themed interviews, the themes to be raised in the interview are carefully considered and defined in advance, and the discussion has a pre-determined purpose. The themed interview aims to acknowledge people's interpretations and their construction of meaning. Space is provided for interviewees to speak freely, but in such a way that the pre-defined issues and themes are covered with all the interviewees. The themed interview requires careful familiarization with the subject matter and knowledge of the situation of the interviewees, so that the interview can be targeted precisely on specific themes. Content and situation analysis is therefore important in a themed interview. The themes to be covered are chosen on the basis of familiarization with the topic being studied (Rubin and Rubin, 2005).

For the current study, interviews were conducted in five companies from each of two different industries. The industries involved were the electrical and electronics industry and the processing industry in general. The selection criterion for companies was that they should have their own production facilities in Finland and operations outside Finland. Interviewed person were CEO, EVP and VP level operators in their organisations responsible for supply chain operations. All the companies participating in the study were fairly large, and the aim was to use the results of the interviews to present the necessary factors for global market leadership. The names and the information of the companies are not published, but all the participant are major globally operated and major player in their field. The interviewees represented the companies' specific areas of business, units or, for example, factories. Depending on the interviewee, the answers provided could apply to his or her limited area or to the entire company.

The interview was always conducted face to face, and took 2-4 hours. The interview situation always involved two interviewers, of whom one was responsible for the content of the research and the progress of the interview, and the other asked additional questions to support the objectives of the interview and was responsible for documenting the occasion. After the interview, both interviewers wrote out their notes. This technique aimed to extract and record everything necessary from the interviews while avoiding mistakes by comparing notes. The actual analysis of the responses was carried out in workshop style over several meetings, where each question was handled according to company and industry, in order to form a shared understanding of the research results. This method proved to be very effective.

We attempted to clarify the base level and winner features for the industry through interview questions relating to market leadership and market factors. In the interview, we asked about the company's position in the markets, the company's competitors, and the means by which the company might join the market leaders. Fairly direct questions were used to identify actual individual market factors, or performance factors. Interviewees were asked to rank performance factors in order of importance, and to answer fictitious case studies.

Using several types of question, our research attempted to clarify the supply chain and production management philosophy and strategy of a Finnish industrial company. The interviews aimed to find out whether the market factors that the market demanded from the company were in line with the company's operations. The interviews began by finding out what the company represented by the interviewee produces and sells. Do they sell products, solutions, or services? Information was also sought on the company's customers, and the market segment in which the company competes. The interviews included direct questions about the company's competitive strategy. Likewise, although the first question area clarified the supply chain philosophy of the interviewee's company in a roundabout way, this was finally asked directly: "Would you describe your business as customer, product, or market-driven?"

Even while forming the interview questions, we were aware that production management in a modern company is likely to use a hybrid strategy. As a hypothesis, this was assumed to be the case at least in the electrical and electronics industry. To find out what kind of hybrid strategy was in use, we had to ask the interviewees a very diverse range of questions on supply chain control methods, production methods, production scheduling and demand forecasting.

Questions in the last thematic area focused on performance measurement. Implementation of the supply chain strategy is monitored and change supported by measurement. In interviews, discussion of measurements began from the generally familiar example of the balanced scorecard. Especially in regard to measurement, it was assumed that companies would use benchmarking, on which questions were therefore asked in this context. Questions were also included on the visibility in measurements of sustainable development (sustainability), which is currently very visible in the research world.

The interviews ended by asking about the interviewee's vision for the future of the supply chain. This section was intended to preserve the integrity of the whole interview, but in the end it was interesting, on the basis of the answers, to consider the ways in which supply chains are evolving.

RESULTS

The first part of the research investigated companies' supply chain philosophy. The aim was to discover the underlying principle that guides the company's supply chain. Does the company's supply chain philosophy aim at product orientation or perhaps customer orientation? What is the basis of the company's competitiveness? How does the company work with its cooperation partners?

In principle, the supply chain philosophy of the electrical and electronics industry is product driven. However, the industry always aims to use a variety of solutions and services in an effort to become customer or market-driven. Competitive strategy relies on cost-effective differentiation and concentration. Companies seek to appear as agile and flexible as possible to the customer. This drive towards reactivity leads to modular product design, which enables mass customization and thereby delays production until the customer makes an order. Modular product design, mass customization, and delayed production are widely used in the industry. Value creation is seen as a customer-specific element within the overall process. Cooperative relationships focus on the long term, and supplier selections are made on a case by case basis.

In the processing industry, the supply chain philosophy is product driven. Forecast-driven supply chain management supports mass production of products, resulting in higher material flows and inventory levels. Depending on the product, competition in the market depends on product price, differentiation, or centralisation. However, competitiveness within the industry is based on focused differentiation. Different levels of supplier selection are most affected by the quality/price ratio and the customer's geographical location. Supplier contracts are entered into for a few years at a time.

In addition to the supply chain philosophy, the first part of the research investigated companies' supply chain strategy. What are the central factors in the company's supply chain and production management? What does the company's business activity require? How flexible is their production scheduling? How does the company predict demand?

In the electrical and electronics industry, supply chain management is either push-based or pull-based, depending on the product. Supply chains are mainly order-driven (MTO), but based on lean principles. Product value creation aims to remove all factors that do not produce value for the customer. Production scheduling ranges from real-time to long-term, depending upon the company and product. Demand forecasting depends on the life cycle of the product. Sales forecasts play a significant role for products with a short life cycle, while forecasting for products with long life cycles is based on history.

In the processing industry, companies aim for a pull-based supply chain, but in practice their operations are largely push-based. Supply chain management and production operate on lean principles, with forecast-driven inventories, although a small part of production is also order-driven. The service level in the industry is very high, so the importance of inventory management is emphasized. Production scheduling is based on customer needs. Demand forecasting plays an important role in the industry, and is closely associated with a variety of larger entities, such as Sales & Order Planning (S&OP).

The second part of the study identified the nature of the most successful businesses. What is common to the global market leaders in the 2010s? What are the qualities required for a company to reach the top of its industry?

In the electrical and electronics industry, companies that succeed in global markets are able to bring high quality products to market in a timely manner. The most important factor in reaching this objective is the reactivity of the supply chain. Companies are expected to be reliable, which from the customer's point of view means a competitive price and quality product, including the necessary services and fast and flexible deliveries, matching customer requirements.

In the processing industry, the properties of market winners culminate in a strong brand, quality products, good customer service, and fast deliveries. Continuous product development and innovation, and sufficient capacity, ensure continuity of operations in markets. Success is based on the customer's experience of quality and customer-oriented service. Supply chains in the processing industry are therefore product driven, although markets are already demanding customer-oriented service.

Market factors alternate as winning characteristics for companies. What is the basic level of companies in the 2010s? Do companies compete on price, availability, delivery times, or quality? What are the competitive factors in the company's market position and what kind of capacity should companies develop?

In the electrical and electronics industry, the main market competition factors are the availability and quality of products and the level of services generally. If these are in order, customer satisfaction is secured. Price competition is limited. The development of the supply chain as a whole is seen as an important development target.

In the processing industry, the most important competitive factors are also availability, quality, and service. This also leads to further customer satisfaction. Companies do not get involved in price competition. Increased customer orientation is considered an important part of operations in the processing industry.

The third and final part of the study examined how companies monitor and develop performance. Performance indicators monitor the effectiveness of the company's processes. Indicators are used in efforts to improve performance and execute strategy. Are there different weightings in companies' indicators and how do the indicators for various functions differ?

The electrical and electronics industry uses both internal and external benchmarking. The balanced scorecard approach is the basis for corporate indicators. The role of human resources in the company's success is highlighted, but current indicators emphasize especially financial metrics and indicators of customer perspective and internal processes. The most important performance factors are service level and customer satisfaction. An important economic aspect is the total cost of the supply chain, which can be connected to a number of indicators, such as the profitability and productivity of operations.

To some extent, the processing industry uses both internal and external benchmarking as well as statistical comparisons. Performance indicators are based on the balanced scorecard approach. Key performance indicators are availability, quality, and customer satisfaction. Other indicators include profitability and personnel development.

CONCLUSIONS AND DISCUSSION

Strategic thinking in companies in the electrical and electronics industry aims to be customer or market-driven, but in fact the industry operates in a very product-centred fashion. Companies sell products. However, companies have partially succeeded in moving from product sales to solution sales, which in turn is a movement towards customer orientation. Academic discussion of customer orientation has continued for several years, so it is surprising that theory is only now moving into practice. Fawcett et al. stated (2008), that focusing on customer satisfaction and customer service is a more sustainable option for companies than seeking cost savings. Gunasekaran et al. (2001) even suggested supply chain metrics with which a company could develop its processes in a more customer-oriented direction. Significant finding was, that in spite of aim to customer focus and commitment, only one company had changed their operations and processes to direction, which make reactivity and strong customer focus possible.

Competitive strategy in the electrical and electronics industry is based on focus and differentiation strategies. The size of the company in its own business environment, the size of the company's industry, and the complexity of products define the core of the company's operations. The aim is to appear a maximally agile and flexible operator to the customer. In operations control, organizational units are no longer seen as independent actors; instead, cross-functionality is seen as a necessity. Reactivity aims at moving the customer order point to the latest possible stage. Competitiveness is sought by means of modular product design and mass customization, which allow production decisions to be delayed until the customer order is placed. These methods aim at short delivery times, delivery ability, and agility. All companies in the sector try to mass customise products, if at all possible. Price competition is not possible; competitive factors depend rather on the market segment and product. Quality is an important competitive factor, which relates not only to the product, but to the capability and reactivity of the entire supply chain.

Table 2 is our condensed interpretation of answers to the research questions from the electrical and electronics and process industry. Differences between the study and migratory model can be seen. On the whole, the supply chain management philosophy in the electrical and electronics industry is generally product driven, but strives continually to become more strongly customer and market-driven. The research findings suggest that the companies' supply chains are order-driven (MTO) lean supply chains, where the most important capabilities and the winning feature lie in supply chain reactivity.

Table 2: Summary of results (migratory model)

	Electrical and Electronics industry	**Process Industry**
Supply chain philosophy	In general product driven, aim to be customer driven	Product driven, competitiveness is based on focused differentiation
Supply chain type	Make To Order LEAN	Lean supply chain
Order Winner	Reactivity	Standard of service Delivery capacity and time Quality products
Market Qualifiers	Availability Quality Standard of service	Availability Quality Level of Service
Performance metrics	Standard of service Customer satisfaction Costs	Availability Quality Customer satisfaction

Companies in the electrical and electronics industry make wide use of benchmarking. Benchmarks are found inside the company, from other companies in the same industry, and from outside the industry. In the companies providing interviews, performance indicators were at least loosely based on the four perspectives of a balanced scorecard (BSC) approach. The role of human resources in the company's future success is mentioned, but current indicators emphasize measurements of finances, customer perspective, and internal processes. The interviewees seldom mentioned the learning and growth perspective, i.e. indicators of staff development. Significant finding was, that while companies had defined their most important performance metrics, personnel competences, knowhow and learning did not came out in the first stage.

The companies used the main quality control systems, such as ISO. Sustainability was not particularly emphasised in the indicators. Views on this topic were slightly contradictory. One interviewee stated that the company should meet the minimum standards of the sector in question, and no more. One company, on the other hand, had been able to turn environmental responsibility into a success factor. The main performance indicator for the industry is the service level, which includes quality, availability, and flexibility. Important performance indicators additionally include customer satisfaction and the financial costs of the entire supply chain, which affect profitability among other matters.

Owing to the special characteristics of the sector, the products of the processing industry are mainly mass produced, and based on the principles of continuous or batch production. In the processing industry the price of raw materials forms a significant element in price formation. Operations control and production management roles are quite traditional, and control methods are largely based on best practices within the industry. Companies' supply chains are based on lean strategy.

Global market leadership is acquired by means of a strong brand, high quality products, good customer service, and fast deliveries. In addition, continuous product development and innovation, as well as the ability to produce sufficiently large volumes, guarantee that the company can stay in the race. Companies' sales strategies emphasize the sale of solutions, which aim to find the right products for a specific customer. Information and maintenance services are also offered with the product. Customer service therefore requires a lot of technical know-how and may thus be considered a purely technical customer service. Companies aim to improve competitiveness by improving product development and becoming more customer-oriented.

Bibliography

Beamon, B. M. (2008). Sustainability and the Future of Supply Chain Management. *Operations and Supply Chain Management: An International Journal* 1(1): 4-18

Chia A., Mark Goh, Hum S., 2009. Performance measurement in supply chain entities: balanced scorecard perspective. Benchmarking: An International Journal 16(5): 605-620

Christopher, M., D. Towill. 2001. An integrated model for the design of agile supply chains. *International Journal of Physical Distribution & Logistics Management* 31(4): 235-246.

Christopher, M., M. Holweg, M. 2011. Supply Chain 2.0': managing supply chains in the era of turbulence. *International Journal of Physical Distribution and Logistics Management* 41(1): 63-82

Deshpandéa R., J. U. Farley. 2004. Organizational culture, market orientation, innovativeness, and firm performance: an international research odyssey. *International Journal of Research in Marketing* 21(1):3–22

Fawcett S. E., G. M. Magnan, M. W. McCarter. 2008. Benefits, barriers, and bridges to effective supply chain management. *Supply Chain Management: An International Journal* 13(1): 35-48

Fisher : L. 1997. What is the right supply chain for your product. *Harvard Business Review* 75(2): 105-116.

Galbraith, J. (2002), “Organizing to Deliver Solutions”, *Organizational Dynamics* 32(2): 194-207

Gligor, D. M., C. L. Esmark, M. C. Holcomb. 2014. Performance outcomes of supply chain agility: When should you be agile? *Journal of Operations Management* 33–34(2015): 71–82

Green A., J. J.C.H. Ryan. 2005. A framework of intangible valuation areas (FIVA): Aligning business strategy and intangible assets. *Journal of Intellectual Capital* 6(1): 43-52

Gunasekaran, A., C. Patel, R. E. McGaughey. 2004. A framework for supply chain performance measurement. *International journal of production economics* 87(3): 333-347

Gunasekaran A., C. Patel, E. Tirtiroglu. 2001. Performance measures and metrics in a supply chain environment. *International Journal of Operations & Production Management* 21(1/2): 71-87

Hallgren, M., J. Olhager, (2009). Lean and agile manufacturing: external and internal drivers and performance outcomes. *International Journal of Operations & Production Management*. 29(10): 976-999

Hayes, R.H. 1985. Strategic planning - forward in reverse. *Harvard Business Review* 63(6): 111-119

Hayes R. H, G.P. Pisano. 1996.Manfacturing strategy: at the intersection of two paradigm shifts. *Production and Operations Management* 5(1):25–41

Hayes, R., Pisano, G., Upton, D., Wheelwright, S., (2005). *Pursuing the Competitive Edge*. Wiley: New York.

Hayes, R. and Wheelwright, S. 1984. Competing Through Manufacturing. *Harvard Business Review* January-February.

Hitt M. A., R. D. Ireland, R. E. Hoskisson. 2015. *Strategic Management: Concepts: Competitiveness and Globalization 11th Edition*. South-Western College Pub. USA.

Kaplan, R. S., Norton D. P. 1992. The Balanced Scorecard: Measures That Drive Performance. *Harvard Business Review*.70(1): 71-79

Kaplan, R. S., Norton D. P. 2004.Measuring the Strategic Readiness of Intangible Assets. *Harvard Business Review* 82(2): 52-63.

Ketokivi, M. A., & Schroeder, R. G. (2004). Strategic, structural contingency and institutional explanations in the adoption of innovative manufacturing practices. *Journal of Operations Management* 22(2): 63–89

Kisperska-Moron D., J. de Haan. 2011. Improving supply chain performance to satisfy final customers: "Leagile" experiences of a polish distributor. *International Journal of Production Economics* 133(1): 127-134

Laugen, B.T. 2005. Best manufacturing practices What do the best-performing companies do? *International Journal of Operations & Production Management* 25(2): 131-150.

Lee H.L. 2004. The Tripple-A supply chain. Harvard Business Review 82(10): 102-112

Voss, C., Blackmon, K., Hanson, P., & Oak, B. (1995). The competitiveness of European manufacturing—a four country study. *Business Strategy Review* 6(1): 1-25.

Swink M, R. Narasimhan, SW. Kim. 2005. Manufacturing practices and strategy integration: effects on cost efficiency, flexibility, and market-based performance. *Decision Sciences* 36(3): 427–457

Melnyk S. A., E. D. Davis, R. E. Spekman, R. Sandor. 2010. Outcome-Driven Supply Chains. *MIT Sloan Management Review* 51(2): 33-38

Naim M., J. Gosling. 2010. On leanness, agility and leagile supply chains. *International Journal of Production Economics* 131(1): 342–354

Rubin H. J.,Rubin, I.S. 2005. *Qualitative interviewing: the art of hearing data. 2nd Edition*. Thousand Oaks; London UK.

Sillanpää I., 2015. Empirical study of measuring supply chain performance. Benchmarking: *An International Journal* 22(2): 290 - 308

Stavrulaki E., M. Davis. 2010. Aligning products with supply chain processes and strategy. The *International Journal of Logistics Management* 21(1): 127 - 151

Swink M., S. Melnyk, M. B., Cooper, J. L. Hartley. 2013. *Managing Operations Across the Supply Chain, 2nd Edition*. McGraw-Hill Education. USA.

Thakkar J, A. Kanda, S.G. Deshmukh, 2009. Supply chain performance measurement framework for small and medium scale enterprises. *Benchmarking: An International Journal* 16(5): 702 - 723

Thakkar, J., S.G. Deshmukh,, A.D. Gupta, R. Shankar. 2007. Development of a balanced scorecard: an integrated approach of interpretive structural modeling (ISM) and analytic network process (ANP). *International Journal of Productivity and Performance Management* 56(1): 25-59

Voss, C. 2005. Paradigms of manufacturing strategy re-visited. *International Journal of Operations & Production Management* 25(12): 1223-7.

Wheelwright, S.C. and Hayes, R.H. 1985. Competing Through Manufacturing, *Harvard Business Review*, January-February.

Waterman R. H., T. J. Peters, J. R. Phillips. 1980. Structure is not organization. *Business Horizons* 23(3):14-26