TECHNOLOGY AS AN ENABLER FOR CREATING VALUE IN SUPPLY CHAIN

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Abstract

The competitiveness of the organizations lies in its ability to predict and foresee the future developments. And managing the future, although a difficult task is not an impossible for an organization that has sound information technology base. When this is coupled with one of the most important systems of the organizations i.e. Supply chain the benefits are supposed to be synergistic. Today information technology is to be viewed as an enabler rather than a solution. The current paper is targeted towards identifying the challenges that the companies face in designing agile global chains. It tries to identify the prospects with special reference to role of technology in creating value in the supply chain. The objective is to identify the technology enablers that would drive the supply chain in future. The paper critical analyses the available literature to draw inferences. The main objectives are 1. To identify the challenges that companies are facing in developing supply chains 2) To study the role of technology in adding value to supply chain management 3) To understand the benefits and prospects offered by a supply chain based on information technology.

Key Words: Supply chain, challenges, information technology, value addition

INTRODUCTION: Supply chain lies at the heart of an agile organization. Supply chain is very important as it has a significant impact on the profitability of the organization. With most of the companies are going global in the current times, they are faced with a few challenges on the supply chain front. There is a realization that the supply chain takes time to develop and build skills in new geographies. The supply chain lacks an inherent capability to respond quickly to stakeholders demands and expectations.

Handfield and Nicholas (1999) refer to supply chain as an integration of activities from the flow and transformation of goods from the raw material stage (extraction) through to the end user as well as the associated information flows. The materials and information flow up and down the supply chain. Supply chain management is the integration these activities through improved supply chain relationships to achieve sustainable competitive advantage. Thus, the underlying word is developing sustainable relationships among the various members of the supply chain.

A supply chain management system gives the organizations the benefit of reduced costs, improved productivity, and better service. It helps the organizations to optimally utilize its property, plant and equipment It has now been understood by the corporate world that to succeed in this fast-moving world they have to secure to their most valuable assets i.e. the employees, the critical information, services and applications at the right time. According to Charles C. Poirier (2002) supply chain refers to the core business processes in an organization that create and deliver a product or service, from concept through development and manufacturing or conversion, and into a market for consumption. Supply chain management includes the methods, systems and leadership that continuously improve an organization's integrated processes for product and service design, purchasing, inventory management, logistics, distribution, and customer satisfaction. R Michael Donovan (2001) has called supply chain management as the effective collaboration through a network of customers and suppliers. Ballou (2004) states that supply chain management is about the coordination of product flows across functions and across companies to achieve competitive advantage and profitability for the individual companies in the supply chain and the supply chain members collectively.

OBJECTIVES AND METHODOLOGY: The current paper is targeted towards identifying the challenges that the companies face in designing agile global chains. It tries to identify the prospects with special reference to role of technology in creating value in the supply chain. The main objectives are

- To identify the challenges that companies are facing in developing supply chains.
- To study the role of information technology in supply chain management
- To identify the value created by information technology in a supply chain and understand the benefits

The paper is based on a critical analysis of the available secondary data on supply chain management. The focus has been to review the existing research on role of technology in supply chain management.

CHALLENGES IN SUPPLY CHAIN: THE NEED FOR STUDY: The significance of developing a supply chain has been repeatedly stressed and empirically proved through a wide spectrum of studies. Edward W. Davis (1983) mentioned that upto 1970s the main concerns were cost containment and productivity improvement. Most manufacturers also focused on direct labor. The fresh look at purchasing perspective found purchased parts content exceeding 50% and inventory carrying costs alone equal to direct labour content. This motivated the companies to look hard at purchasing and to examine everything they were doing. One step was to create an advanced materials organization to consolidate and integrate purchasing storage and transportation function. Cooper and Ellram (1993) compare supply chain management to a well-balanced and well-practiced relay team. Such a team is more competitive when each player knows how to be positioned for the hand-off. The relationships are the strongest between players who directly pass the baton, but the entire team needs to make a coordinated effort to win the race

Attaining the objective of an agile supply chain is a challenging task.The business world today is facing numerous challenges. They are faced with the pressure of increasing productivity and efficiency. They are being forced to think of ways to reduce their operating cash flows and optimise the cash to cash cycle time. The companies are facing a tremendous pressure to reduce their operating costs. It has been seen that 70% of the sales revenue are directed towards various supply chain activities starting from procurement and going upto delivery of the product. Hence supply chain has a strong impact on the profitability of the company. It is a big challenge that the supply chain managers are facing especially as the cost of fuel and consequently freight charges are rising. In such an environment the supply chains have a key role in helping the organizations control their costs and contribute to the profitability of the organisation.

The biggest challenge comes from globalistion. Most of the companies are taking their operations to foreign shores. The emerging markets offer tremendous opportunity for the companies to expand. The trend towards outsourcing and the increasing importance of intangibles heightens the need for, and the potential of, supply chain management. According to Storey et.al(2006)globalisation necessitates greater attention to logistics and to other component elements of supply chain management. The dispersion of nodes in the supply chain across the

continents offers new business opportunities to freight handling companies and third party logistics. However most of the companies are realizing that there is a lack of requisite skill set that would manage the supply chain functions. Further the lead time to develop such skill set is significantly large, hence the companies rely on a centralized shared services pool

On top of that the expectations of the customers for effective and fast delivery are increasing. Faster pace of innovation and shorter product life cycle make the task of demand forecasting a challenge. The firms gain a competitive edge not by manipulating the price function but by delivering innovative products as fast and quickly as possible. The supply chain has to be dynamic. The challenge is to periodically revise and redesign the supply chains in response to the changing market dynamics like new product development, global sourcing of material. This means that the supply chain managers are now faced with the challenging task of maintaining sustainable relationships with the suppliers who can react quickly to their changing demands There is a need to consolidate the supply chain base so that variances and fluctuations in the cost can be minimal.

With the pace of operational decision making growing fast, there is a need for the managers to proactively look at the problems and solve the issues. Such effective operational decision making requires insight and understanding of the issues and problems. This is possible when quick and accurate information is made available to the people at operational level. It is only through the information technology that seamless analytical insights can be gained for effective and informed decision making.

ROLE OF INFORMATION TECHNOLOGY IN SUPPLY CHAIN: In this digital age, information technology forms the basis of are daily life movements and the business sector is even more so running dependent on information technology. The success of supply chain depends on three dimensions; organization, coordination and information. Integrating all these three dimensions is the fourth dimension of information technology which has now become an integral part of a good supply chain management system. Realising the importance of information technology Chee et al.(1996) found that there is an unrealized potential for using information technology in support of network coordination. A survey was done of more than forty computer manufacturers. It was found that only about 15% of the partners were communicating through EDI. It was also found that much of the coordination activity occurs above the operational level. Bowersox et al.(2002) have also identified the strategic role of Information technology for third part logistics firms. Integerated logistics services, such as shipping, consolidation, warehousing,

labeling, packing and inventory management should be seamlessly integrated into the supply chain as a whole. More specifically, Jain (2004) identifies critical points through a simulation based study, for tradeoffs among service level, inventory and lead times for a large logistics supply chain. Reorder points (ROP) can be used to trade-off the gains in service level and administrative business process time against inventory levels. Based on a study conducted on 131 suppliers, Subramani (2004) has found supporting evidence that patterns of information technology use are significant determinants of relationship-specific investments in business processes. The results support the vendors-to-partners thesis that IT deployments in supply chains lead to closer buyer-supplier relationships Mahapatra and Roy(2006) find that most small industries in India have low information deployments. There is a need for them to implement standard off the shelf but proven applications that would help them to network with buyers and suppliers. Software companies like SAP, Oracle and Microsoft have also realized the potential of small and medium sector enterprises and are intensively launching lower end versions of this software. Altekar(2008)refers to the key role played by information technology in supply chain management for optimisation through use of algorithms, simulation and analysis capabilities and also data mining tools for industrial applications. Information technology is used in supply chain management for transaction, execution, collaboration, coordination and decision support. Lai et.al (2008) state that the critical role of information technology in saving costs, improving service quality and providing a variety of services cannot be ignored. Using empirical data they have established that IT capability in a third part logistics firm is a strong determinant of cost advantage, service variety advantage and service quality advantage. Starner mentions that an intelligent networked manufacturing company uses familiar technologies-such as Ethernet, Internet Protocol (IP), branch networks, enterprise resource planning (ERP), and radio frequency identity (RFID)-to give you real-time visibility into your company's processes. With this visibility, you can reduce time to market, improve quality, and reduce costs. Stolle and Moser(2009) in their study find that many organizations are still focusing on operational and tactical activities, although their competitive environment requires a more strategic role. There is a lack of holistic approach in managing the supply chain.

The importance of a holistic approach to the supply chain management has been repeatedly stressed in these studies and the use of information technology is considered important in attaining this objective. It can further be interpreted that the use of information technology transforms the supply chain from a traditional sequential supply chain to a collaborative supply chain which is

proactive in nature and can preempt the event thus imparting strategic value to supply chain. In a web enabled chain the consumer occupies an important place where the demands of the consumers are being met in a timely manner.

ADDING VALUE TO SUPPLY CHAIN: A survey conducted by Nelson et. al (2002) suggests that 76% of CEOs expect supply management to contribute to shareholder value as firms continue to move toward more outsourcing. With an increasing trend towards more customized orders, tighter delivery windows, and an increased focus on retail vendor compliance, the need for a value added supply chain has grown substantially. Value is added to a supply chain when it delivers more than the cost of putting up a supply chain. It is reflected in the profitability witnessed by the supply chain participants. Fang Wu(2006) have found in their research that IT enabled supply chains serve as a catalyst in transforming IT-related resources into higher value for a firm. These supply chains are firm specific and are hard to copy across organizations thus turning them into a valuable resource for the company and pointing towards a strong case for increasing the IT investment in the supply chain. According to Fine et al., (2002)the "sweet spot" in a supply chain is the set of activities where a significant amount of value is created and captured. While the sweet spots in the value system are changing, in the present times it is the information technology that adds value to the supply chain. The evolution of the supply chain can be seen in figure I. It is clearly visible that as the supply chain moves from the stage of integration, collaboration to synchronization the scope of the supply chain increases. The earlier elusive goal of synchronizing the supply chain across all partners has become possible through the use of web technology. The relationships along the supply chain have evolved from integration to collaboration and finally adding value to the supply chain through e-synchronisation.
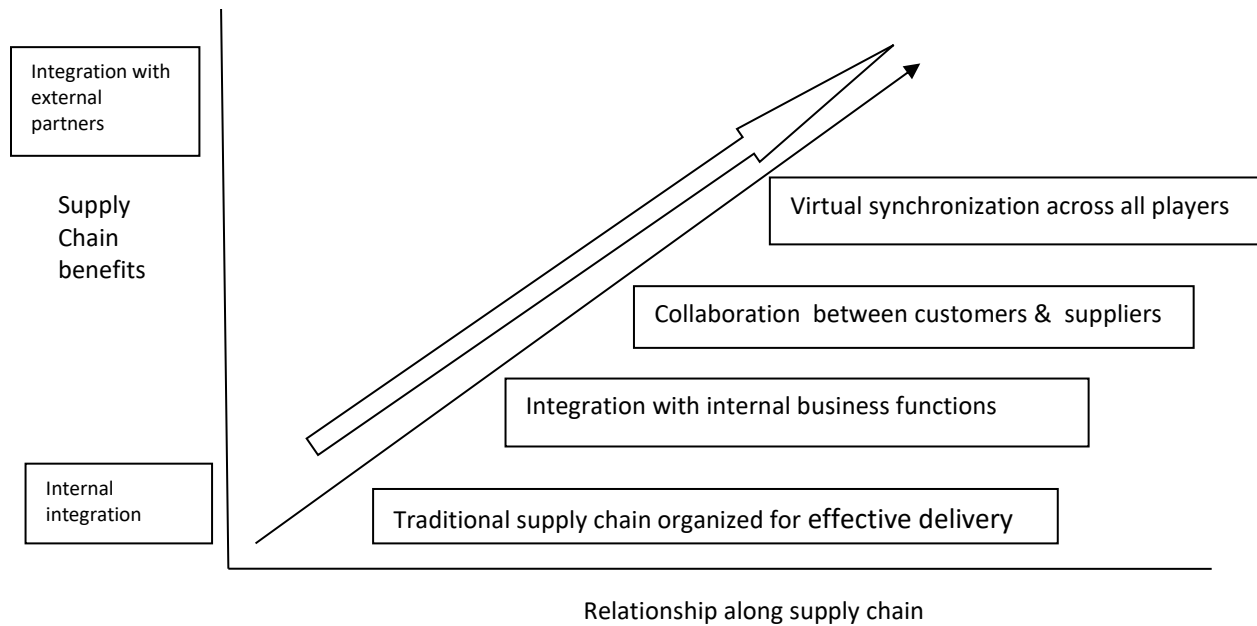
Figure I: Technology enabled supply chain

Technology has become an enabler not a solution to the challenges that the companies are facing. Traditionally information technology started with a simple automation of the basic supply chain processes. Technology has added value over the period of time. Technology started by integrating the supply chain into the enterprise resource planning systems which linked the internal as well as the external partners of the supply chain. Today technology has leveraged internet to provide fast and realtime communication thus increasing the transparency in the supply chain. This has created extended supply chain communities that include the external partners of the organization. Information has become the key competitive weapon for the firms to add value to the supply chain.

Enterprise resource planning allows the integration of various activities and information flow. ERP is suitable for streamlining the routine flow of information but does not provide with much specific and strategic information that would leverage the supply chain to deliver value to the client. However using online analytical processing techniques on the database provided by ERP software helps the managers with access to a multidimensional view to standard situations and thus empowers them to take better decisions. According to Hennel (2001) organizations that have used OLAP technology in conjunction with standard transactional systems have gained by reducing the production costs, increasing the working capital availability. It allows for better

integration between the various supply chain partners wh now have direct access to the same information. With such kind of collaboration the supply chain becomes more responsive and helps improve customer satisfaction and retain the customers.

Radio Frequency Identification (RIFD) is another technology that has helped in managing various processes of supply chain management like demand management, order fulfillment, manufacturing flow management, and return management. RIFD uses a chip as thin and small as a grain of sand placed on a tag to track the product throughout its life cycle, from the manufacture to final purchase, and sometimes even afterwards. At a very basic level this technology helps in tracking the inventory on a real time basis, thus saving time and money and creating value in the supply chain. Sabbaghi and Vaidyanathan(2008) in a study on RIFD applications on supply chain systems have concluded that RFID offers significant strategic value potential for companies in developing an integrated model of supply and demand chain to drive revenues and innovation and to gain competitive advantage. The chief benefit of the RIFD technology in a supply chain comes from the fact that it allows for information sharing across the boundaries between the partners The information collected by RIFD can be utilised intelligently to give accelerated benefit to the companies.

CONCLUSION: Satisfying customers have become something of a corporate obsession. Serving the customer in the best, most efficient and effective manner has become critical, and information about issues such as order status, product availability, delivery schedules, and invoices has become a necessary part of the total customer service experience. With the integration of information technology and supply chain operations, the supply chain has become a more collaborative effort. There is a better, timely and enhanced communication between the various participants. The costs-per-sale have decreased due to reduction in inventory carrying costs, communication costs and customer support costs. Use of technology has leveraged a powerful, global sales channel to broadcast and update product information, product availability and prices. It has become possible to reach customers in diverse areas and supply customized products. A secure, real-time link with buyers and prospects is created. With the creation of a seamless link between the customers and suppliers' information exchange and update is instantaneous which has paid off handsomely in lower costs, less inventory, higher quality decision making, shorter cycle times and better customer service. To this extent it can be said that the use of information technology-based technologies has contributed to adding value to organizations supply chain.

REFERENCES

Altekar, Rahul V.(2008). *Supply Chain Management-Concepts and Cases.* Prentice Hall of India Pvt. Ltd. New Delhi

Ballou,Ronald H.(2004).*Business Logistics/Supply Chain Management-Planning, Organising and Controlling the Supply Chain.* 5th Ed., Pearson (Singapore)Pvt. Ltd.

Bowersox, D.J., Closs, D.J. and Cooper, M.B. (2002). *Supply Chain logistics Management,* McGraw Hill, New York.

Chee, Ching, Holsapple,Clyde W. and Whinston, Andrew B. (1996). 'Toward IT support for coordination in network organizations' *Information & Management* (30) pp179-199.

Cooper, M. C. and Ellram, L. M. (1993) 'Characteristics of Supply Chain Management and the Implications for Purchasing and Logistics Strategy', *The International Journal of Logistics Management*, 4, 2, pp13-24.

Donovan R.Michael,(August 2001) 'The E-Supply Chain is Coming …..and Fast', *Effective Executive*. pp 23-25.

Donovan R.Michael, "*E-Supply Chain Management–Managing the Extended enterprise- Part-I*", www.rmdonovan.com

Davis, Edward W. (1983).*JIT in Purchasing at GE.* Case UVA-OM-484-GE Co-Transportation System and Business opportunity

Fang, Wu., Yeniyurt, Sengun., Daekwan. Kim. and Cavusgil, S. Tamer. (May 2006). 'The impact of information technology on supply chain capabilities and firm performance: A resource-based view,' *Industrial Marketing Management.*Volume35, Issue 4,pp493-504

Fine, C. H., Vardan, R., Pethick, R., El-Hout, J. (2002). 'Rapid-Response Capability in Value Chain Design,' in MIT *Sloan Management Review*, Winter (69–75).

Hennel M.J. (2001), 'Analytic Applications and the Intelligent Supply Chain', available athttp://www.dmreview.com/dmdirect/20011221/4448-1.html

Jain, Sanjay. (2004). *Supply Chain Management Tradeoffs Analysis*, In: Proceedings of the 2004 Winter Simulation Conference, eds. R .G. Ingalls, M. D. Rossetti, J. S. Smith, and B. A. Peters, Piscataway, New Jersey: Institute of Electrical and Electronics Engineers.

Lai, Fujun., Dahui Li, Qiang Wang and Xiande Zhao (2008). 'The Information Capability of third party logistics providers: A Resource Based View and Empirical Evidence From China' *Journal of Supply Chain Management,* Vol 44, No.3, pp22-38

Nelson D, Moody P, Stegner J.(2002). *The Purchasing Machine*. New York: The Free Press; p. 184

Poirier, Charles C.(24 July, 2002) '*Advanced Supply Chain Management and E-Business'*, Monterry Institute of Technology. Mexico.

Sabbaghi, Asghar and Vaidyanathan, Ganesh (August 2008). Effectiveness and efficiency of RIFD in Supply Chain Management: Startegic Values and Challenges, *Journal of Theoretical and Applied Electronic Commerce*, Vol 3, Issue 2. pp71-81

Stolle, Michael and Roger Moser (June 2009) 'The effects of Purchasing and Supply Management on Performance :A Structural Model' *IIMB Management Review*, Vol 21, No. 2, pp91-110

Storey, John., Emberson,Caroline., Godsell, Janet., and Harrison,Alan. (2006).'Supply chain management:theory, practice and future challenges', *International Journal of Operations & Production Management,* Vol. 26 No. 7, pp. 754-774

Subramani, Mani.(March 2004) 'How do suppliers benefit from information technology use in supply chain relationships', *MIS Quarterly,* Vol 28, No.1, pp45-73