Influence of E-Business in SME's Supply Chain Management: A Status Review

L.Aravindh Kumaran
Assistant Professor (Sel. Gr), Crescent Business School
B.S Abdur Rahman University, Chennai-600 048, India
E-mail: aravindh@bsauniv.ac.in

R.Ganesan
Advisor (Research), B.S.Abdur Rahman University
Chennai-600 048, India
E-mail: dr_r_ganesan@bsauniv.ac.in
Tel: +914422751347; Fax: +914422751350

Abstract

The explosion in the field of information technology, advent of internet and the emergence of e-business have transformed the way in which, business is conducted by organizations, and the (small & medium scale enterprise) SME sector is of no exception. Integration of e-business and supply chain enhances the flow of information from suppliers to customer service network, through the internet to improve efficiency and responsiveness. The key strengths of SMEs are flexible, quick decision-making and co-operation from employees, whereas, the weaknesses are lack of technical superiority, lack of infrastructural facilities and financial resource. Larger companies are in a stronger position to implement the e-business in supply chain practices. The small and medium scale enterprises are unable to overcome the obstacles to implement and reap the benefits. Only very little is explored to find the influence of e-business in an SME environment as compared to large company environment. Lack of understanding of e-business and its help to SME's to improve their collaborative working and further to enhance their competitiveness in supply chain. The usage pattern e-business technologies and its direct benefits are still limited in SME's. This paper reviews the status of the influence of e-business in SME's Supply chain management in terms of the relationship between supply chain & e-business, literature of SME's Supply Chain Management (SCM) and the influence of e-business in SME's SCM.

Keywords: Supply Chain Management(SCM), e-business, Small and Medium Scale Enterprises (SME's)

1. Introduction

Today business organizations are facing a complex and competitive environment than ever before. Business success is not depending on individual firm alone, but the chain of delivering and supplying organizations. Small and medium Scale enterprise's (SME's) contribution to manufacturing sector is in terms of supplying raw materials, producing components and distributing finished goods to customers. Hence, SMEs have significant contribution on supply chain processes (Huin et al., 2002). In several developing countries, SMEs form the largest group of manufacturing firms which essentially provide specialty manufacturing and support services to large firms (Huin et al., 2002). SMEs also play a very crucial role to the economies of most emerging nations from the viewpoint of generating employment

and economic growth. In recent times increasing interest to explore the opportunities to use e-business technologies in supply chain to improve competitive advantage. The potential benefits of e-business technologies include lower prices from suppliers, improved speed & procurement process, flexibility, lower transaction costs, higher customer service levels and reduced investments in supply chain inventories (Neef, 2001).

However, current status of literature indicates that the use of e-business in SMEs is only in terms of supply chain research. Major studies carried out by the researchers like Ritchie and Brindley (2000), Jun and Cai (2003), Taylor et al. (2004), Zheng et al. (2004),Wagner et al. (2003), Lenny Koh et al. (2007) and Chuang et al. (2007) have helped to find out the following research gaps:

- Very few studies have explored the influence of e-business in an SME environment as compared to large company environment
- Lack of understanding of e-business as how it influences supply chain decision areas in SMEs especially to improve their collaborative working and to enhance their competitiveness.
- The usage pattern of e-business technologies and its direct benefit is still limited in SMEs.

This paper examines the status of the influence of e-business in SME's supply chain management in the following three sections. The first section of the paper reviews the status of the relationship between supply chain & e-business. The second section is devoted to the review of literature of SME's SCM and the third section examines the influence of e-business in SME's SCM .

2. Supply Chain and E-Business

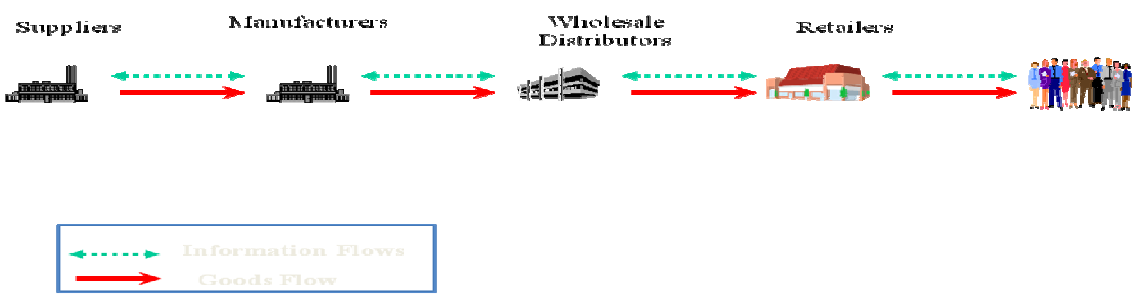
2.1. Emergence of Supply Chain & E-Business

The evolution of supply chain goes back to transportation and warehousing at the initial phase. In the second stage with the help of World Wide Web manufacturing, procurement and order management functions were added to the supply chain. With the advent of EDI and decision support system, suppliers and customer functions were integrated in the third stage. Nowadays, with the help of information technology, many other functions such as product development, marketing and customer services are also added to extend the supply chain from suppliers to customers (Ronald H. Ballou, 2007).

As shown in the figure 2.1 the supply chain is a system which includes material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information. (Stevens, 1989). Infact, it confines

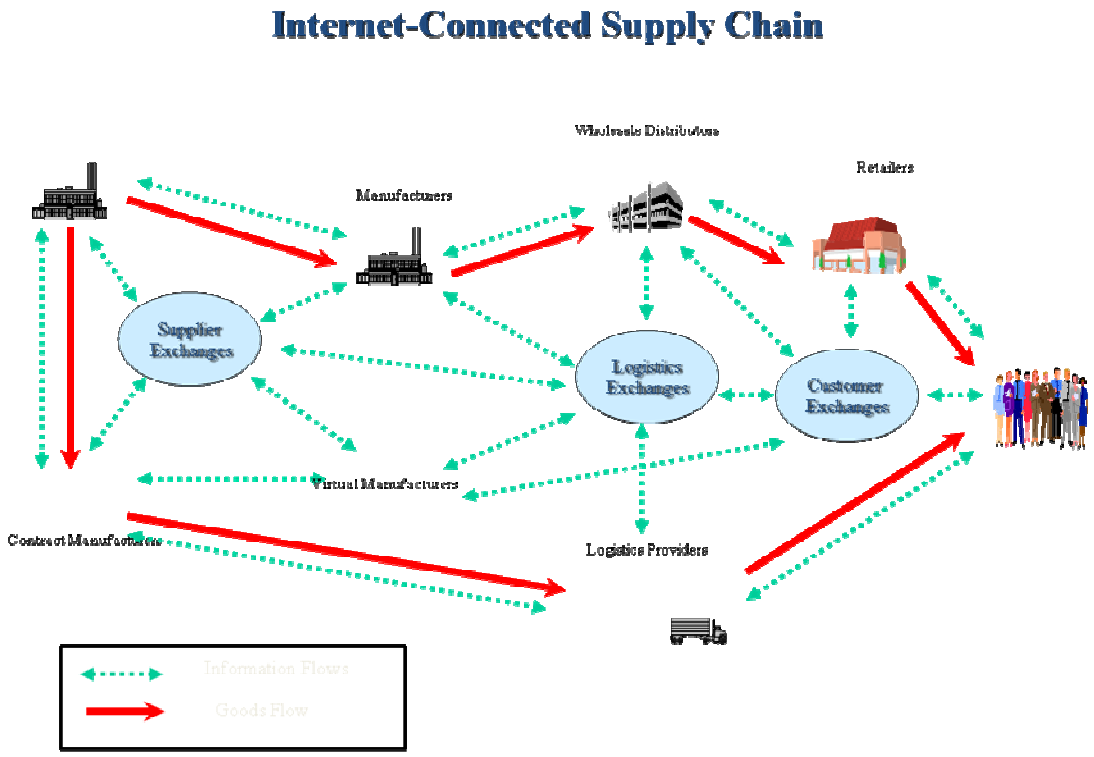
Supply chain management confines the notion of an organization to coordinate the activities from procurement to the final customer. Each component of the supply chain management activity supports another by focusing on each component operations across firms' boundaries (McIvor and McHugh, 2000).

Figure 2.1: Traditional supply chain



Globally, consumers' demand for lower prices and higher quality of products & services forces retailers, manufacturers and distributors to achieve greater cost-efficiencies and improve lead times by improving the supply chain efficiency to gain competitive advantage. In this case, the role of e-business is felt as an important enabler for integration and also to add more sophistication to all the components of supply chain (Proudlock et al., 1999). The supply chain systems nowadays link production and supply chain processes across geographically dispersed locations (Stock et al., 2000). This e-business enabled supply chain (Fig 2.2) or e-supply chain management, is emerging as a recent operations and manufacturing strategy through the use of internet and other tether-free technologies (Luo et al. 2001a).

Figure 2.2: Internet connected supply Chain



According to Sahay and Mohan (2003) the status of Indian supply chain management practices highlights free trade practices and globalization of businesses as key factor for the industries to align supply chain strategy with business strategy. Moreover, Indian organizations are increasingly deploying supply chain strategies for logistics improvements – to increase sales revenue, enhance profits, reduce order to delivery cycle time and minimize inventories (Sahay and Mohan, 2003).

2.2. E-Business and SCM Performance

Previous studies have measured organizational performance relying on both financial and non-financial criteria (Llorens et al., 2003). Although financial performance is the ultimate aim of any business organization, other indicators such as innovation, market share, customer focus, supply chain design, performance metrics, trading partner management, inventory management, returns management, employee training & management and other non-financial performance indicators may also be equally important in evaluating the impact of SCM performance. There is a lot of scope for e-business which can influence these non-financial performance indicators significantly. (Demirbaq et al., 2006).

2.3. Factors Influencing Supply Chain Performance

From the literature it is evident that the following factors are considered as important for benefits of the supply chain performance:

Authors	Factors
Bower and Hout, 1988	Purchase order cycle time
Schonberger, 1990	Order lead time & Delivery lead time
Rushton and Oxley, 1991	order cycle and delivery process, product development cycle time
Graham et al., 1994	Supplier assistance in solving technical problems, Supplier ability to respond to quality problems
Stewart 1995	Inventory carrying cost
Thomas and Griffin 1996	Supplier cost saving initiatives
Mason- Jones and Towill, 1997	Supplier's order entry methods
Levy, 1997	Information carrying cost
Spekman et al., 1998	Buyer-Supplier partnership level
Gunasekaran et al., 2001	Total Supply Chain cycle time, Supplier lead time, Level of supplier's defect free deliveries, Supplier rejection rate, Accuracy of forecasting techniques, Operational cost per operation, Delivery reliability, Responsiveness to urgent deliveries, Effectiveness of distribution planning schedule, Quality of delivery documentation & Frequency of delivery, Quality of delivered goods, Achievement of defect free deliveries, Flexibility of service systems, Customer perceived level of value, Total cash flow time, Customer query time
Tan 2001	Effectiveness of master production schedule
Fuentes-Fuentes et al., 2004).	Customer query time

It is estimated that the Indian industry spends an exceptionally high amount of 14 percent of its gross domestic product (GDP) on logistics. Close to 22 percent of the aggregate sales, amounting to over US$25 billion is tied up in inventories in the supply chain network countrywide. Hence, it has become necessary for Indian organizations to look for methodologies and processes to get maximum benefits of supply chain management which produces maximum efficiency both within and beyond their operations (Sahay and Mohan, 2003).Most of the Indian firms have realized the importance of performance measurement of supply chain based on the available literature about all measures influencing the supply chain performance. However, they are predominantly using financial, productivity-based measures and less of the intangible or soft measures. The emphasis remains upon productivity and cost related measures only (Mohammed Saad et al., 2006).

3. E-Business in SME'S SCM

An SME is described as an entity which deployss limited resources due to its small size, with less information & integration, and employs less trained workers with short-term goals (Persona et al., 2004). Globally, it is recognized that approximately 80 per cent of economic growth comes from the SME sector. In developing countries more than 70 percent of all businesses are through SMEs (Adam et al., 1998). Therefore, it necessary that SMEs across countries must adopt strategies to promote the usage of e-business in their firms that will have a major impact on the firm's supply chain management (Huin et al., 2002).

Small and medium scale enterprises (SME's) are exposed to the consequences of the developments in information, computing and communication technologies which will arguably provide competitive opportunities as well as threats. To reap the maximum benefit from supply chain, all companies in the network should be integrated electronically. The larger companies force its partners to adopt online solutions through e-business integration which enables finding timely solutions to operational problems. Certain primary requirements must be met to integrate the SME into the supply chain successfully with low, predictable cost, minimum change in behavior, compelling benefits over alternatives, and rapid technical adaptations. Ritchie and Brindley, (2000) is of the view that achieve

this integration, technical solutions can include electronic marketplaces that offer collaborative supply chain management solutions, or an internal solution .

As far as the Indian manufacturing SMEs are concerned the major barrier is the investment in IT for managing supply chains. (Lai et al., 2006). While large organizations rely more on decision support systems (DSS) for decision making, the SME's neither have the option nor awareness to use DSS for strategic planning due to high expertise requirement and high investment requirement (Temtime, 2003). Another problem faced by the SMEs is the SCM–SME fit. For SMEs, the inherent vulnerability is the reliance on SCM partners for relation-based contracts. Nowadays, the barriers have been eliminated in most of the firm. It is due to its capability to develop an internal control system using e-business which is aligned with the various needs of the customers (Arend and Winser, 2005). In this background it is essential to explore the influence of e-business in different stages of SME's SCM.

4. Influence of E-Business in SME'S SCM

4.1. E-Business Influence in Vendor Long Term Relation

Manufacturing companies are trying to shift away from vertical integration toward smaller, leaner operations (Prahalad et al., 1990). Organizations have downsized, focused more on core competencies and attempted to achieve competitive advantage by leveraging their vendor capabilities and technologies. Many have reduced their vendor base to more effectively manage relationships with strategic vendors (Tully 1995) and developed cooperative, mutually beneficial relationships with all vendors (Mason 1996). Exploitation of vendor capabilities will lead to improvements in product quality, quicker integration of technological breakthroughs and shorter new product development lead times (Ragatz et al., 1997).

In India, SME's suppliers offer low costs and better quality but lag behind in delivery times, which are not acceptable by their MNE (Multinational enterprise) customers as they want to remain competitive in their own product segment. These circumstances have implications of the SCM in SMEs and their relationship with large enterprises. It is reported by Sahay et al (2002) that problems in the Indian SMEs regarding vendor relationship include sharing of more information and better coordination of interdependent tasks, and investment in dedicated or specific assets which can improve quality or lower production costs.

4.2. E-Business Influence in Purchase and Order Processing

The development of e-business technologies have a considerable impact on purchasing and order processing related decisions in the form of communication patterns in supplier networks (McIvor et al., 2000). There are many factors that influence purchase & procurement and order processing related decisions through e-business in supply chain management. These include on line purchase from vendor catalogs , EDI program sharing, communication, negotiation, checking price quotation, arranging for returned /damaged products to vendors, dealing with warranty issue of vendors, electronic document management, e-payments, order processing and follow-up via e-mail. The utilization of information technology on the above purchase related factors enhance the performance of supply chain (Zillur Rahman, 2004).

The Indian SMEs are not influenced by many of the above mentioned factors in making decisions related to purchase and order processing. They tend to purchase over phone order, fax and personal visit rather than any e-business solutions. The limited use of e-business solutions is on account of the low priority given to purchasing function. Therefore, e-business solutions are mainly designed targeting large organizations and in most of the cases are not suitable for SMEs (Sahay and Mohan, 2003).

4.3. E-Business Influence in SCM Integration with Manufacturing

The integration of e-business and supply chain demands that all information from each components of supply chain to be linked electronically. This enhances smooth information flow from suppliers to customer service network through the internet, tether-free technologies and computational tools (Wohlwend and Fulton, 2005). However, further enhancements in supply chain performance will necessitate speeding up the flow of information. This leads to upstream supply chain partners and expediting logistics activities like storage and delivery of materials or products through the entire supply chain (Bhatnagar et al., 1999). The factors that benefits the firm for further enhancement of e-business and SCM integration include e-procurement, e-auctions for procurement, retail e-payments, certifications for security of payments, wholesaler's e-payments, electronic signature, electronic ID, electronic document management, collaborative tools for e-business, order processing, follow-up and online marketing. Efficient application of these factors have brought significant improvements in supply chain performance through their focus on compressed manufacturing lead times and improved quality. (Keenan and Ante, 2002).

For Indian SMEs, availability of right kind of information at right time has become a prerequisite for successful operations. This is required to avoid the volatility and unpredictable business environment using e-business to integrate their supply chain components to a certain level. During the last decade many SMEs have tried to adjust their business operations to cope up with the increased demands for customized manufacturing. Now more and more SMEs are taking active part in the global business network, participating in many interlinked supply chains. This makes e-business as one of the key issues for SMEs from their day-to-day functional point of view (Milind Kumar Sharma et al., 2006).

4.4. E-Business Influence in Inventory Management Decision

Inventory management decision is necessary to transform incomplete information about the market place to coordinated plans for production and replenishment of raw materials. The inventory system is tackled by inspecting the data relating to demands, inventory levels and orders in the pipeline. (Kaipia et al., 2002). Various factors related to inventory management decisions are considered through e-business in SCM. They include EDI programs with vendors for inventory, coordination of JIT delivery programs, communication with customers on out of stocks, etc., notification of delays in order & shipment dates to customers. Communication with vendors on raw-material inventory levels,with customers on emergency situations affecting inventory levels, with vendors on finished goods inventory levels, with field warehouses and depots on field inventory levels and on field depots on out of stocks situations, emergencies, also from part of the factors that affect inventory management decision. Usage of these factors in inventory decision will enhance the value of supply chain and reduce the cost (Zillur Rahman, 2004).

According to Singh et al., (2004) the Indian SMEs were failing to achieve their business potential due to myopic viewpoints and shortsightedness. This has resulted in weak quality processes and products, late deliveries, problems with inventory management and a poor mismatch between demand and forecasts under conditions of uncertainty. The focus on inventory management system using e-business is a testimony for Indian industry. Infact the inventory levels are e-monitored and maintained at the lowest possible level, without compromising on customer service, in order to deliver superior bottom-line results (Sahay and Mohan, 2003).

4.5. E-Business Influence in Transportation Management Decision

Transportation decisions are important for seamless supply chain operation. It involves moving inbound materials from supply sites to manufacturing facilities, repositioning inventory among different plants & distribution centers and delivering finished products to customers. One has to keep in mind that since 30% of the cost of a product is on account of transportation, using the correct

transport mode is a critical strategic decision. Above all, customer service levels must be met and this often determines the mode of transport used. Hence, factors such as transportation cost, scheduling pickups at regional distribution centres, scheduling drop-offs at regional distribution centres, monitoring on time arrivals of carriers and mode of transportation have to be considered while taking decisions on transportation (Zillur Rahman, 2004).

Transportation decision by the Indian SME's in e-business is mainly assessed based on freight consolidation, modal choice, distribution network design, transport distances and information management apart from the measures mentioned above. All the factors related to transport infrastructure stated have adversely affected the logistics network in the country – both in terms of lead-time and costs. It appears ahost of policy changes is being contemplated to improve. This will provides vast opportunities for companies offering logistics services in the country and hence augurs good news for Indian organizations to reduce logistics costs by using third party logistics services for enhanced supply chain efficiencies (Milind Kumar Sharma et al., 2006).

4.6. E-Business Influence in Customer Service Management Decision

Information Technology is a widely-implemented for managing a company's interactions with customers, clients and sales prospects. It involves DSS technology to organize, automate, and synchronize business processes—principally sales activities, also for marketing, customer service, and technical support. The customer service management decisions can be improved by customer promising time, customer order status, providing details of products to customers to purchase items online through catalogs and lists, receipt of customer complaints, providing technical service and notifying customers of emergencies in the supply chain during strikes, fires, etc., (Zillur Rahman, 2004).

Indian SMEs are slowly moving from physical distribution to logistics management. As a result, more and more Indian organisations today have embarked on the process of developing and implementing a key business driver not only to cut costs, but also to enhance customer service. They realised customer service/satisfaction outscores all other objectives in terms of their effectiveness to the supply chain management. At the same time, expanding sales revenue, reducing inventory cost and improving on-time delivery follow closely in terms of supply chain priorities (Saxena, 2000).

5. Conclusion

The e-business is a powerful technology for communication at the buyer-supplier interface. It has been observed from the literature that the influence of e-business in supply chain leads to buyer supplier partnership and better co-ordination and ensure competitive advantage. The e-business in SME's supply chain management increases its performance by increasing speed, accurate and intelligent decision making. This also leads to form strategies for purchasing decisions, portfolio responsibilities, customer demand forecasts and lead time reduction. It is evident that the survival of SME's is dependent upon its capability to develop internal control systems, which are aligned with the varying needs of their customers and the supply chain. The SMEs must develop themselves to use various types of commercial ERP systems. By having better SCM the SME's can save up to 20% of the procurement cost.

Refernces

[1] Bower, J.L. and Hout, T.M. (1988), ``Fast cycle capability for competitive power", *Harvard Business Review,* November-December, pp. 110-18.

[2] Chuang, T., Rutherford, M.W. and Lin, B. (2007), "Owner/manager characteristics, organisational characteristics and IT adoption in small and medium enterprises", *International Journal of Management and Enterprise Development,* Vol. 4 No. 6, pp. 619-34.

[3] Demirbag, M., Koh, S.C.L., Tatoglu, E. and Zaim, S. (2006), "TQM and market orientation's impact on SMEs' performance", *Industrial Management & Data Systems,* Vol. 106 No. 8, pp. 1206-28.

[4] Fuentes-Fuentes, M.M., Albacate-Saez, C.A. and Llorens-Montes, F.J. (2004), "The impact of environmental characteristics on TQM principles and performance", *Omega,* Vol. 32 No. 6, pp. 425-42.

[5] Graham, T.S., Dougherty, P.J. and Dudley, W.N. (1994), ``The long term strategic impact of purchasing partnerships", *International Journal of Purchasing and Materials Management,* Vol. 30 No. 4, pp. 13-18.

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

[7] Huin, S., Luong, L. and Abhary, K. (2002), "Internal supply chain planning determinants in small and medium-sized manufacturers", *International Journal of Physical Distribution & Logistics Management,* Vol. 32 No. 9, pp. 771-8.

[8] Jun, M. and Cai, S. (2003), "Key obstacles to EDI success: from the US small manufacturing companies' perspective", *Industrial Management & Data Systems,* Vol. 103 No. 3, pp. 192-203.

[9] Lenny Koh, S.C., Demirbag, M., Bayraktar, E., Tatoglu, E. and Zaim, S. (2007), "The impact of supply chain management practices on performance of SMEs", *Industrial Management & Data Systems,* Vol. 107 No. 1, pp. 103-24.

[10] Levy, D. L. (1997). "Lean production in an international supply chain" *Sloan Management Review,* Winter, 94–102.

[11] Luo, Y., Wirojanagud, P. and Caudill, R.J. (2001a), "Network-based optimisation and simulation of sustainable e-supply chain management", IEEE 2001, pp. 185-90.

[12] Mason-Jones, R. and Towill, D.R. (1997), ``Enlightening supplies", *Manufacturing Engineer,* August, pp. 156-60.

[13] McIvor, R. and McHugh, M. (2000), ``Partnership sourcing: an organizational change management perspective", *Journal of Supply Chain Management,* Vol. 36 No. 3, Summer, pp. 12-31.

[14] Neef, D., 2001." e-Procurement: From Strategy to Implementation". Prentice Hall, Upper Saddle River, NJ.

[15] Proudlock, M., Phelps, B. and Gamble, P. (1999), ``IT adoption strategies: best practice guidelines for professional SMEs", *Journal of Small Business and Enterprise Development,* Vol. 6 No. 3, pp. 240-52.

[16] Ritchie, B. and Brindley, C. (2000), "Disintermediation, disintegration and risk in the SME global supply chain", *Management Decision,* Vol. 38 No. 8, pp. 575-83.

[17] Ronald H. Ballou (2007) "The evolution and future of logistics and supply chain management" *European Business Review* Vol. 19 No. 4, pp. 332-348.

[18] Rushton, A. and Oxley, J. (1991), Handbook of Logistics and Distribution Management, Kogan Page, London

[19] Sahay, B.S. and Mohan, R. (2003), "Supply chain management practices in Indian industry", International Journal of Physical Distribution & Logistics Management, Vol. 33 No. 7, pp. 582-606.

[20] Schonberger, R.J. (1990), Building a Chain of Customers, The Free Press, London.

[21] Spekman, R.E., Kamauff, J.W. Jr and Myhr, N. (1998), "An empirical investigation into supply chain management: a perspective on partnerships", *Supply Chain Management: An International Journal,* Vol. 3 No. 2, pp. 53-67.

[22] Stevens, J. (1989), ``Integrating the supply chain", *International Journal of Physical Distribution and Materials Management,* Vol. 19 No. 8, pp. 3-8.

[23] Stewart, G. (1995). Supply chain performance benchmarking study reveals keys to supply chain excellence. *Logistics Information Management,* 8(2), 38–44.

[24] Stock, G.N., Greis, N.P. and Kasarda, J.D. (2000), "Enterprise logistics and supply chain structure: the role of fit", *Journal of Operations Management,* Vol. 18, pp. 531-47.

[25] Tan, K.C(2001). "A Framework of Supply Chain Management Literature," *European Journal of Purchasing and Supply Management,* (7:1), 2001, pp. 39-48.

[26] Taylor, M.J., Mcwilliam, J., England, D. and Akomode, J. (2004), "Skills required in developing electronic commerce for small and medium enterprises: case based generalization approach", *Electronic Commerce Research and Applications,* Vol. 3, pp. 253-65.

[27] Thomas, D.J. and Griffin, P.M. (1996), ``Co-ordinated supply chain management'', *European Journal of Operational Research,* Vol. 94 No. 3, pp. 1-15.

[28] Wagner, B.A., Fillis, I. and Johansson, U. (2003), "E-business and e-supply strategy in small and medium sized business (SMEs)", *Supply Chain Management: An International Journal,* Vol. 8 No. 4, pp. 343-54.

[29] Zheng, J., Calswell, N., Harland, C., Powell, P., Woerndl, M. and Xu, S. (2004), "Small firms and e-business: cautiousness, contingency and cost-benefit", *Journal of Purchasing and Supply Chain Management,* Vol. 10, pp. 27-39.

[30] Zillur Rahman ,2004 . "Use of internet in supply chain management: a study of Indian companies *"Industrial Management & Data Systems* Volume 104 . Number 1 .pp 31-41