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A REVIEW OF LITERATURE ON IMPACT OF INFORMATION TECHNOLOGY ON PERFORMANCE OF SUPPLY CHAINS

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ABSTRACT

In any supply chain the product or the supply moves from supplier to manufacturer to distributers by transporters and then to customers through retailers. Thus Supply Chains are actually networks or the webs. The exponent growth in Information Technology tools have been contributed to the development and expansion of Supply Chain Management all over the world. Thus Information Technology which affects each and every part of the Supply Chain acts as the key driver to provide higher responsiveness while simultaneously improving efficiencies. These tools are used to gather information, analyze the information and to work on it for the better performance of any Supply Chain. But there are several risks associated with the use of Information Technology in the Supply Chain. The larger the change in Information Technology system the greater is the risk of negative impact on operations.

This paper is a review type paper which is based on the standard literature review.

INTRODUCTION

(Oliver and Webber 1992) and (Houlihan 1984) used the term SCM for the internal supply chain that integrates business functions involved in the flow of materials and information from inbound to outbound ends of the business. When a customer's requirement is fulfilled by involving many parties- directly or indirectly they together constitute a chain – Supply Chain. This includes manufacturer, transporter, warehouses, suppliers, retailers and even the customers. Thus in any Supply Chain the product or the supply moves from supplier to manufacture to distributers by transporters and then to customers through retailer. According to some researchers (Jagdev and Browne, 1998; Jagdev and Thoben, 2001; Tan, 2001) supply chains as extended enterprises are responsible for the whole product life cycle, from material procurement and supply management, to production and manufacturing, further to product distribution and customer service and finally to the recycling and disposal of end-of-life product.. Thus Supply Chains are actually networks or the webs. Today's customer has an access to abundant information related to the varieties, qualities and the prices of the available products. The exponent growth in Information Technology tools have been contributed to the development and expansion of Supply Chain Management all over the world. The development of ITE (Information Technology Enabled) tools- MRP, MRPII, ERP, CPFR, VMI, TAV & VM have spread the efficiencies across the whole chain. Thus Information Technology which affects each and every part of the Supply Chain acts as the key driver to provide higher responsiveness while simultaneously improving efficiencies. These tools are used to gather information, analyze the information and to work on it for the better performance of any Supply Chain. But there are several risks associated with the use of Information Technology in the Supply Chain. The larger the change in Information technology system the greater is the risk of negative impact on operations.

IT AND SCM

The way, organizations conduct business, has been transformed greatly by the recent developments in Information Technology.. Today, customer intimacy are improved by the use of Internet and taking advantage of new business models resulting in cost cutting by the companies through real time electronic communications.. At its core SCM is to optimize the performance of system as a whole. Research has demonstrated that every factory and distribution center used by large manufacturer can be operating at peak efficiency but organization whole can be operating Sub optimally.(R Prasad, 2007). It is analogous to a sports team where the individual player is having great statistics but the team cannot win. The need of the hour is not to work in air tight compartments where every department works efficiently in isolation but to have semi permeable membrane between the departments which lets the information flow.

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Today Supply Chain Management is regarded as one of the key functions and is no longer a support function to give any organization a competitive edge in the market. It is strategy to gain advantage through co-ordination of all processes from the procurement of material to the final product to the customer. This requires the efficiently managed information system to monitor all the related activities.

Now a day, on the front of information and communication, technology has progressed rapidly providing an essential tool for decision making. Information sharing among the partners has emerged as the basic enabler for effective Supply Chain input. This has been greatly facilitated by the recent advances in IT (Freeman, 1998; Lee and Whang, 2000). Integration, collaboration, and the use of IT are all depicted as 'building blocks' of 'house of supply chain' in Stadtler (2005). 'Increased importance of information systems' to support supply chain integration and management for the new organization; and the idea that 'ERP provides the digital backbone in supply chain integration' are repeatedly emphasized in the literature (Pant et al. 2003, Bendoly and Kaefer 2004, Gunasekaran et al. 2004, Gunasekaran and Ngai 2004).

IT is used to improve inter organizational coordination (McAfee, 2002; sanders 2008) and in turn, inter organizational coordination has been shown to have a positive impact on firm's performance measures such as customer service, lead time and production costs.

METHODOLOGY
In recent past years, studies have been carried out in the area of performance management by investing one or more parts or the key processes in Supply Chains. This study aims to review the impact of Information Technology on the performance of Supply Chain. Since the topic is relatively new the review was restricted by the limited number of papers. The literature survey was undertaken using online databases relating to publishers such as Emerald, Elsevier, Taylor & Francis, Springer, Palgrave, Inder science and Inter science. This standard literature review included international journals, reports from smaller journals, conference papers and grey literature and the internet material. Initially some key words like "SC performance Measurement", "IT enabled Supply Chain", "Impact of IT tools on SC","IT tools used in SC", etc. were queried to get the list of papers. In the next step, abstract and conclusions were reviewed to finally select the articles as the base for review. Table 1 lists the articles selected. These 45 articles were found much more relevant for the study as they clearly reveal trends and importance of the IT integration, flexibility, agility and lean concepts for today's Supply Chain Management.

With objective to collect, organize and synthesize existing knowledge related to IT Enabled Supply Chain and the impact of IT on performance of Supply Chain it is to analyze how research in this area has evolved in recent years and to identify some areas for further research, that is, it provides practitioners and academicians with a comprehensive source of information to draw from, and help them identifying areas and directions for future work.

DISCUSSIONS & FINDINGS
There is little evidence of research on alignment of Information strategies in Supply Chain until (Seggie et al, 2006). There is lack of empirical research to examine relationship between Supply Chain strategies and e-Business (Cagliano et al 2003).But during past two decades, attention has been received by the Supply Chain Management Performance by the industries in order to achieve competitive advantage. Researchers have been carried out to find the effect of increased IT practices in Supply Chain.

According to Shaw (2000) the two most important barriers in implementing internet and extranet technologies in Supply Chain are the security and access privileges. Also, by Jharkaria and Shankar,(2000) tampering of information and unauthorized access by the competitors may lead to disasters. Thus it is advised that the security aspects must be considered while using IT Tools in the Supply chain. Implementation of cross organizational information system is costly, time consuming and risky.

There must be full co-ordination and confirmation among the Supply Chain partners to agree on adoption and specification of the technical systems to be used in Supply chain. Having compatible IT tools to communicate electronically in Supply Chain trading partners is the necessary conditions. IT Enabled Supply Chain will be a success if the partner companies are ready to share information for their mutual benefits as many companies are still reluctant in sharing their information with their business partners (Lee & Whang, 2000).

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According to Neuman & Christopher,(1996); Laster,(1997); Kilpatrick & Factor,(2000) ; Agarwal & Shankar, (2003) the important issues in IT Enabled Supply Chain environment are the mutual trust for confidentiality of information and long term relationship as IT enablement of Supply Chain is a strategic and capital intensive issue. If there is lack of mutual understanding and trust among supply chain partners no strategy can be adopted on the long term basis.

As because of IT enablement there may arise some changes in work culture and nature of work of some of the employees which may result in some resistance from the employees. Sometimes the hierarchy of organization may also needs to be changed (Andraski (1998), Lalonde (2000).

According to Bender,(2000); Kilpatrick and Factor,(2000); LaLonde,(2000); Monczka and Morgan(1997), improper or poor IT infrastructure is barrier in the Supply Chain integration. The reason for this may be the lack of funds or the lack of awareness and commitment of top management about use of IT tools in a Supply Chain. Also Supply Chain partners may not agree on the adoption and specifications of the technical system to be used in supply chain, eg. EDI standards (Lee and Whang, 2000)

The scarcity of tracking technologies like global positioning systems (GPS),(www.scmr.com) the inability of ports to handle goods quickly, and the lack of modern technology in warehouse. (RAMANA REDDY&N.V.S.RAJU, 2013) result in slow process through the Supply Chain.

Kadambi (2000) has reported weak infrastructure outside the organization and small size of the trading partners as the inhibitors in the IT enablement of Supply Chain. Size of the firm is also a main driver for organizational arrangements in any of the IT enabled business. Existing researches/evidences show that SMEs are less likely to use new practices than larger firms. There is the impact of firm size on decisions related to resources available for investment in IT as smaller businesses are often less aware of full potential benefits of e-Business. According to Chapman et al, 2000 there is lack of assistance from larger Supply Chain. Generally suppliers think that customer prefer printed catalogues, prefer to order over the phones and thus they can't 'trust' that complicated product will arrive as ordered.

These smaller firms are more worried about the viruses and e-hackers and thus cannot prioritize the e-mails. There assistive technology chain is too small and hence they believe that e-business adds extra time and money to their cost as price is the key driver. The financial factors and lack of compatibility of partners are also the barriers in the IT enablement of manufacturing companies- according to Sohal et al(2001) & Kwan (1999).

Soliman and Youssef (2001) emphasize that an e-Business strategy should specify the aims, goals and context of application. According to them large and small firms will have different objectives and strategies and thus e-Business should be in a way reliant to specific organization.

For IT enabled business practices different social formations and regions are also responsible.(Berger & Dore,1996).

On the basis of literature review and discussions with industries and academia, Jhakaria and Shankar, (2005) identified 11 barriers which are presented in the table I-.

Table I: Barriers in IT Enablement of Supply Chain

S.No.	Barriers in IT Enablement of Supply Chain
1	Disparity in trading partner's capability
2	Resistance to change to IT enabled SCM
3	Low level of SC integration
4	Threats of information security
5	Lack of trust in SC Linkage
6	Fear of Information System Breakdown
7	Low priority by management
8	Fear of SC breakdown
9	Lack of funds
10	Poor IT infrastructure facilities
11	Lack of awareness about use of IT in SC

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CONCLUSION

Though there are certain barriers but still some IT based performance measurement framework have been developed to make information handling and maintenance easy and reliable for the organization. This study has revealed the problems and requirements of today's broadened, enabled supply chain performance measurements systems as distinctive from the traditional performance measurement systems. To improve visibility across functions, in order to respond faster to the changing business needs and to create truly adaptive Supply Chain, is the main challenge for many Supply Chain organizations. As Supply Chains are becoming more and more complex and extended day-by-day the end to end visibility into Supply Chain operations will be possible by the effective integration of IT Enabled Tools. It can be concluded that there are the barriers which slow down the process of IT enabled Supply Chain. Hence there is need to identify them and develop the strategies to overcome these barriers. For this further research development efforts and future advancements are still required. It is still a fruitful research area with the need of further research on supply chain performance measurement

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