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An Overview of Information Technology Tools Implementation in Supply Chain Management

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Abstract: Information Technology (IT) and its usage in administrations and across the supply chain has develop a factor of competitive benefit for numerous companies. This paper focuses the practice of IT tools for Supply Chain Management (SCM) [10]. It also highlights the impact of IT in helping to rearrange the whole delivery set up to accomplish advanced service levels and lower inventory and lower supply chain charges [10]. An overview and perceptible benefits of the present IT tools that are extensively organized is also providing with focus on current configurations considerations, accessible applications. The role of existing communication technologies in making IT an enabler of SCM is highlighted by addressing a range of dissimilar point and initiative solutions in a diversity of supply chain settings.

Introduction to Supply Chain Management

Supply chain management (SCM) is the management of a network of interrelated businesses complicated in the eventual delivery of product and service packages obligatory by end customers [1]. Supply Chain Management spans entirely drive and storage of fresh materials, work-in-process inventory, and completed goods from point-of-origin to point-of consumption (supply chain) [11]. Supply Chain Management includes the planning and management of all activities elaborate in sourcing, procurement, conversion, and logistics management actions. Importantly, it also comprises organization and collaboration with channel associates, which can be suppliers, mediators, third-party service providers, and customers [10]. In essence, Supply Chain Management assimilates supply and

demand management within and across companies. More recently, the insecurely attached, self-organizing network of businesses that collaborates to deliver product and service offerings has been named the Extended Enterprise [3].

Current growth in technologies allows the group to avail information easily in their sites. These technologies are helpful to coordinates the activities to manage the supply chain. The cost of info is reduced due to the growing rate of expertise [10]. In the combined supply chain model bi-directional arrow imitate the accommodation of reverse materials and information response flows [11]. Manager needs to comprehend that information technology is more than just PCs. Except computer data recognition equipment, communication technologies, factory automation and other hardware and services are included.
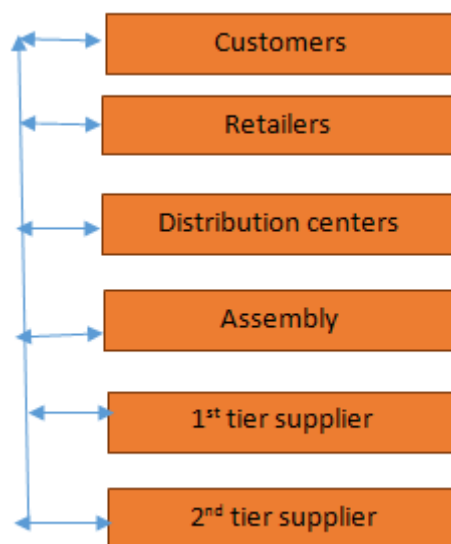

Figure1: integrated supply chain model.

Information Technology as an Enabler of Supply Chain Management

Earlier to 1980s the info flow between functional ranges within an organization and between supply chain member partners were paper-based. The paper-based transaction and communication is slow. During this period, information was often overlooked as a critical modest resource because its value to supply chain members was not obviously understood [10]; [11]. IT structure capabilities deliver a competitive positioning of commercial initiatives like cycle time reduction, application, and implementing reshaped cross-functional procedures [10].

Info distribution between associates in the supply chain is also critical and these integration attempts are accompanied by IT initiatives. Such IT initiatives include:

• Usage of bar-coding in logistics systems

• Usage of EDI to communicate between branches

• Usage of Material Requirements Planning

• Enterprise Solutions like ERP

• Internet and Web Services for communication between associates.

The functional roles of IT in SCM have been outlined as follows [2]:
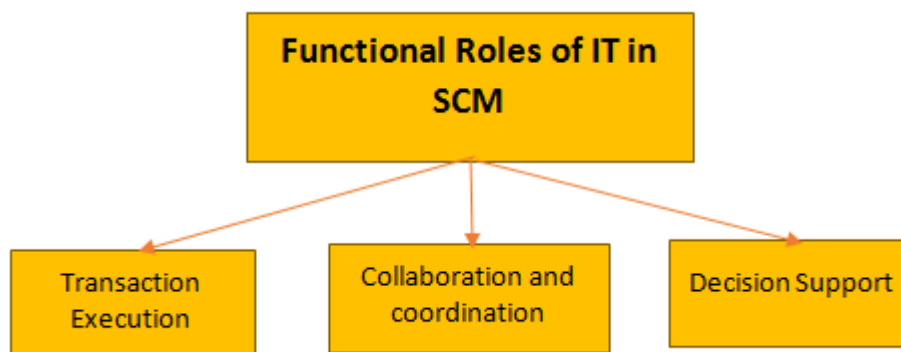

Figure 2: The functional roles of IT in SCM.

Objectives and Benefits of Information Technology in Supply Chain Management

The purposes of IT in SCM are [4]:

- As long as information accessibility and visibility;
- Allowing a single point of interaction for data;
- Permitting decisions founded on total supply chain information; and
- Assisting collaboration with partners

IT in SCM allows excessive chances, extending from straight operational benefits to the formation of strategic advantage [10]. It variations industry constructions and even the rules of cooperation. IT is key in supporting companies making strategic advantage by enabling centralized strategic planning

with day-to-day centralized operations. Infect supply chain developed more market-oriented because of IT usage. Cisco reported savings of $500 million by rearrangement its internal operations and assimilating processes with dealers and clients with the help of web-based tools [5]. The Wal-Mart & P&G practices establish how information sharing can be utilized for mutual benefit. Through sound information technologies, Wal- Mart shares point of sale information from its many retail outlet straight with P&G and other foremost suppliers. [6].

Challenges in Implementing Information Technology in Supply Chain Management

Any company that has assumed the assignment of executing an integrated supply chain management approach with the use of IT tools knows that one of the extreme challenges. It faces is the important change in inner culture that is required to make the supply chain redesign positively [10]. It is not an easy thing, to re-condition people to accept change, especially in organizations where a certain attitude has succeeded for many years. However difficult it may be to achieve, change can be implemented successfully when focused by a strong and knowledgeable leader, who understands the tools available for achieving positive change, as well as their role in starting and supporting these changes. Assimilating new applications with existing and bequest systems could also posture problems. Irreconcilable systems at buyer and vendor services are another management challenge to tackle. Data sharing with diverse stakeholders like suppliers and customers, filtering and mining data generated and finding "business" value of the data are other issues.

Electronic Data Interchange (EDI). Announced in the 1970s and promoted in the 1980s, Electronic Data Interchange (EDI) technology has been extensively used by firms in supply chains to facilitate transactions and information exchanges [11]. EDI is well-defined as computer to computer exchange of structured data for automatic processing. EDI is used by supply chain partners to exchange vital information necessary for the effective running of their businesses. These structural links are usually set up between organizations that have a long-term trading relationship.

Bar coding and Scanner. Bar Codes are the illustration of a number or code in a form suitable for reading by machines [7]. Bar codes are widely used all over the supply chain to identify and track goods at all phases in the process. Bar codes are a series of different width lines that may be obtainable in a horizontal order, called ladder orientation, or a vertical order, called picket fence orientation.

Enterprise Resource Planning (ERP) Systems. Enterprise Resource Planning (ERP) Systems are Enterprise-wide Information Systems used for automating all activities and functions of a business [9].

These are transaction-based information systems that are combined across the whole business. Basically, they permit for data capture for the entire business interested in a single computer package which's give a single source for all the key business information activities, such as customer orders, inventory and financials.

Warehouse Management Systems. Warehouse management systems are systems that regulate all the traditional activities of warehouse operations. Areas enclosed usually include receipt of goods, allocation or recording of storage locations, replenishment of picking locations, production of picking instructions or lists, order picking, order assembly and stock rotation [9]. Some systems are used in combination with radio frequency (RF) communication kit. This equipment can be straddling on fork-lift trucks. The warehouse management system communicates with the RF system and leads the activities of the warehouse supervise [8]. For example, when picking that it will provide the tasks for the operative to carry out. Once the job is complete the functioning updates the system and is directed to the next task [9]. This has the advantage of updating the stock holding in real time.

Transportation Management Systems. Transport Management Systems deliver more perceptibility into shipments and orders. Scheduling issues are also addressed on time. Numerous transportation choices can be explored as a result of earlier visibility into the supply chain [10]. Timely communication and status reports can also be obtained. By having control on its supply chain, businesses can make effective direction-finding conclusions.

Inventory Management Systems. During the mid to late 1990s, sellers began applying modern inventory management systems, made likely in huge part by advances in computer and software technology [9]. The systems work in a round process, from purchase tracking to inventory one-to-one care to re-ordering and back everywhere again [10].

Emerging and New Information Technology Solutions for Supply Chain Management

Radio Frequency Identification (RFID). The bar code was planned to improve efficiencies in the trade space, but the bar code cannot uniquely identify the specific object such as when items are produced, the lot of the items was made and when will the items expire. RFID was able to take care of these issues for better performance.

Software Agents. Artificial Intelligence appeared into the model of software agents with the application area of multi-agent systems. A software agent is a software system, which has qualities of intelligence, independence, awareness or acting on behalf of a user. Agents can behave independently or proactively [10]. The intelligence of an agent refers to its capability of execution tasks or actions using relevant information gathered as part of different problem-solving techniques such as prompting, reasoning and application specific knowledge. Java has been the most common tool for building such intelligent agents which are gradually becoming mobile. Most of the agent platforms available today like Agent Builder, Aglets, Voyager, JADE, ZEUS and FIPA are implemented using this language [11].

Decision Support Systems. Decision Support Systems (DSS) are an exact class of computerized information systems that supports business and organizational decision-making activities. A correctly designed DSS is an interactive software-based system planned to help decision makers accumulate useful information from raw data, documents, personal knowledge, and/or business models to recognize and solve problems and make decisions. Typical information that a decision support application might gather and present would be:

• An inventory of all of present information resources,

• Reasonable sales figures between one week and the next,

• Predictable income figures based on new product sales assumptions;

• The consequences of different decision replacements, given past experience in a context that is defined.

Web Services

Web services are application interfaces available via Internet standards that use XML and that employment at least one of the following standards: Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) or Universal Description, Discovery and Integration (UDDI). These standards, and the following generation standards that are being built on them, are describing the way that forward-thinking enterprises manage lightweight integration tasks.

Electronic Commerce

Electronic commerce refers to the wide diversity of tools and methods used to conduct business in a paperless environment [9]. Electronic commerce consequently includes electronic data interchange, e-mail, electronic fund transfers, electronic publishing, image processing, electronic bulletin boards, shared databases and magnetic/optical data capture. Companies are able to automate the procedure of moving documents electronically between suppliers and customers. This system delivers access to customers all over the globe and thus eliminates geographic limitations.

Electronic Supply Chains

Electronic Supply Chains (ESC) mentions to those supply chains that are electronically simplified between or among contributing firms. Also called Virtual Supply Chains, these are realized in two forms, EDI-based or Internet based. EDI usually attaches firms through proprietary Value Added Networks (VAN), whereas the Internet generally connects firms through open networks which use normal procedures. The ESC links trading partners to permit them to buy, sell and move products, facilities and cash.

Conclusion

Manufacturing trends like globalization, outsourcing, customization, time to market and pricing pressure have compelled enterprises to adopt well-organized and effective supply chain management technologies, practices, and policies. Customers' expectations are also increasing and companies are prone to more and more uncertain environments in the face of increasing competition. To survive, companies will find that their conventional supply chain combination will have to be expanded elsewhere their boundaries so as to assimilate all stakeholders. Adoption of Information Technology tools is vital for such efforts.

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