Information Technology Support System of Supply Chain Management

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Abstract: - Effective supply chain management is built on the basis of the high quality of information transmission and sharing, This will rely heavily on information technology to provide reliable support. In this paper, against the characteristics of the supply chain information flow, discuss the impact of information technology on supply chain management and support system which information technology form in the supply chain management.

Key-Words: - Supply chain management; Information technology; Support System; Information flow; Supply chain; Information

1   Introduction

Supply Chain Management (SCM) rise is attributed to enterprises trying to eliminate production and inventory plans misleading as information slow transmission or errors. In 1990s, some of computer manufacturers such as HP, or P & G which product household appliances begin integrate information systems of down-upstream, hope to archieve purposes for rapid responsion to the demand of market and lower inventory by correct and rapid transmission, analysis and integration of information. Therefore, effective supply chain management is built on the basis of the high quality of information transmission and sharing, This will rely heavily on information technology to provide reliable support.

In today's age, information has become a key factor in the decision to the survival and development of enterprises, any business must face the issue of how to integrate information. Information is from both the vertical information of the upstream and downstream firms and the horizontal information of the internal enterprise, as well as information of the macro level. How to transmit and share information, to coordinate economic behavior of the upstream and downstream enterprises and functional behavior of interal enterprise which is the core questions supply chain management is to deal with. Compared with the individual enterprises, supply chain as an extended enterprise, shows own characteristics by its way of information flow and acquisition.

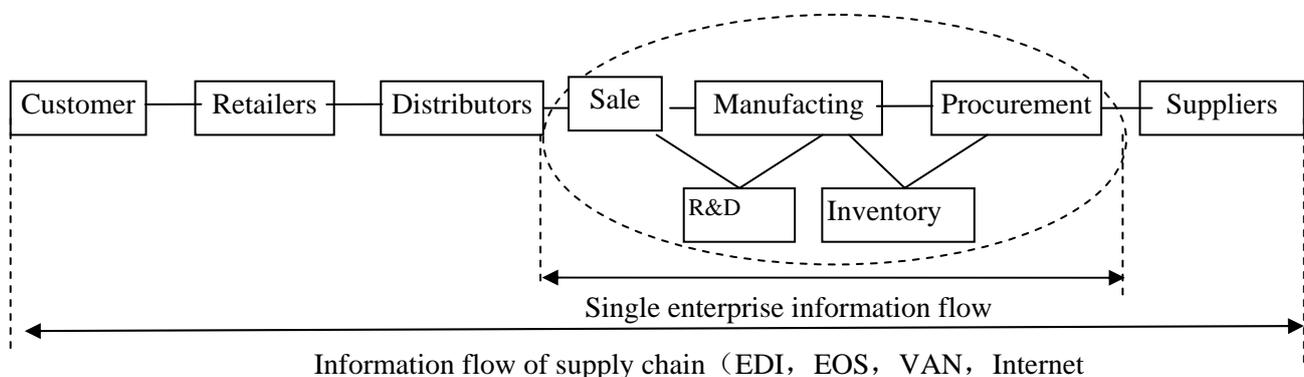## 2   The Characteristics of the Supply Chain Information Flow

Fig.1 information flow of supply chain and the single enterprise

2.1 Wide coverage

The information of the supply chain covers from all links of suppliers, manufacturers to distributors and then retailers in the supply chain. Information flow distinct into information flow of demand and supply, these are two different flows of information flow. When demand information (such as customer orders, production planning, procurement, etc.) takes direction from the demand-side to the supply-side movement, it triggered logistics. Meanwhile supply information (such as storage lists, the inventory records for sales, deliver lists), together again along with materials for the direction of the supply chain from supply-side to demand-side movement. The information flow of individual enterprises mainly confined to the internal Invoicing records (see figure 1).

2.2 More access channels

As businesses in the supply chain is a collaboration relationship and community interests, information of the supply chain have so many channels to obtain. demand information isn't only from the customers but also distributors and retailers; the supply Information is from various suppliers, These information flow and share in all enterprises through the supply chain information systems . For individual enterprises, as it haven't formed the Community interests with upstream and downstream businesses, so it is totally dependent on own collection.

2.3 High-quality information

Because of specialization, the quality of the supply chain was superior to the information of the single enterprise, For example, distributors and retailers can be specifically responsible for the collection of demond information, the suppliers will collect supply information, Product manufacturers collect information of products.

3 Information Technology and Supply Chain Management

The development of information technology provides an effective support to supply chain management. About some issues how to thank of the impact of information technology on supply chain management, and how to use information technology in supply chain management, and so on, through studies, it basically can be summed up in three aspects :

3.1 Enhance the sharing of information on the supply chain can effectively improve supply chain management

When members of the supply chain based only on information from neighbor member of lower levels to make decision, the system will have a phenomenon of magnification of demand. The reason for this situation is not the irrational of all members, but rational decision-making in the actual circumstances of unclear information, included demand forecast in the unbalanced demand, increasing orders in the expected shortage, increasing EOQ for the fixed orders costs and effects of batch. The occurrence of this phenomenon will have a negative impact on all members of the supply chain. To eliminate or contain this phenomenon, within the scope of the supply chain, we can take appropriate countermeasures, such as to strengthen information sharing, shorten the delay time, coordinate purchasing and simplify marketing behavior and so on.

3.2 The development of information technology enhances internal collaboration in the supply chain

The development of information technology makes enterprises more accessible to use information technology to exchange and collaborate with other members of and supply chain, therefore the use costs relatively lower, so that enterprises can choose more supplies to get cheaper supply and services in the same level of information use costs. In other words, the relationship between enterprises and their suppliers will likely become unreliable and unstable, but the number of suppliers which successful enterprises choose don't increase, but reduce. In fact, "between enterprises and their suppliers and customers, it is necessary to establish a collaborative relationship" that it has a clear requirement in the JIT, it just has not been given sufficient attention.

3.3 The development of information technology can help to build a more perfect user demand model

The end-user is an important component of the supply chain, the response situation to customer demand is a very important supply chain management evaluation. Better grasping the demands of users is the basis of supply chain management. Many articles used similar assumption for a variety of needs and distribution, but demand is random, its release is not as ideal as we generally assumed. Therefore, it is necessary to consider the demand forecast in the supply chain inventory

control problems, choose different model according to different circumstances, establish an appropriate demand model.

4   Information Technology Support System of Supply Chain Management

The establishment of the supply chain information systems needs a large number of information technology to support, we discuss information technology support system in the forming of supply chain management from the main areas of supply chain management.

The main areas of supply chain management involved: products (services) design, manufacturing, marketing, customer service, logistics and so on. It is a synchronized, integrated production plan as a guide, through use different types of information technology to improve the performance in these areas (see figure 2).

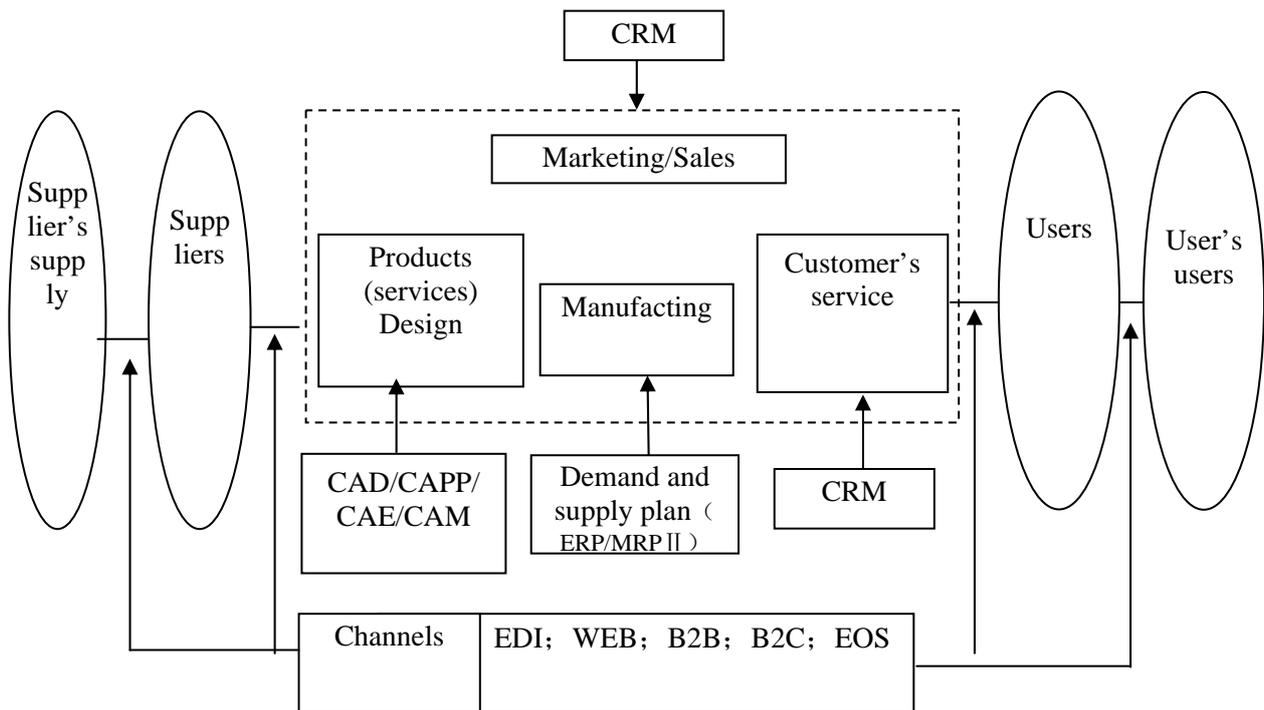Information technology to support the supply chain can be divided into two levels.

Fig.2 application of information technology in the supply chain management

4.1 The first level

The first level is component with technology of identification code, automatic identification and data collection technology, electronic data interchange technology, Information technology on the basis of Internet technology.

4.1.1 Technology of Identification Codes

A unified information coding is the basis of the exchange and sharing of data among supply chain trading partners. Without it, automatic identification technology and electronic data interchange (EDI) can not be realized. Through standardization technology of information coding applied to the supply chain management system, it is realized that automated data collection in the activities of supply chain systems   and exchange of data and sharing of

resources between systems. It can promote the efficient functioning of the supply chain activities.

4.1.2 Automatic Identification and Data Collection Technology

Automatic identification and data collection (AIDC) has become the ideal technology of dealing with the logistics information in process to supply chain management. Through automatic identification technology, automatic data identification and data collection, it is ensured that High-speed and accurate data acquisition and real-time control in the links of supply chain. At present, in the supply chain management, the most commonly AIDC technology is barcode technology and radio frequency identification technology. Barcode technology can facilitate the timely capture the needs of the consumer, improve sales results, as take place

immediately automatic retrieval of information in the activities. Barcode alternative keyboard input and improve the accuracy of data collection, the application of technology solve the "bottleneck" problems of the data entry and data collection.

Radio Frequency Identification (RFID) technology is a relatively new automatic identification technology. RFID technology can be characterized as non-contact identification (identification distance from a few centimeters to tens of meters), identification of high-speed moving objects, resistance of harsh environment, secrecy, it can also identify a number of identified targets, therefore widely used in the manufacturing and other unfit barcode labels environment. In the supply chain process control, it was widely used transport vichoel identification (AVI), tracking and monitoring goods, shop alarm systems, expressway toll and intelligent transportation system (ITS), production line automation and process control as well.

4.1.3 Electronic Data Interchange (EDI)

EDI technology is method that transmit and exchange data between different enterprises in order to improve the efficiency of business activities on the basis of standardized data through computer networks. EDI is a essential technology of Replenishment methods of rapid response (QR), Efficient Consumer Response (ECR). At present, almost all of the supply chain management methods of operation without the support of EDI technology. the main functions of EDI performance electronic data transmission and exchange, evidence for transmission data, instruments standard format for data conversion, security, and providing information inquiries, providing technical advisory services, providing the value-added information services. Global 500 biggest enterprises which are selected by the American Fortune magazine have applied their EDI systems with major customers and suppliers to exchange business information.

4.1.4 Internet Technology

The development of Internet technology supplies a the basis tool of relatively, quick and cheap for members of the supply chain to share and exchange information. With development and mature of wireless Internet technology, the members of supply chain can not be restricted to commercial space activities.

4.2 The Second Level

The second level is component with various information systems and application software which are developed to support production and various aspects of the management on the basis of information technology infrastructure. When integrated and applicate systems, they not only will be considered to be a technical solution, but also a deep refraction of management thinking should be understand.

4.2.1 Point of Sale System(POS)

POS is system through automated retrieval equipment (cash register) in the direct sale of merchandise sales information retrieval, and then through communication networks and computer systems transmitted to the relevant authorities for analysis to enhance the operating efficiency of the processing.

4.2.2 Electronic Automatic Ordering System (EOS)

EOS refers to use the communication network (VAN or Internet) and the terminal equipment by the means of on-line (ON-LINE) to carry out orders and the exchange of orders information. Compared with traditional methods of ordering, the EOS system can shorten the time from receiving orders to send orders, shorten the delivery time for goods of orders, reduce to the loss rate of merchandise orders; helps to reduce the inventory level of enterprise, improves the efficiency of inventory management; For manufacturers and wholesalers, retailers, through the analysis of orders information of retailers, it can be accurately judged selling merchandise and unsalable merchandise, and helps adjust plans of commodity production and marketing.

4.2.3 Computer Aided Design (CAD) and Computer-Aided Process Planning (CAPP). Computer Aided Engineering (CAE) and computer-aided manufacturing (CAM)

CAD/CAPP/CAE/CAM technology used mainly to support new products design and manufacturing. With the development of PDM (product data management), to effectively establish the integration of information between CAD, CAPP, CAE, CAM, and realize correct and rapid exchange of data among firms of supply chain, to further speed up product development cycle and lower costs.

4.2.4 Enterprise Resource Planning (ERP), manufacturing resource planning II (MRPII), Just in Time (JIT)

ERP/ MRPII/ JIT is mainly used in production control and inventory control. Of course, the scope of ERP is more broader, it reflects the ideas of supply chain management that expand its application to

other types industries from traditional manufacturing industries. Application of ERP/ MRPII/ JIT techniques can eliminate a variety complex issues in manufacturing, promoting changes of business processes, information processes and the organizational structure, improve the flexibility of enterprise production and the entire supply chain. guarantee the normal operation of the production and supply chain.

4.2.5 Customer Relationship Management (CRM)
Customer Relationship Management (CRM) refers to constantly accumulated customer information in the process of a enterprise's operation, and meet individual customer needs by the use of customer information to make marketing strategies. the most important function modules of CRM are customer services, marketing, sales. Through apply CRM to the sharing of information between enterprises, it can enhance services between the enterprises in the supply chain, improve customer satisfaction, maintain high customer retention, develop a positive impact to customer benefits and potential benefits.

4.2.6 E-commerce
E-commerce refers to complete business transaction between the various participants in electronic form, but not by physical exchange or direct physical contact, It includes electronic data interchange (EDI), electronic means of payment, electronic ordering systems, e-mail, fax, Internet, electronic bulletin systems, bar-coding, image processing, intelligent cards and so on. In supply chain management, E-commerce generally have two types: business-to-business (B2B) and business-to-consumer (B2C). E-commerce system improve the operational efficiency of the supply chain management of enterprises in supply management, inventory management, transportation management and information circulation.

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