

Study on supply chain workflow based on grid

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Abstract—As society enters the Internet era, it affects models and competitive environment of companies. Under the global environment of E-commerce, the traditional supply chain management has not fully adapted to business activities in the era of grid which is coming, and new model of supply chain management emerges. In this paper, it focuses on the characteristics of grid, states how to make e-supply chain more effective and how to play a role well in corporation management, and provides solutions and technical supporting to supply chain management through e-commerce. Then it makes a forecast on the future of the electronic supply chain management, paving the way for the companies to adapt to the new era.

Index Terms—grid, supply chain management, e-commerce, workflow

I. INTRODUCTION

In the 90s, e-commerce has extended from EDI, online shopping, e-mail to the financial and securities industry, and became a kind of network technology applications. It is changing the operating model of enterprise business activities unbelievably. E-commerce is no longer optional. E-elements have infiltrated every corner of society, which attracts the attention of enterprises[1].

Supply chain is the source of the competitiveness of enterprises. The traditional supply chain management is no longer applicable to such a complex competitive environment, and enterprises strengthen the core competitiveness of enterprises through partners' advantages. In the new situation, to accelerate integration with e-commerce and supply chain management can make supply chain management play an unprecedented network economic effects in enterprise's operation.

Early in 2001, "Forbes" magazine predicts the essential character of the next wave of information technology is that the World Wide Web will upgrade to the grid, resulting in a large value of 20 trillion industry. Grid will be able to realize all the resources on the Internet, including computing resources, storage resources, communication resources, software resources, information resources and knowledge resources, which can provide a good environment of network to better achieve the electronic supply chain for the enterprises, and eventually be able to make network virtual environment work together, and eliminate information islands and island resources. The emergence of the network will not be the eradication of the supply chain business processes, but change the business way.

II. THE EXISTING INADEQUACIES OF SUPPLY CHAIN MANAGEMENT

The traditional supply chain is linear array in the structure, and is usually centered on trade transactions. Because of the linear array in supply chain, some suppliers may be far away from the terminal customers. For these enterprises, cooperative value chain is constitute of visibility. In the past, it may cost several days, several weeks or even several months to complete a flow in a whole supply chain, and there may be a lot of errors and omissions. But now, the supply chain is a network in the structure, and suppliers can be action to the demand of terminal customers at nearly the same time, making the supply chain a better synergy and efficiency and reduce bullwhip effect.

In China, supply chain management is very immature both in theory and practice. Enterprises are excessively pursuit of vertical integration, creating a market slow to react, the high cost of the internal organization of enterprises, the market risk. Enterprises in the upstream and downstream of supply chain are lack of trust with each other, and they are mutual independent, which results in increasing transaction costs, affecting market competitiveness of the final product seriously[2].

III. BUILDING ESCM IN THE ERA OF GRID

A. The development of supply chain architecture

Supply chain management takes synchronization, integrated production planning as a guide, a variety of technologies as supporting, and is based on Internet and Intranet. It focuses on the implementation of sales forecasting, procurement, inventory management, manufacturing, order management, logistics, distribution and customer satisfaction degrees, etc. to raise customer service level and reduce transaction costs and to seek a balance between this two objectives. And supply chain management in the background of e-commerce is based on information technology in the enterprise applications to respond to customer needs and change more flexibility for the enterprises, in order to control Bullwhip Effect, and significantly reduce supply chain operating costs, which makes the operation model of the supply chain transform from "push" to "pull".

Supply chain network forms in the internal of the enterprises, and then because of the needs of the market and in the help of e-commerce, it expands to external constantly, and ultimately develops into a seamless network[3].

B. Supply chain relationship between enterprises based on grid

Enterprises are seen as the core of the supply chain, they keep touch with suppliers upstream and customers

downstream in the supply chain closely. In the era of grid, they take advantage of e-commerce information technology and grid technology to build a smooth, real-time information sharing channels, realizing the whole supply chain management. The following Fig.1 is the whole supply chain workflow.

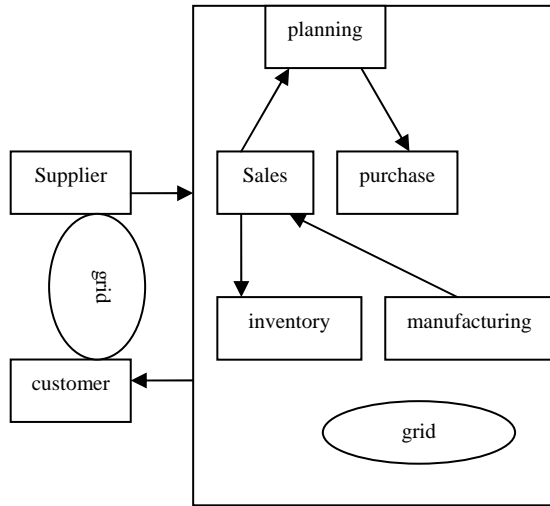


Figure 1. The whole supply chain workflow based on grid

C. Internal of enterprise supply chain integration workflow based on grid

1) Planning workflow

It takes advantage of e-commerce technology and grid technology to achieve real-time information sharing and integrated management between suppliers and the various departments in the enterprises, make their process automation, and provide services for managers to plan and make decisions with the real-time information. The following Fig.2 is planing of workflow of the supply chain based on grid.

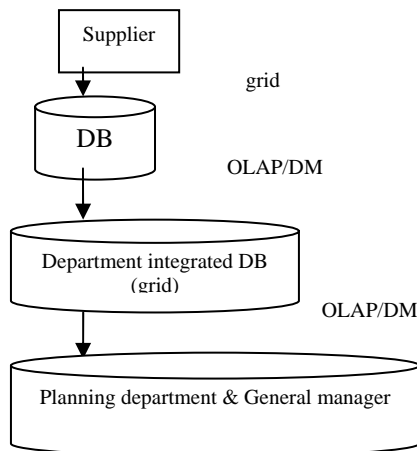


Figure 2. Supply chain planing workflow based on grid

2) Purchasing workflow

It focuses on two main stages of purchasing, which means purchasing requirement and actual operation of the purchasaing. Through e-commerce information technology

and grid technology, it implements the automation and e-purchasing of purchasing needs to reduce the manual operation, which brings about the purchasing cost. Fig. 3 is supply chain purchasing workflow based on grid[4].

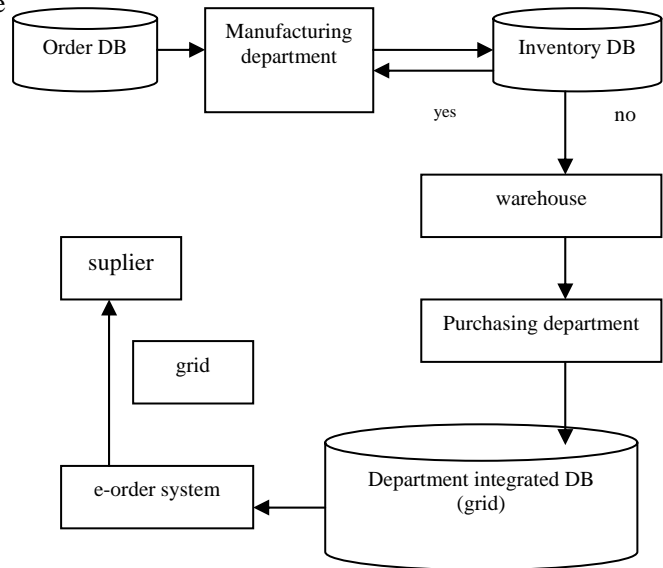


Figure 3. Supply chain purchasing workflow based on grid

3) Manufacturing workflow

It focuses on manufacturing flow, ties together with manufacturing department, sales department and warehouse, taking advantage of e-commerce information technology and grid technology to implement automation and electronic of their business processes and real-time sharing of their information. And it makes forecasting on changing of customer orders, coordinates inventory levels of inventory department to, makes manufacturing planning with manufacturing department, and accesses to manufacturing planning with the use of Intranet for all departments. Fig.4 is the supply chain manufacturing workflow based on grid.

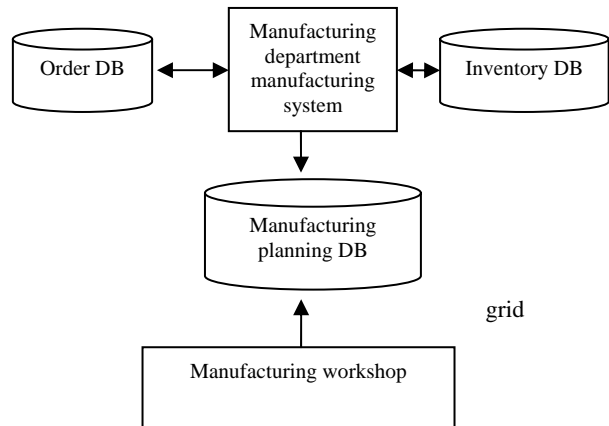


Figure 4. Supply chain manufacturing workflow based on grid

4) Distribution and the return flow workflow

It shares the order information among customers In the company's distribution department and sales department, and makes business process automation between distribution and warehouse department provide transport information inquiries to customers, and deal with

logistics arrangements among sales agents, sales offices and terminal customers and the information inquiries of goods in the road. Goods returning workflow is for the reverse flow of delivery workflow. Fig. 5 is delivery workflow and goods returning workflow of supply chain based on grid[5].

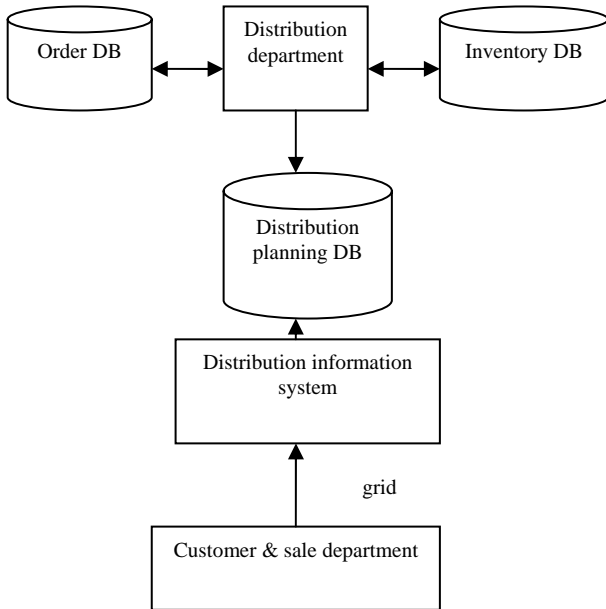


Figure 5. Delivery workflow and goods returning workflow of supply chain based on grid

D. Workflow integration of external of enterprises based on grid and departmental grid

It implements real-time sharing of information which enterprises need, which means the suppliers can be able to know the enterprises' order demand information at any time, as well as consumption rate from raw material to product. It brings about automation adding of inventory levels and electronic payment to eliminate credit payment which enterprises occupy a lot of money in. In addition to taking advantage of e-commerce information technology and grid technology to achieve resources sharing between every aspects of supply chain, enterprises should also take advantage of departmental grid technology to access to their external suppliers, calling resources and sharing them, speeding up data transmission and updating, which draws closer between every aspects of the supply chain and improves the visibility between them. Fig.6 expresses workflow between core enterprises and the suppliers based on grid and departmental grid.

E. Grid-based supply chain workflow advantages

1) The realization of supply chain data visualization..

It can achieve data visualization between enterprises and suppliers and it can implement electronic information flow and fund flow between core enterprises and suppliers and control and supervise logistics and business flow through real-time information sharing, which can effectively solve the supply problem.

It can implement data visualization of enterprise and customers. Today, with the operation philosophy which is centered in customers, the data visualization between enterprises and customers plays an important role in planning implementing and market competition. E-commerce technology can help enterprises implement electronic and automation with customers and help enterprises analyze customers purchasing behavior and predict customer demanding, so as to provide the necessary data to them[6].

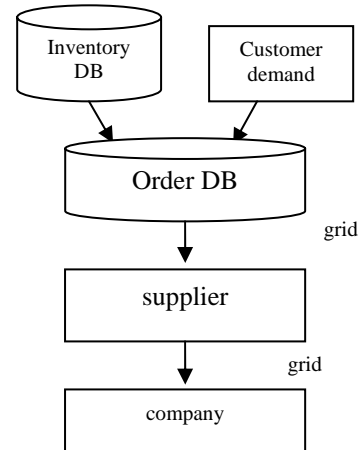


Figure 6. Workflow between core enterprises and the suppliers based on grid and departmental grid

It can implement data visualization between enterprises and third-party logistics enterprises. Today, logistics business is outsourced to third-party logistics enterprises. E-commerce technology can help enterprises realize electronic and automation of business data for a third-party logistics enterprises.

2) Collection and fault of Information

The more function of E-commerce information technology is to collect and analyze data through sharing real-time, integrated management of information, database mine and discovery more valuable information from the supply chain which is good to members of the supply chain and decision-making, and then share the information among the members of supply chain.

3) To promote the Rapid Response of the supply chain members

Data visualization and information-sharing among members of supply chain among will inevitably make the whole supply chain respond quickly to market changes, which can make enterprises take actions earlier than their opponents in fiercely competitive market[7].

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IV. TECHNOLOGY FEATURES OF G-SCM OF GRID PLATFORM

A. Isomerism

Grid is made up by a variety of Internet distributed resources. The resources are distributed and the nature of resources is not the same, so that the resources are heterogeneous.

B. Adaptability

Grid resources is not unchangable but is on the dynamic changing, and its availability, performance, access policies and other factors are changing always. Therefore, in organizations, the deployment of resources is also dynamic, which can add or withdraw to it at any time according to necessity[9].

C. Common sharing

The fundamental characteristic of the network is resources sharing. Even though the grid resources are distributed, but they really can be fully shared. Distribution is the physical characteristic on the grid hardware, and sharing is the the logic characteristic under the support of grid software.

V. CONCLUSION

In the formulation of corporate strategy program, many enterprises have realized the importance of combining with the supply chain management and e-commerce technology and network technology, and take measures to make preparation for it., which means the enterprises must look for supply chain partners who have e-commerce capacity which is sophisticated enough to build a network of solutions. under the era of Electronic and digital economy.

In the future, any enterprise who wants to succeed have to collaborate with their partners throughout the whole supply chain network and ensures that they can make rapid and accurate response to customers requiring. The winners are those that connecting each other in the supply chain network and sharing resources with each other in a collaborative manner.

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