

Study on Mode of Material Supply Management in Coal Enterprises Based on E-Commerce

HOU Yan-hui ¹⁺, WANG Wei ², HAO Min ¹ and BI He-de ³

¹ College of Economic and Management, Shandong University of Science and Technology, Qingdao, P. R. China

² President's Office, Shandong University of Science and Technology, Qingdao, P. R. China

³ Wanfu Coal Mine Production Technology Division, Yanzhou Coal Mine Company Limited, Heze, P. R. China

Abstract. The emergence and development of E-Commerce brings new challenges and opportunities to the material supply management. In this paper, the necessity and feasibility of applying E-Commerce in the material supply management of coal enterprises were discussed. Based on the characteristics of the supply chain and the material supply management in the network era, the material supply chain in the coal mine group was divided into internal chain and the external chain and a specific implementing plan was given. Finally, a new system model of material supply management based on the E-Commerce was established.

Keywords: e-commerce, supply chain, material supply.

1. Introduction

The substance of E-Commerce is electrical commercial trade behaviour based on the network, in particular the Internet. Using Internet technology, E-Commerce integrates the enterprise, the user, the supplier and other links needed by business and trade into the existing information system. E-Commerce also brings the trade activity into net by the unprecedented way and completely changes the existing operation way and the process. Facing the network era's challenge, the widespread application and the vigorous development of E-Commerce in all the various trades and occupations, as to material supply management, an important part of coal-mining group's supply chain management, what course to follow is a problem worth of discussing.

It is well known that supply chain is a commercial circulation system that influences an enterprise's livelihood. As one of an important part of enterprise's supply chain management, the material supply management system has the pivotal status during the informatization of enterprise. Based on the characteristics and development situation of E-Commerce, regarding realities of the coal industry, a new pattern of executing material supply management for the coal industry based on E-Commerce was discussed in this study.

2. The Necessity of Developing E-Commerce for Material Supply Management

2.1. Necessity of business development for materials supplying sector

There are many advantages of developing E-Commerce for material supply management. The main points are as follows:

2.1.1 It's beneficial to expanding the purchasing choice spaces and reducing the purchase costs

⁺ Corresponding author. Tel.: + 0532 88032095.
E-mail address: coolhyh@126.com.

After the construction of E-Commerce website, enterprises can compose a strategic alliance with the suppliers of upper supply chain based on Internet and grasp the information of suppliers. With the growth of the number of registered suppliers, not only purchasers but also users can choose the products which are high-quality and low-cost and the considerate services as well, they will have more information and a broader space of product selection, unceasingly reduce purchase costs. It is indeed true that "shop around, price three."

2.1.2. It's beneficial to improving the efficiency of purchase

By tracking logistics, capital flow, business flow and information flow in the purchase process, purchasers can control the whole process of purchase and master the progress of purchase. At the same time, according to the business data accumulated, purchasers can also evaluate and analyze the purchase activities, optimize purchase processes, streamline the purchase process and shorten the purchase time. Compared with the original manual labour, purchase efficiency can be significantly increased.

2.2. Necessity of openness in the purchase of materials

Although a lot of enterprises formulated many systems and took a lot of measures to strengthen supervision and management in the actual purchase process, they still can not eradicate the corruption phenomena fundamentally. The reason is that, because of the economic interests, material suppliers depend on human relations and other improper means such as treat and gifts to promote sale. There are many human factors in the supply management system of many enterprises. Consequently, corrupt phenomenon cans often appear. However, the computer can only work according to the procedures fixed in advance and can not be influenced by emotion and personal factors. Therefore, the establishment and development of E-Commerce system which based on computer quotation and inquiry is a fundamental change of material supply management. It will help enhancing openness in purchase and establishing material supply system which is fair-and-square, impartial and open.

3. Feasibility of Implementing E-Commerce in Material Supply Management

3.1. Application level of computer and network in material supply departments is high

3.1.1. A huge amount of data information resources has been accumulated

After the exploration and use of various kinds of material supply management information systems, many coal enterprises had accumulated large amounts of data, which were first-hand information recording production and business process of each department. Transplantation of these data can provide the E-Commerce systems with the raw data, maintain the continuity and consistency. In the new material supply management system, through statistical analysis of historical data with use of DSS technology such as data warehouse and data mining, enterprises can carry out evaluation and forecast of the material supply management and provide technical support for managers.

3.1.2. The hardware and software resources of computer and network were continuously enriched

Most of the state-owned large-scale coal enterprises established the LAN which covers entire scope of enterprises, the software and hardware equipments, facilities of LAN in some enterprises had achieved quite advanced level. Most of departments were equipped with computers and many kinds of terminal device. The achievements of enterprise informatization had laid a solid material base for the implementation of E-Commerce.

3.2. Construction of informatization got significant results and personnel's concepts changed greatly

In many coal enterprises, the software and hardware of network system improved continually, application range expanded unceasingly. The information technology is widely used in the fields of production, office and management, the contribution which information technologies made in development of enterprises grew greatly. For example, the implementation of OA system changes the working pattern from the completely manual to automatic. Through e-mail exchanges and the sharing of network resources, personnel can improve working efficiency and save more time; Finance sections transmitted the statistical report and the data, through the Internet, directly to the higher authorities.

4. Basic pattern of E-Commerce of material supply management in coal enterprises

As most of coal enterprises had implemented ERP or MRP to realize overall management of logistics, information flow and funds, the new E-Commerce system should be integrated with the existing information system to share data.

4.1. External chain

Seeing from the supply chain, there are always two directions in an enterprise's E-Commerce system: enterprises to upstream-suppliers named B to B, and enterprises to downstream-customers named B to C. As for coal enterprises, the material supply departments generally have not external sales, so they have not downstream -customers, that is to say the supply chain is unidirectional. But generally speaking, materials departments have both suppliers and customers -- the grass-roots units. In view of this, the supply chain of coal enterprises is divided into the internal chain and the external chain. Its logical model is shown as figure 1.

External chain is designed to solve such problems of traditional material supply management based on E-Commerce model as manufacturers' information management, purchases management and contracts management, to achieve the goal of involving online bidding, optimizing manufacturer, lower purchase costs and shortening purchase cycle. This is the main access links material supply sectors with external suppliers. Materials supply sectors publishes material demand information through commercial website, including the material names, specifications, quantities and quality requirements. According to the information, providers can give their offering and providing time through the Internet. Given consideration of many factors, such as the reputation, prices and quality of suppliers, buyers can confirm their suppliers and inform them to sign the contracts through the network, finally check the cargo and complete the purchase process.

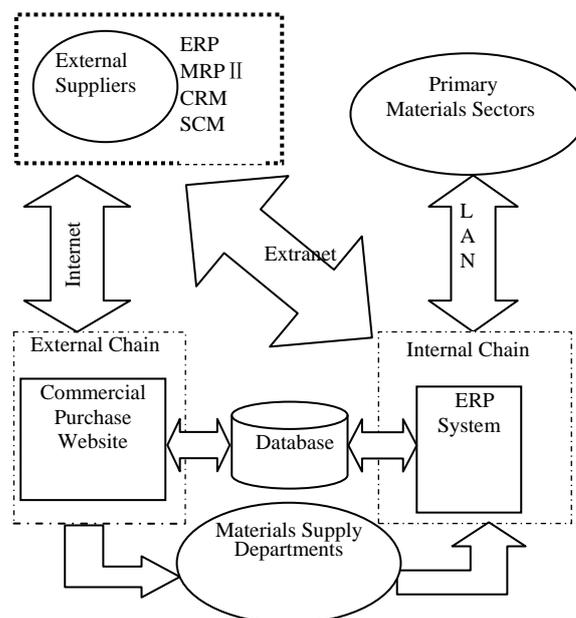


Fig. 1: Logical Model of E-C System

As for the suppliers who have established the strategic alliance relations based on supply chain with coal enterprises, they may establish secure Extranet through VPN technology and so on, integrate function and data of their information system together, for example ERP, CRM, SCM. Finally, resources sharing and strategic cooperation of higher level can be achieved. Based on BPR, some changes of external chain can be made to achieve electronic-collaborative purchase. The essence of the electronic-collaborative purchase based on the supply chain lies in two collaborations:

4.1.1. Collaboration of purchase plans

Materials supply departments issued their recent purchase plans through network to their upstream suppliers. The materials supply departments' purchase orders automatically switch to the supplier's sales orders. According to these orders, suppliers make scheduling and stocking, the velocity of delivery is speeded up. There is strategic and cooperative partnership between the supplier and demander. The certification, product quality and credit of suppliers are credible, they can omit the quotations and the quality supervision to improve the efficiency.

4.1.2. Collaboration of implementing purchase orders

Materials supply departments issue purchase orders to their suppliers via the Internet. Suppliers convey the implementation situation of the orders timely. So materials supply departments can grasp the implementation of orders and make adjustments timely.

Seeing from the angle of information processing and communication technology, operation of external chain mainly relies on Internet, so problems, including the security, secrecy and integrity of data, the ability of withstanding network attack and destruction and so on, needs to be solved properly. Seeing from the angle of commercial operation, these problems, including optimization of supply chain, total management of suppliers, purchase process reengineering and so on, needs to be emphasized.

4.2. Internal chain

The internal chain is the primary channels used for the exchange of information between materials supply departments and internal units. It is usually presented by MRP or ERP system. This paper took SAP R/3 MM for example, which is representative, to introduce the function model and the structure of internal chain. The function structure of SAP R/3 MM is shown in figure 2.

4.2.1. Material requirement plan

Through the purchase and warehouse/stock system, the MM system can provide basic data of the material requirement plan. The material requirement plan based on consumption data generate purchase plan based on the re-order level principle and forecast. Other demands are recorded in the form of purchase application and assigned to the corresponding purchase personnel. This process determined the appropriate quantity of order and the suitable service level.

4.2.2. Purchase

The purchase unit has formidable function which can optimize all the related processions, including the formation of purchase application, long-term purchase agreement and printing purchase order. In the purchase process, the order is formed according to the existing quotation or demanders send out the quotation application firstly. To some degree, purchase orders are formed automatically according to the existing data. In addition, the system can supply the related information for the appraisal, choosing the supplier and monitoring the activities of orders.

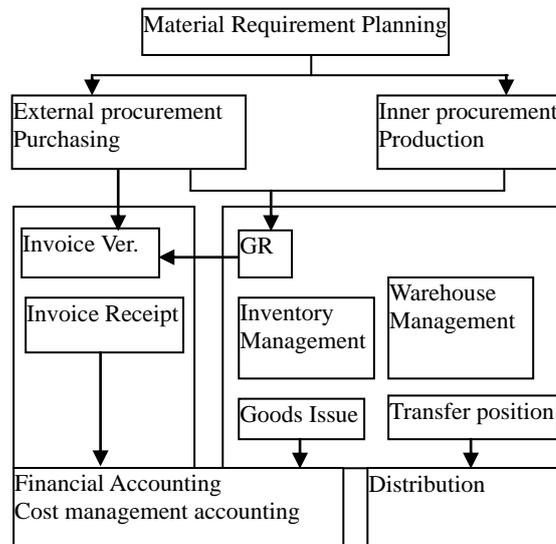


Fig. 2: Function structure of SAP R/3 MM

4.2.3. Stock management

This unit includes such related stock processing as accepting goods, rejecting goods, stock cancelling, stock transferring, reserving and adjusting. Recording these data in real time can ensure instant renewal and accuracy. This is the precondition to draw up an accurate material plan.

4.2.4. Accepting goods

In the process of accepting goods, all related data is obtained from the purchase order. System update stock amount according to the amount of delivery. The renewal of stock value is made by an automatic subject definition.

4.2.5. Warehouse management

The warehouse management can define and manage complicated warehouse framework and divide warehouse into different physical or logical units, for example, high frame area and stocking area.

4.2.6. Logistic information system

The logistic information system supports strategy decision by providing various kinds of analysis.

Thinking from the angle of realization technology, the internal chain operation depends on LAN of enterprise, so the problems, including speed and stability of network, the function and service quality of ERP, the security and stability of database, the personnel's ability of operating information system and so on, are prominent. Thinking from angle of process handling, the problems, including perfection of material provisioning system, the optimization and reengineering of business process is the really needed.

5. References

- [1] Ding Baocheng, Shen Yuzhi. Designing of the material supply management based on E-Commerce. Journal of Liaoning university of engineering and technology, 2002, 4: 242~244
- [2] Li Hui, Ding Guannan. The application of E-Commerce in material supply system of smelting and chemistry. Automation of petroleum chemical engineering, 2002, 4: 73~76
- [3] Gu Xiaowei. Discussion of the basic mode of material supply management based on E-Commerce. Economist, 2005, 1: 294